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Chapter 9. Tables

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Code-Making Panel 1
Articles 90, 100, 110, Annex A, Annex G

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Code-Making Panel 2
Articles 210, 215, 220, Annex D
Chapter 9 Examples 1 through 6

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Code-Making Panel 3
Articles 300, 590, 720, 725, 727, 760, Chapter 9, Tables 11(A) and (B), and Tables 12(A) and (B)

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Code-Making Panel 4
Articles 225, 230

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Code-Making Panel 5
Articles 200, 250, 280, 285

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Code-Making Panel 6
Articles 310, 400, 402, Chapter 9 Tables 5 through 9, and Annex B

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Code-Making Panel 7
Articles 320 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 382, 394, 396, 398

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Code-Making Panel 8
Articles 342, 344, 348, 350, 352, 353, 354, 356, 358, 360, 362, 366, 368, 370, 372, 374, 376, 378, 380, 384, 386, 388, 390, 392
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Code-Making Panel 9
Articles 312, 314, 404, 408, 450, 490

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Code-Making Panel 10
Articles 240, 780

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Code-Making Panel 11
Articles 409, 430, 440, 460, 470, Annex D, Example D8

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Code-Making Panel 12
Articles 610, 620, 625, 630, 640, 645, 647, 650, 660, 665, 668, 669, 670, 685, Annex D, Examples D9 and D10

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Rep. Information Technology Industry Council
(VL to 640, 645, 647, 685)

Robert A Jones, Independent Electrical Contractors, Inc., TX [IM]

Andy Juhasz, Kone, Inc., IL [M]
Rep. National Elevator Industry Inc.
(VL to 610, 620, 630)

Todd Lottmann, Cooper Bussmann, MO [M]
Rep. National Electrical Manufacturers Association

Sam Marcovici, New York City Department of Buildings, NY [E]

John H Mortimer, Inductotherm Corporation, NJ [M]
(VL to 610, 630, 665, 668, 669)

Ralph C Prichard, Hercules Incorporated, DE [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.

David R Quave, IBEW Local Union 903, MS [L]
Rep. International Brotherhood of Electrical Workers

Craig Sato, Underwriters Laboratories Inc., CA [RT]

Arthur E Schlueter, Jr., A. E. Schlueter Pipe Organ Company, GA [M]
Rep. American Institute of Organ Builders
(VL to 640, 650)

Kenneth White, Olin Corporation, NY [U]
Rep. American Chemistry Council

Alternates

William E Anderson, The Procter & Gamble Company, OH [U]
(Alt. to Ralph C Prichard)

Jeffrey W Blain, Schindler Elevator Corporation, NY [M]
(VL to 610, 620, 630)
(Alt. to Andy Juhasz)

Thomas M Burke, Underwriters Laboratories Inc., CA [RT]
(Alt. to Craig Sato)

Jeffrey L Holmes, IBEW Local Union 1 JATC, MO [L]
(Alt. to David R Quave)

Tim McClintock, Wayne County, Ohio, OH [E]
(Alt. to Ron L Janikowski)

Roger D McDaniel, Georgia Power Company, GA [UT]
(Alt. to Timothy M Croushore)

Peter Pollak, The Aluminum Association, Inc., VA [M]
(VL to 610, 625, 630, 645, 660, 665, 668, 669, 685)
(Alt. to Kent B Givens)

Lori L Tennant, Square D Company/Schneider Electric, NC [M]
(Alt. to Todd Lottmann)

George S Tidden, George's Electrical Service Inc., TX [IM]
(Alt. to Robert A Jones)

Charles M Trout, Maron Electric Company, FL [IM]
(Alt. to Thomas L Hedges)

Robert C Turner, Oxford, MD [M]
(VL to 610, 630, 665, 668, 669)
(Alt. to John H Mortimer)

Nonvoting

Andre R Cartal, Yardley, PA [E]
(Member Emeritus)

Mark W Earley, NFPA Staff Liaison

Code-Making Panel 13
Articles 445, 455, 480, 690, 692, 695, 700, 701, 702, 705

Thomas H Wood, *Chair*
Cecil B. Wood Inc., IL [IM]
Rep. National Electrical Contractors Association

Tarry L Baker, Broward County Board of Rules & Appeals, FL [E]
Rep. International Association of Electrical Inspectors
Ward I Bower, Sandia National Laboratories, NM [U]
Rep. Solar Energy Industries Association
(VL to 690, 692, 705)
Douglas L L Elkins, ExxonMobil Chemical Company, TX [U]
Rep. American Chemistry Council
George W Flach, George W. Flach Consultant, Inc., LA [SE]
Ernest J Gallo, Telcordia Technologies, Inc., NJ [U]
Rep. Alliance for Telecommunications Industry Solutions
(VL to 445, 480, 690, 692)
Robert J Gustafson, Ohio State University, OH [U]
Rep. American Society of Agricultural & Biological Engineers
Banks Hattaway, Hattaway Brothers, Inc., AL [IM]
Rep. Associated Builders & Contractors, Inc.
Barry N Hornberger, PECO Energy Company, PA [UT]
Rep. Electric Light & Power Group/EEI
Kenneth Krastins, Plug Power, Inc., NY [M]
Rep. US Fuel Cell Council
(VL to 690, 692, 705)
James S Nasby, Master Control Systems, Inc., IL [M]
Rep. National Electrical Manufacturers Association
Steven H Pasternack, Intertek Testing Services NA, Inc., NY [RT]
Elliot Rappaport, Electro Technology Consultants, Inc., FL [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Duke W Schamel, Electrical Service Solutions, Inc., CO [IM]
Rep. Independent Electrical Contractors, Inc.
Todd W Stafford, National Joint Apprentice & Training Committee, TN [L]
Rep. International Brotherhood of Electrical Workers
Herbert V Whittall, Electrical Generating Systems Association, FL [M]
Timothy P Zgonena, Underwriters Laboratories Inc., IL [RT]

Alternates

Paul D Barnhart, Underwriters Laboratories Inc., NC [RT]
(Alt. to Timothy P Zgonena)
Daniel Batta, Jr., Constellation Power Source Generation, Inc., MD [UT]
(Alt. to Barry N Hornberger)
Ron B Chilton, North Carolina Department of Insurance, NC [E]
(Alt. to Tarry L Baker)
Larry D Cogburn, Cogburn Bros, Inc., FL [IM]
(Alt. to Thomas H Wood)
Brian L Crise, NIETC, OR [L]
(Alt. to Todd W Stafford)
Steven J Fredette, UTC Fuel Cells, LLC, CT [M]
(VL to 690, 692, 705)
(Alt. to Kenneth Krastins)
John P Goodsell, Hubbell Incorporated, CT [M]
(Alt. to James S Nasby)
Timothy D Holleman, AC Corporation, NC [IM]
(Alt. to Duke W Schamel)
Robert Swayne, P2S Engineering, Inc., CA [U]
(Alt. to Elliot Rappaport)
Dale A Triffo, Shell Oil Products US, TX [U]
(Alt. to Douglas L L Elkins)
Robert H Wills, Intergrid, LLC, NH [U]
(VL to 690, 692, 705)
(Alt. to Ward I Bower)

Nonvoting

David Mascarenhas, Canadian Standards Association, Canada [RT]

Mark W Earley, NFPA Staff Liaison

Code-Making Panel 14
Articles 500, 501, 502, 503, 504, 505, 506, 510, 511, 513, 514, 515, 516

Donald Cook, *Chair*
Shelby County Development Services, AL [E]
Rep. International Association of Electrical Inspectors

Troy Beall, B & D Industries, Inc., NM [IM]
Rep. National Electrical Contractors Association
Marc J Bernsen, IBEW Local Union 291, ID [L]
Rep. International Brotherhood of Electrical Workers
Edward M Briesch, Underwriters Laboratories Inc., IL [RT]
James D Cospolich, Waldemar S. Nelson & Company Inc., LA [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Mark Goodman, Jacobs Engineering Group, CA [U]
Rep. American Petroleum Institute
Gregory D Hall, Better-Way Electric, Inc., CO [IM]
Rep. Independent Electrical Contractors, Inc.
Joseph H Kuczka, Killark Electric Manufacturing Company, MO [M]
Rep. National Electrical Manufacturers Association
William G Lawrence, Jr., FM Global, MA [I]
L. Evans Massey, Rockwell Automation, SC [M]
Rep. Instrumentation, Systems, & Automation Society
Jeremy Neagle, Intertek ETL SEMKO, NY [RT]
Mike O'Meara, Arizona Public Service Company, AZ [UT]
Rep. Electric Light & Power Group/EEI
David B Wechsler, The Dow Chemical Company, TX [U]
Rep. American Chemistry Council
Mark C Wirfs, R & W Engineering, Inc., OR [U]
Rep. Grain Elevator and Processing Society

Alternates

Donald W Ankele, Underwriters Laboratories Inc., IL [RT]
(Alt. to Edward M Briesch)
A. W Ballard, Crouse-Hinds , NY [M]
(Alt. to Joseph H Kuczka)
Mark W Bonk, Cargill Incorporated, MN [U]
(Alt. to Mark C Wirfs)
Dave Burns, Shell Exploration & Production Company, LA [U]
(Alt. to Mark Goodman)
Larry E Fuhrman, City of Titusville, FL [E]
(Alt. to Donald Cook)
Richard A Holub, E. I. DuPont de Nemours & Company, Inc., DE [U]
(Alt. to David B Wechsler)
Nicholas P Ludlam, FM Global, United Kingdom [I]
(Alt. to William G Lawrence, Jr.)
Christopher P. O'Neil, NSTAR Electric & Gas Corporation, MA [UT]
(Alt. to Mike O'Meara)
Ted H Schnaare, Rosemount Incorporated, MN [M]
(Alt. to L. Evans Massey)
John L Simmons, Florida East Coast JATC, FL [L]
(Alt. to Marc J Bernsen)
Donald W Zipse, Zipse Electrical Engineering Inc., PA [U]
(Alt. to James D Cospolich)

Nonvoting

Timothy J Pope, Canadian Standards Association, Canada [RT]
Eduardo N Solano, Estudio Ingeniero Solano S.A., Argentina [SE]
Fred K Walker, US Department of the Air Force, FL [U]
Rep. TC on Airport Facilities

Mark W Earley, NFPA Staff Liaison

Code-Making Panel 15
Articles 517, 518, 520, 525, 530, 540

Donald J Talka, *Chair*
Underwriters Laboratories Inc., NY [RT]

James R Duncan, Sparling Electrical Engineering & Technology Consulting, WA [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Ronald E Duren, PacifiCorp, WA [UT]
Rep. Electric Light & Power Group/EEI
Douglas S Erickson, American Society for Healthcare Engineering, VI [U]
Mitchell K Hefter, Entertainment Technology/Genlyte, TX [IM]
Rep. Illuminating Engineering Society of North America
(VL to 518, 520, 525, 530, 540)
Kim Jones, Funtastic Shows, OR [U]
Rep. Outdoor Amusement Business Association, Inc.
(VL to 525)
Edwin S Kramer, Radio City Music Hall, NY [L]
Rep. International Alliance of Theatrical Stage Employees
(VL to 518, 520, 525, 530, 540)
Larry Lau, US Department of Veterans Affairs, DC [U]
(VL to 517, 518)
Dennis W Marshall, TAG Electric Companies, TX [IM]
Rep. Independent Electrical Contractors, Inc.
Eugene E Morgan, County of Clackamas, Oregon, OR [E]
Rep. International Association of Electrical Inspectors
Hugh O Nash, Jr., Nash Lipsey Burch, LLC, TN [SE]
Rep. TC on Electrical Systems
Bruce D Shelly, Shelly Electric Company, Inc., PA [IM]
Rep. National Electrical Contractors Association
Michael D Skinner, CBS Studio Center, CA [U]
Rep. Alliance of Motion Picture and Television Producers
(VL to 518, 520, 525, 530, 540)
Kenneth E Vannice, Leviton Manufacturing Company Inc., OR [M]
Rep. US Institute for Theatre Technology
(VL to 518, 520, 525, 530, 540)
Michael Velvikis, High Voltage Maintenance Corporation, WI [IM]
Rep. InterNational Electrical Testing Association
Andrew White, IBEW Local Union 3, NY [L]
Rep. International Brotherhood of Electrical Workers
James L. Wiseman, Square D Company/Schneider Electric, TN [M]
Rep. National Electrical Manufacturers Association

Alternates

James L Brown, Detroit Edison, DTE Energy, MI [UT]
(Alt. to Ronald E Duren)
Matthew B Dozier, IDesign Services, TN [U]
(Alt. to James R Duncan)
Samuel B Friedman, General Cable Corporation, RI [M]
(Alt. to James L. Wiseman)
Stephen M Lipster, The Electrical Trades Center, OH [L]
(Alt. to Andrew White)
Joseph P Murnane, Jr., Underwriters Laboratories Inc., NY [RT]
(Alt. to Donald J Talka)
Marcus R Sampson, Minnesota Department of Labor & Industry, MN [E]
(Alt. to Eugene E Morgan)
James C Seabury, III, Enterprise Electric, LLC, TN [IM]
(Alt. to Dennis W Marshall)
Steven R Terry, Electronic Theatre Controls Inc., NY [M]
(VL to 518, 520, 525, 530, 540)
(Alt. to Kenneth E Vannice)

Mark W Earley, NFPA Staff Liaison

Code-Making Panel 16
Articles 770, 800, 810, 820, 830

S. D Kahn, *Chair*
Tri-City Electric Company, Inc., CA [IM]
Rep. National Electrical Contractors Association

J. Robert Boyer, GE Infrastructure, Security, NJ [M]
Rep. National Electrical Manufacturers Association
James E Brunssen, Telcordia, NJ [U]
Rep. Alliance for Telecommunications Industry Solutions
Larry Chan, City of New Orleans, LA [E]
Rep. International Association of Electrical Inspectors
Gerald Lee Dorna, Belden Wire & Cable, IN [M]
Rep. Insulated Cable Engineers Association Inc
Roland W Gubisch, Intertek Testing Services NA, Inc., MA [RT]
Robert L Hughes, The DuPont Company, GA [U]
Rep. American Chemistry Council
Robert W Jensen, dbi-Telecommunication Infrastructure Design, TX [M]
Rep. Building Industry Consulting Services International
Steven C Johnson, Time Warner Cable, NC [UT]
Rep. National Cable & Telecommunications Association
Ronald G Jones, Ronald G. Jones, P.E., TX [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Harold C Ohde, IBEW-NECA Technical Institute, IL [L]
Rep. International Brotherhood of Electrical Workers
Luigi G Prezioso, M. C. Dean, Inc., VA [IM]
Rep. Independent Electrical Contractors, Inc.
James W Romlein, MV Labs LLC, WI [M]
Rep. Telecommunications Industry Association
Susan L Stene, Underwriters Laboratories Inc., CA [RT]
Kyle E Todd, Entergy Corporation, TX [UT]
Rep. Electric Light & Power Group/EEI

Alternates

Terry C Coleman, National Joint Apprentice & Training Committee, TN [L]
(Alt. to Harold C Ohde)
Timothy D Cooke, Times Fiber Communications, Inc., VA [UT]
(Alt. to Steven C Johnson)
Bill Hopple, Tyco/SimplexGrinnell, CA [M]
(Alt. to J. Robert Boyer)
Randolph J Ivans, Underwriters Laboratories Inc., NY [RT]
(Alt. to Susan L Stene)
Stanley Kaufman, CableSafe, Inc./OFS, GA [M]
(Alt. to Gerald Lee Dorna)
William J McCoy, Verizon Wireless, TX [U]
(Alt. to Ronald G Jones)
Robert P McGann, City of Cambridge, MA [E]
(Alt. to Larry Chan)
W. Douglas Pirkle, Pirkle Electric Company, Inc., GA [IM]
(Alt. to S. D Kahn)
David B Schrembeck, DBS Communications, Inc., OH [IM]
(Alt. to Luigi G Prezioso)

Mark W Earley, NFPA Staff Liaison

Code-Making Panel 17
Articles 422, 424, 426, 427, 680, 682

Don W Jhonson, *Chair*
Interior Electric, Inc., FL [IM]
Rep. National Electrical Contractors Association

Thomas V Blewitt, Underwriters Laboratories Inc., NY [RT]
Richard J Cripps, Association of Home Appliance Manufacturers, VA [M]
(VL to 422, 424)
Paul Crivell, Camp, Dresser & McKee Inc., WA [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Larry M Eils, National Automatic Merchandising Association, IL [M]
(VL to 422)
Christopher S Gill, New York Board of Fire Underwriters, NY [E]
Bruce R Hirsch, Baltimore Gas & Electric Company, MD [UT]
Rep. Electric Light & Power Group/EEI
Robert M Milatovich, Clark County Building Department, NV [E]
Rep. International Association of Electrical Inspectors
Jurgen Pannock, Whirlpool Corporation, TN [M]
Rep. Air-Conditioning and Refrigeration Institute
(VL to 422, 424)
Marcos Ramirez, Hatfield-Reynolds Electric company, AZ [IM]
Rep. Independent Electrical Contractors, Inc.
Brian E Rock, Hubbell Incorporated, CT [M]
Rep. National Electrical Manufacturers Association
Kenneth M Shell, Tyco Thermal Controls, CA [M]
Rep. Copper Development Association Inc.
(VL to 426, 427)
Ronald Sweigart, E.I. duPont de Nemours & Company, Inc., DE [U]
Rep. American Chemistry Council
(VL to 422, 424, 426, 427, 682)
Lee L West, Balboa Instruments, Inc., CA [M]
Rep. National Spa and Pool Institute
(VL to 680)
Randy J Yasenchak, IBEW Local Union 607, PA [L]
Rep. International Brotherhood of Electrical Workers

Alternates

Dennis L Baker, Springs & Sons Electrical Contractors Inc., AZ [IM]
(Alt. to Marcos Ramirez)
Aaron B Chase, Leviton Manufacturing Company, Inc., NY [M]
(Alt. to Brian E Rock)
James E Maldonado, City of Tempe, AZ [E]
(Alt. to Robert M Milatovich)
Wayne E Morris, Association of Home Appliance Manufacturers, DC [M]
(VL to 422, 424)
(Alt. to Richard J Cripps)
Brian Myers, IBEW Local Union 98, PA [L]
(Alt. to Randy J Yasenchak)
Ronald F Schapp, Intertek Testing Services NA, Inc., OH [RT]
(Voting Alt. to Intertek Rep.)
Gary L Siggins, Underwriters Laboratories Inc., CA [RT]
(Alt. to Thomas V Blewitt)
Joel G Solis, Air-Conditioning & Refrigeration Institute, VA [M]
(VL to 422, 424)
(Alt. to Jurgen Pannock)
Robert E Wisenburg, Coates Heater Company, Inc., WA [M]
(VL to 680)
(Alt. to Lee L West)

Nonvoting

Andrew M Trotta, US Consumer Product Safety Commission, MD [C]
Douglas A Lee, US Consumer Product Safety Commission, MD [C]

Mark W Earley, NFPA Staff Liaison

Code-Making Panel 18
Articles 406, 410, 411, 600, 605

Michael N Ber, *Chair*
IEC, Houston, TX [IM]
Rep. Independent Electrical Contractors, Inc.

Charles L Boynton, The DuPont Company, TX [U]
Rep. American Chemistry Council
Frederick L Carpenter, Lithonia Lighting, GA [M]
Rep. National Electrical Manufacturers Association
Paul Costello, NECA and IBEW Local 90 JATC, CT [L]
Rep. International Brotherhood of Electrical Workers
Kenneth F Kempel, Underwriters Laboratories Inc., NC [RT]
Stephen G Kieffer, Kieffer & Company, Inc., WI [M]
Rep. International Sign Association
(VL to 600)
Steven A Larson, BWXT Y-12, LLC, TN [U]
Rep. Institute of Electrical & Electronics Engineers, Inc.
Michael S O'Boyle, Lightolier Division of Genlyte Group, MA [M]
Rep. American Lighting Association
(VL to 410, 411)
Timothy S Owens, City of Santa Clara, CA [E]
Rep. International Association of Electrical Inspectors
Jim F Pierce, Intertek Testing Services NA, Inc., OR [RT]
Michael W Smith, Schaeffer Electric Company, MO [IM]
Rep. National Electrical Contractors Association
Sondra K Todd, Westar Energy, Inc., KS [UT]
Rep. Electric Light & Power Group/EEI
Jack Wells, Pass & Seymour/Legrand, NC [M]
Randall K Wright, RKW Consulting, PA [SE]

Alternates

Steve Campolo, Leviton Manufacturing Company, Inc., NY [M]
(Alt. to Frederick L Carpenter)
Robert T Carlock, R. T. Carlock Company, TN [IM]
(Alt. to Michael N Ber)
Melvyn J Kochan, Young Electric Sign Company, NV [M]
(VL to 600)
(Alt. to Stephen G Kieffer)
Charles S Kurten, Underwriters Laboratories Inc., NY [RT]
(Alt. to Kenneth F Kempel)
Amos D Lowrance, Jr., City of Chattanooga, Tennessee, TN [E]
(Alt. to Timothy S Owens)
Terry K McGowan, Lighting Ideas, Inc., OH [M]
(VL to 410, 411)
(Alt. to Michael S O'Boyle)
Ronald Michaelis, South Bend Vicinity Electrical JATC, IN [L]
(Alt. to Paul Costello)
Ronald Sweigart, E.I. duPont de Nemours & Company, Inc., DE [U]
(Alt. to Charles L Boynton)

Mark W Earley, NFPA Staff Liaison

Code-Making Panel 19
Articles 545, 547, 550, 551, 552, 553, 555, 604, 675, Annex D Examples D11 and D12

Leslie Sabin-Mercado, *Chair*
San Diego Gas & Electric Company, CA [UT]
Rep. Electric Light & Power Group/EEI

Barry Bauman, Alliant Energy, WI [U]
Rep. American Society of Agricultural & Biological Engineers
William Bruce Bruce Bowman, Fox Systems, Inc., GA [IM]
Rep. Independent Electrical Contractors, Inc.
Roger L Carlson, Monaco Coach Corporation, IN [M]
(VL to 550, 551, 552)
Monte R Ewing, Wisconsin Department of Commerce, WI [E]
Rep. International Association of Electrical Inspectors
James W Finch, Kampgrounds of America, Inc., MT [U]
(VL to 550, 551, 552, 555)
Bruce A Hopkins, Recreation Vehicle Industry Association, VA [M]
(VL to 550, 551, 552)
Thomas R Lichtenstein, Underwriters Laboratories Inc., IL [RT]
Linda J Little, IBEW Local 1 Electricians JATC, MO [L]
Rep. International Brotherhood of Electrical Workers
Timothy P McNeive, Thomas & Betts Corporation, TN [M]
Rep. National Electrical Manufacturers Association
John Mikel, Skyline Corporation, IN [M]
Rep. Manufactured Housing Institute
(VL to 550, 551, 552)
Tug L Miller, National Association of RV Parks & Campgrounds, CA [U]
Rep. National Assn. of RV Parks & Campgrounds
(VL to 550, 551, 552)
Kenneth Weakley, Mountain Electric, Inc., CA [IM]
Rep. National Electrical Contractors Association
Michael L Zieman, RADCO, CA [RT]
(VL to 545, 550, 551, 552)

Alternates

Glenn H Ankenbrand, Delmarva Power, MD [UT]
(Alt. to Leslie Sabin-Mercado)
Steven J Blais, EGS Electrical Group, IL [M]
(Alt. to Timothy P McNeive)
Joseph M Bolesina, Pinellas County Building Inspections, FL [E]
(Alt. to Monte R Ewing)
William (Billy) E Duggins, San Diego Electrical Training Center, CA [L]
(Alt. to Linda J Little)
David W Johnson, CenTex IEC, TX [IM]
(Alt. to William Bruce Bruce Bowman)
Kent Perkins, Recreation Vehicle Industry Association, VA [M]
(VL to 550, 551, 552)
(Alt. to Bruce A Hopkins)
Michael J Slifka, PFS Corporation, WI [M]
(VL to 550, 551, 552)
(Alt. to John Mikel)
Raymond F Tucker, Consulting Professional Engineer/RADCO, CA [RT]
(VL to 545, 550, 551, 552)
(Alt. to Michael L Zieman)
Eugene W Wirth, Underwriters Laboratories Inc., WA [RT]
(Alt. to Thomas R Lichtenstein)

Mark W Earley, NFPA Staff Liaison

Code-Making Panel 20
Articles 585 and Annex H

Donald P Bliss, *Chair*
National Infrastructure Institute, NH [U]

Tarry L Baker, Broward County Board of Rules & Appeals, FL [E]
Rep. International Association of Electrical Inspectors
Lawrence A. Bey, Cummins Power Generation, MN [M]
Richard Bingham, Dranetz-BMI, NJ [M]
Jeffrey Boksiner, Telcordia Technologies, Inc., NJ [UT]
Rep. Alliance for Telecommunications Industry Solutions
James C Carroll, Square D Company/Schneider Electric, TN [M]
Wayne G Carson, Carson Associates, Inc., VA [SE]
George R Dauberger, Thomas & Betts Corporation, TN [M]
Palmer L Hickman, National Joint Apprentice & Training Committee, MD [L]
Rep. International Brotherhood of Electrical Workers
Ronald A Keenan, M. C. Dean, Inc., VA [IM]
Rep. Independent Electrical Contractors, Inc.
Gil Moniz, National Electrical Manufacturers Association, MA [M]
Wayne D Moore, Hughes Associates, Inc., RI [SE]
Timothy S Owens, City of Santa Clara, CA [E]
Rep. International Association of Electrical Inspectors
Leslie Sabin-Mercado, San Diego Gas & Electric Company, CA [UT]
Evangelos Stoyas, US Army Corps of Engineers, VA [E]
Timothy P Zgonena, Underwriters Laboratories Inc., IL [RT]

Alternates

Paul J Casparro, Scranton Electricians JATC, PA [L]
(Alt. to Palmer L Hickman)
Robert Michael Forister, National Electrical Manufacturers Association, WY [M]
(Alt. to Gil Moniz)
Peyton S Hale, Jr., US Army Corps of Engineers, VA [E]
(Alt. to Evangelos Stoyas)
John R Kovacik, Underwriters Laboratories Inc., IL [RT]
(Alt. to Timothy P Zgonena)
Alan Manche, Square D Company/Schneider Electric, KY [M]
(Alt. to James C Carroll)
Stephen V St. Croix, Primo Electric Company, Inc., MD [IM]
(Alt. to Ronald A Keenan)

Mark W Earley, NFPA Staff Liaison

NFPA Electrical Engineering Division Technical Staff

Mark W. Earley, Assistant Vice President/Chief Electrical Engineer
Ernest W. Buss, Senior Electrical Engineer
Mark Cloutier, Senior Electrical Engineer
Jean A. O'Connor, Electrical Project Specialist/Support Supervisor
Lee F. Richardson, Senior Electrical Engineer
Richard J. Roux, Senior Electrical Specialist
Jeffrey S. Sargent, Senior Electrical Specialist
Joseph V. Sheehan, Principal Electrical Engineer

These lists represent the membership at the time each Committee was balloted on the text of this report. Since that time, changes in the membership may have occurred. A key to classifications is found at the front of the document.

Committee Scope: This Committee shall have primary responsibility for documents on minimizing the risk of electricity as a source of electric shock and as a potential ignition source of fires and explosions. It shall also be responsible for text to minimize the propagation of fire and explosions due to electrical installations.

The National Electrical Code Committee proposes for adoption its Report on Comments to NFPA 70, *National Electrical Code*. NFPA 70-2008 is published in Volume 4 of the 2007 National Fire Codes and is in separate pamphlet form.
This Report has been submitted to letter ballot of the Code-Making Panels of the National Electric Code Committee and the results of the ballot can be found in the Report.
This Report has also been submitted to letter ballot of the Technical Correlating Committee which consists of 11 voting members. It was voted unanimously affirmative to release this Report.

Key to Comment Headings

The first line of every proposal includes the following information:

Document No.	Proposal No.	Log No.	Paragraph Reference	Committee Action
101	6	38	3.4	Accept

Example: 101-6 Log #38 **Final Action: Accept (3.4)**

TYPES OF ACTION

P Partial Revision **C** Complete Revision **N** New Document **R** Reconfirmation **W** Withdrawal

The following classifications apply to Committee members and represent their principal interest in the activity of the Committee.

1. M Manufacturer: A representative of a maker or marketer of a product, assembly, or system, or portion thereof, that is affected by the standard.

2. U User: A representative of an entity that is subject to the provisions of the standard or that voluntarily uses the standard.

3. IM Installer/Maintainer: A representative of an entity that is in the business of installing or maintaining a product, assembly, or system affected by the standard.

4. L Labor: A labor representative or employee concerned with safety in the workplace.

5. RT Applied Research/Testing Laboratory: A representative of an independent testing laboratory or independent applied research organization that promulgates and/or enforces standards.

6. E Enforcing Authority: A representative of an agency or an organization that promulgates and/or enforces standards.

7. I Insurance: A representative of an insurance company, broker, agent, bureau, or inspection agency.

8. C Consumer: A person who is or represents the ultimate purchaser of a product, system, or service affected by the standard, but who is not included in (2).

9. SE Special Expert: A person not representing (1) through (8) and who has special expertise in the scope of the standard or portion thereof.

NOTE 1: “Standard” connotes code, standard, recommended practice, or guide.

NOTE 2: A representative includes an employee.

NOTE 3: While these classifications will be used by the Standards Council to achieve a balance for Technical Committees, the Standards Council may determine that new classifications of member or unique interests need representation in order to foster the best possible Committee deliberations on any project. In this connection, the Standards Council may make such appointments as it deems appropriate in the public interest, such as the classification of “Utilities” in the National Electrical Code Committee.

NOTE 4: Representatives of subsidiaries of any group are generally considered to have the same classification as the parent organization.

FORM FOR FILING NEC® NOTICE OF INTENT TO MAKE A MOTION (NITMAM) AT AN ASSOCIATION TECHNICAL MEETING 2007 ANNUAL REVISION CYCLE

FINAL DATE FOR RECEIPT OF NEC® NITMAM: 5:00 pm EDST, May 4, 2007 (NEC only)

If you have questions about filling out or filing the NEC® NITMAM, please contact the Codes and Standards Administration at 617-984-7249

For further information on the Codes- and Standards-Making Process see the NFPA website (www.nfpa.org)

FOR OFFICE USE ONLY

Log #:_____

Date Rec'd:_____

Date 8/10/2005 **Name** John B. Smith **Tel. No.** 617-555-1212

Company or Affiliation John B. Smith Consulting **Email Address** _____

Street Address 9 Seattle Street **City** Seattle **State** WA **Zip** 02255

1. (a) NFPA Document (include Number and Title) National Fire Alarm Code/NFPA 72 1999ed

(b) Proposal or Comment Number **72-5**

(c) Section/Paragraph 1.5.8.1

2. Motion to be made. Please check one (See also 4.6 of the Regulations Governing Committee Projects):

(a) Proposal

X (1) Accept. _____ (2) Accept an Identifiable Part.*

_____ (3) Accept as modified by the TC. _____ (4) Accept an Identifiable Part as modified by TC.*

(b) Comment

_____ (1) Accept. _____(2) Accept an Identifiable Part. * _____(3) Accept as modified by the TC.

_____ (4) Accept an Identifiable Part as modified by TC.* _____(5) Reject _____(6) Reject an Identifiable Part.*

(c) Return Technical Committee Report for Further Study

_____(1) Return entire Report. _____ (2) Return a portion of a Report in the form of a proposal and related comment(s).

_____(3) Return a portion of a Report in the form of identifiable part(s) of a proposal and related comment(s). (Identify the specific portion of the proposal and the related comments below)*

*** Clearly identify the Identifiable Part(s) indicated above (use separate sheet if required).**

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3. I am entitled to make this motion in accordance with 4.6.8 of the Regulations Governing Committee Projects, as follows [check (a), (b), or (c)]:

(a) **X** This motion may be made by the original submitter or their designated representative, and I am the [if you check (a) indicate one of the following]:

X I am the original submitter, or

___I am the submitter's designated representative (attach written authorization signed by the original submitter), or

___ I am an Organization Member Delegate permitted to represent the submitter on behalf of the Organization Member in accordance with 4.6.8.2.

(b)____This motion may be made by a Technical Committee Member and I am a Member of the responsible Technical Committee.

(c)____This motion may be made by anyone.

(Form continued on next page)

NEC® NITMAM form (continued)

4. Comments or Clarification (optional): This NEC® NITMAM will be reviewed by a Motions Committee. In addition to determining whether your Amending Motion is proper, the Panel may take other actions as described in 2.3 of the Technical Meeting Convention Rules as follows:

> **Restating and Grouping of Motions. Upon request or on its own initiative, and in consultation with the mover(s), the Motions Committee may: (a) restate an Amending Motion to facilitate the making of a proper motion or to clarify the intent of the mover; and (b) group Amending Motions that are dependent on one another into a single Amending Motion. Dependent motions are motions that the mover(s) wish to be considered by the assembly and voted on as single up or down package. In addition to the foregoing, the Motions Committee may take such other actions or make such other recommendations as will facilitate the fair and efficient consideration of motions within the available time.**

The NFPA Staff may contact you to clarify your motion or to consult on the permitted actions in 2.3. If you have any comments, suggestions or requests of the Motions Committee as it reviews your NITMAM and considers actions permitted in 2.3, please provide them below. (Use additional sheet if necessary):

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Name (please print): John B. Smith

Signature (required): _____

(Note: This NEC® NITMAM will be reviewed, and if proper, your Amending Motion will be certified in accordance with the Technical Meeting Convention Rules and posted on the NFPA website by May 18, 2007. Documents that have NEC® Certified Amending Motions will be considered at the June 2007 Annual Meeting Technical Committee Report Session. In order to have your Certified Amending Motion considered at that meeting, you must appear, sign in, and make the motion as prescribed in the Convention Rules).

PLEASE USE A SEPARATE NITMAM FORM FOR EACH NEC® AMENDING MOTION YOU WISH TO MAKE

Mail to: Secretary, Standards Council, National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471
NFPA Fax: (617) 770-3500

FORM FOR FILING NEC® NOTICE OF INTENT TO MAKE A MOTION (NITMAM) AT AN ASSOCIATION TECHNICAL MEETING 2007 ANNUAL REVISION CYCLE

FINAL DATE FOR RECEIPT OF NEC® NITMAM: 5:00 pm EDST, May 4, 2007 (NEC only)

If you have questions about filling out or filing the NEC® NITMAM, please contact the Codes and Standards Administration at 617-984-7249

For further information on the Codes- and Standards-Making Process, see the NFPA website (www.nfpa.org)

FOR OFFICE USE ONLY

Log #:_____

Date Rec'd:_____

Date_____ **Name**_____ **Tel. No.**_____

Company or Affiliation _____ **Email Address**_____

Street Address_____ **City**_____ **State**_____ **Zip**_____

1. (a) NFPA Document (include Number and Title)_____

(b) Proposal or Comment Number_____

(c) Section/Paragraph _____

2. Motion to be made. Please check one: (See also 4.6 of the Regulations Governing Committee Projects)

(a) Proposal

_____(1) Accept. _____ (2) Accept an Identifiable Part.*

_____ (3) Accept as modified by the TC. _____ (4) Accept an Identifiable Part as modified by TC.*

(b) Comment

_____ (1) Accept. ____(2) Accept an Identifiable Part.* ____(3) Accept as modified by the TC.

_____ (4) Accept an Identifiable Part as modified by TC.* ____(5) Reject ____(6) Reject an Identifiable Part.*

(c) Return Technical Committee Report for Further Study

_____(1) Return entire Report. _____ (2) Return a portion of a Report in the form of a proposal and related comment(s).

_____(3) Return a portion of a Report in the form of identifiable part(s) of a proposal and related comment(s). (Identify the specific portion of the proposal and the related comments below)*

*** Clearly identify the Identifiable Part(s) indicated above (use separate sheet if required).**

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___I am the Original submitter, or

___I am the submitter's designated representative (attach written authorization signed by the original submitter), or

___ I am an Organization Member Delegate permitted to represent the submitter on behalf of the Organization Member in accordance with 4.6.8.2.

(b)____This motion may be made by a Technical Committee Member and I am a Member of the responsible Technical Committee.

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(Form continued on next page)

NEC® NITMAM form (continued)

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Name (please print):_____

Signature (required):_____

(Note: This NEC® NITMAM will be reviewed, and if proper, your Amending Motion will be certified in accordance with the Technical Meeting Convention Rules and posted on the NFPA website by May 18, 2007. Documents that have NEC® Certified Amending Motions will be considered at the June 2007 Annual Meeting Technical Committee Report Session. In order to have your NEC® Certified Amending Motion considered at that meeting, you must appear, sign in, and make the motion as prescribed in the Convention Rules).

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Mail to: Secretary, Standards Council, National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471
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Sequence of Events Leading to Issuance of an NFPA Committee Document

Step 1 Call for Proposals

▼ Proposed new document or new edition of an existing document is entered into one of two yearly revision cycles, and a Call for Proposals is published.

Step 2 Report on Proposals (ROP)

▼ Committee meets to act on Proposals, to develop its own Proposals, and to prepare its Report.

▼ Committee votes by written ballot on Proposals. If two-thirds approve, Report goes forward. Lacking two-thirds approval, Report returns to Committee.

▼ Report on Proposals (ROP) is published for public review and comment.

Step 3 Report on Comments (ROC)

▼ Committee meets to act on Public Comments to develop its own Comments, and to prepare its report.

▼ Committee votes by written ballot on Comments. If two-thirds approve, Reports goes forward. Lacking two-thirds approval, Report returns to Committee.

▼ Report on Comments (ROC) is published for public review.

Step 4 Technical Committee Report Session

▼ *"Notices of intent to make a motion"* are filed, are reviewed, and valid motions are certified for presentation at the Technical Committee Report Session. ("Consent Documents" that have no certified motions bypass the Technical Committee Report Session and proceed to the Standards Council for issuance.)

▼ NFPA membership meets each June at the Annual Meeting Technical Committee Report Session and acts on Technical Committee Reports (ROP and ROC) for documents with "certified amending motions."

▼ Committee(s) vote on any amendments to Report approved at NFPA Annual Membership Meeting.

Step 5 Standards Council Issuance

▼ Notification of intent to file an appeal to the Standards Council on Association action must be filed within 20 days of the NFPA Annual Membership Meeting.

▼ Standards Council decides, based on all evidence, whether or not to issue document or to take other action, including hearing any appeals.

The Technical Committee Report Session of the NFPA Annual Meeting

The process of public input and review does not end with the publication of the ROP and ROC. Following the completion of the Proposal and Comment periods, there is yet a further opportunity for debate and discussion through the Technical Committee Report Sessions that take place at the NFPA Annual Meeting.

The Technical Committee Report Session provides an opportunity for the final Technical Committee Report (i.e., the ROP and ROC) on each proposed new or revised code or standard to be presented to the NFPA membership for the debate and consideration of motions to amend the Report. The specific rules for the types of motions that can be made and who can make them are set forth in NFPA's rules, which should always be consulted by those wishing to bring an issue before the membership at a Technical Committee Report Session. The following presents some of the main features of how a Report is handled.

What Amending Motions Are Allowed. The Technical Committee Reports contain many Proposals and Comments that the Technical Committee has rejected or revised in whole or in part. Actions of the Technical Committee published in the ROP may also eventually be rejected or revised by the Technical Committee during the development of its ROC. The motions allowed by NFPA rules provide the opportunity to propose amendments to the text of a proposed code or standard based on these published Proposals, Comments, and Committee actions. Thus, the list of allowable motions include motions to accept Proposals and Comments in whole or in part as submitted or as modified by a Technical Committee action. Motions are also available to reject an accepted Comment in whole or part. In addition, Motions can be made to return an entire Technical Committee Report or a portion of the Report to the Technical Committee for further study.

The NFPA Annual Meeting, also known as the NFPA World Safety Conference & Exposition®, takes place in June of each year. A second Fall membership meeting was discontinued in 2004, so the NFPA Technical Committee Report Session now runs once each year at the Annual Meeting in June.

Who Can Make Amending Motions. NFPA rules also define those authorized to make amending motions. In many cases, the maker of the motion is limited by NFPA rules to the original submitter of the Proposal or Comment or his or her duly authorized representative. In other cases, such as a Motion to Reject an accepted Comment, or to Return a Technical Committee Report or a portion of a Technical Committee Report for Further Study, anyone can make these motions. For a complete explanation, NFPA rules should be consulted.

The Filing of a Notice of Intent to Make a Motion. Before making an allowable motion at a Technical Report Session, the intended maker of the motion must file, in advance of the session, and within the published deadline, a Notice of Intent to Make a Motion. A Motions Committee appointed by the Standards Council then reviews all notices and certifies all amending motions that are proper. The Motions Committee can also, in consultation with the makers of the motions, clarify the intent of the motions and, in certain circumstances, combine motions that are dependent on each other together so that they can be made in one single motion. A Motions Committee report is then made available in advance of the meeting listing all certified motions. Only these Certified Amending Motions, together with certain allowable Follow-Up Motions (that is, motions that have become necessary as a result of previous successful amending motions) will be allowed at the Technical Committee Report Session.

Consent Documents. Often there are codes and standards up for consideration by the membership that will be noncontroversial and no proper Notices of Intent to Make a Motion will be filed. These "Consent Documents" will bypass the Technical Committee Report Session and head straight to the Standards Council for issuance. The remaining Documents are then forwarded to the Technical Committee Report Session for consideration of the NFPA membership.

Important Note: *The filing of a Notice of Intent to Make a Motion is a new requirement that took effect beginning with the Fall 2005 revision cycle. For the most up-to-date information on the codes and standards process, see the Rules and Regulations on the NFPA website at www.nfpa.org.*

Action on Motions at the Technical Committee Report Session. In order to actually make a Certified Amending Motion at the Technical Committee Report Session, the maker of the motion must sign in at least an hour before the session begins. In this way a final list of motions can be set in advance of the session. At the session, each proposed document up for consideration is presented by a motion to adopt the Technical Committee Report on the document. Following each such motion, the presiding officer in charge of the session opens the floor to motions on the document from the final list of Certified Amending Motions followed by any permissible Follow-Up Motions. Debate and voting on each motion proceeds in accordance with NFPA rules. NFPA membership is not required in order to make or speak to a motion, but voting is limited to NFPA members who have joined at least 180 days prior to the session and have registered for the meeting. At the close of debate on each motion, voting takes place, and the motion requires a majority vote to carry. In order to amend a Technical Committee Report, successful amending motions must be confirmed by the responsible Technical Committee, which conducts a written ballot on all successful amending motions following the meeting and prior to the Document being forwarded to the Standards Council for issuance.

Standards Council Issuance

One of the primary responsibilities of the NFPA Standards Council, as the overseer of the NFPA codes and standards development process, is to act as the official issuer of all NFPA codes and standards. When it convenes to issue NFPA documents, it also hears any appeals related to the document. Appeals are an important part of assuring that all NFPA rules have been followed and that due process and fairness have been upheld throughout the codes and standards development process. The Council considers appeals both in writing and through the conduct of hearings at which all interested parties can participate. It decides appeals based on the entire record of the process as well as all submissions on the appeal. After deciding all appeals related to a document before it, the Council, if appropriate, proceeds to issue the document as an official NFPA code or standard. Subject only to limited review by the NFPA Board of Directors, the decision of the Standards Council is final, and the new NFPA code or standard becomes effective twenty days after Standards Council issuance.

5-1 Log #990 NEC-P05 **Final Action: Reject**
(Entire Document)

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 5-1
Recommendation: Mr. Ziessniss had it right; the proposal should be accepted as written.
Substantiation: I have looked at the changes accepted as alternatives to this broader change; they do not correct the misleading implication of various uses of "grounding." In fact, by redefining "ground" as "earth" - I don't have a problem with that, if they think the dictionary won't do the job - the CMP may push some people's assumption further toward the idea that "equipment grounding" may be accomplished by connection to a local ground reference. The present use of "grounding" is hallowed in tradition. However, if we can suck it up and accept the fact that chapters are moved around and given new numbers, we can accept the use of a more-appropriate term. Also, the "we" who are accustomed to the present usage are aging, and newer users may be more-easily misled. They certainly are less likely to be disconcerted by the new language.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its initial action and position on Proposal 5-1 (Log No. 160) to reject changing the term "equipment grounding conductor" to the term "equipment bonding conductor" throughout the NEC. The work the TCC-assigned task group on grounding and bonding determined through a consensus process that changing the term would not result in an adequate solution for the identified problems in Code-wide grounding and bonding definitions and terminology that resulted from Proposal 5-1 (Log No. 2453e) in the 2004 Committee Report on Proposals. The revisions to the definition of the term "equipment grounding conductor" and the associated fine print notes together with additional Code-wide revisions where the term is used, are consistent with the objectives and responsibilities of the TCC assigned Task Group on Grounding and Bonding. See the panel action and statement on Proposal 5-1 (Log No. 160).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 90 — INTRODUCTION

1-1 Log #832 NEC-P01 **Final Action: Accept**
(90.2(A)(2))

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 1-4
Recommendation: Accept the Proposal.
Substantiation: The submitter is correct. The FPN does add confusion when one considers that the NEC is an enforcement document that is adopted by practically all jurisdictions in the US.

The NESC does indeed contain provisions that are in conflict with the NEC. Should users decide to utilize the NESC for installations covered by the NEC, the conflicts place the AHJ in a very difficult position. Although the NESC may be useful for some engineering design information, its reference as a source from the NEC implies that it is capable of being used without interfering with the use of the NEC. The code loses nothing by deleting the reference, but has increased confusion/conflict with the reference included.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

ANTHONY, M.: Our interest group is interested in the outcome of Proposal 1-4 because many colleges and universities have power plants and utility distribution systems that operate much like utilities.

We believe that the NEC loses a great deal with the deletion of a reference (to the NESC) which has been present for many code cycles. Much of the credibility of the NEC arises from the fact that it is referenced in so many other legal documents and references so many related documents within it. No doubt these references add to the bulk of the NEC but you cannot sustain credibility by not acknowledging the single most important document that governs the construction and operation of equipment at brings electric energy from the power plant to the power outlet. Knowledge of the operating characteristics of upstream equipment, for example, is important for the design and operation of emergency switchgear within the building premises (coordinating utility reclosers with transfer switches, for example).

Some of the confusion may arise from the similarity in the titles of the NEC and the NESC. Perhaps something should be done about re-naming the NESC. In the intervening time the NEC and the NESC should continue to refer to each other. If, indeed, the NEC is a document to be used by trained persons only, as described in 90.1(C), then that training should ameliorate the confusion.

LABRAKE, JR., N.: This comment and Proposal 1-4 should be rejected and the FPN needs to be retained. The Fine Print Note (FPN) in the scope of the NEC referencing ANSI C2, National Electrical Safety Code (NESC) provides a desirable correlation with a similar note in the Scope of the NESC explaining that, whereas, the NESC covers utility facilities and functions up to the Service Point, the NEC covers utilization wiring requirements beyond the Service Point. It is noted that the definition of "Service Point" is identical in both documents. The two codes interface at the Service Point and it is proper that each code reference the other to avoid confusion. Provisions of the NESC described in the FPN may be considered in the design and installation of electric supply facilities on the load side of the service point where the NEC is silent, or where not in conflict with the provisions of the NEC. It is also noted that in some jurisdictions, the Authority enforcing the NEC also has authority to enforce the provisions of the NESC in these instances. The FPN is also important to the application to 90.2(C) Special Permission. In addition, refer to my affirmative statement in Comment 1-44a (1-34a; CC1-101), NEC Section 110.7 Title.

1-2 Log #2027 NEC-P01 **Final Action: Accept**
(90.2(A)(2), FPN 2)

Submitter: Donald Cook, Shelby County Building Inspections
Comment on Proposal No: 1-4
Recommendation: Delete this FPN completely.
Substantiation: The panel statement indicates the FPN provides Code users with an applicable resource that can be adopted by governmental bodies to cover industrial substations or multibuilding complexes. If adoption of two standards is required or needed for governmental bodies to regulate the installations in the panel statement, it seems the NEC should remove those installations from it's scope and remove the uncertainty of responsibility for these installations. If the NEC continues to claim responsibility for the installations, a complete set of requirements should be established and references to another document in FPN's should be removed. In the enforcement of the NEC, the NEC references to the NESC cause regular debate and challenge from designers that attempt to use the NEC for pole line distribution on the secondary of the service point. The purpose for this proposal and comment is not to change the requirements that govern the installations, but to clarify which code or standard is responsible for installations on the customer side of the service point. Confusion can not enhance safety. See CMP-1 action on Proposal 1-145.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

ANTHONY, M.: See my explanation of negative vote on Comment 1-1.

LABRAKE, JR., N.: This comment and Proposal 1-4 should be rejected. Refer to my negative ballot statement on Comment 1-1.

1-3 Log #985 NEC-P01 **Final Action: Accept**
(90.2(B)(5))

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 1-5
Recommendation: This proposal should be Accepted.
Substantiation: The use of the term "or by other agreements" is in essence, a total exemption of the NEC for utilities. The Panel statement by CMP-1 on the action to reject this proposal clearly recognizes that when and where utilities desire to enter into an agreement with an owner, municipality, school district or other party, the NEC no longer applies, the NESC becomes the installation standard of choice. Additionally, now that the utility is doing the installation, no permit is required, no license is required and no inspection is necessary.

Inspectors are no longer needed. Product standards are no longer necessary. No equipment grounding conductors and no overcurrent protection will be installed.

The panel statement reads as follows:
"The text "or by other agreements" allows for the installation of utility facilities directed by their regulatory commissions on other than easements or right of ways through applications executed for service to the premise. These facilities include private area lighting, the safety of which is covered through utility conformance with the requirements of the authorities having jurisdiction over the utility."
Note that the statement clearly recognizes "private area lighting" but does not limit in any way the scope of work permitted to ignore the NEC. This statement also recognizes that such installations are "safe" through utility conformance with the requirements of the authorities having jurisdiction over the utility. There is no AHJ for the utility.
If the utility company chooses to do "private area lighting," or any other work for private consumption, they should be licensed, obtain a permit, be required to meet the minimum requirements of the NEC, and have the installation inspected.

CMP-1 however, in this 2008 ROP stage has gone on record, with a clear statement to allow the utilities to ignore the safety driven provisions of the NEC, product standards and the inspection process.

It is interesting to note that the scope of the NESC is limited to the "service point." The NESC does not apply downstream of the service point. CMP-1 has

given permission to the utilities to ignore the NEC and the scope of the NESC ends at the service point. No code or standard applies when the utility enters into "other agreements." This situation is further complicated by the utility interpretation of the term "service point." The utility interpretation of "service point" is as follows:

(1) The service point is a "moving target" subject to each individual installation.

(2) If the serving utility brings only a service drop to a building, the "service point" is outside of the structure at the point the service drop conductors meet the premises wiring.

(3) If the serving utility enters into "other agreements" and provides service equipment, transformers, buss duct, feeders and panelboards, the service point is at the load side of the branch circuit overcurrent protective device.

It is interesting to note that all organizations represented on CMP-1 other than IBEW and IEC agree that utilities may completely ignore the NEC.

The solution offered by the utilities is a simple one, broaden the scope of the NESC, eliminate the NEC, eliminate inspectors and eliminate contractors. I disagree.

The utility exclusion should be limited to generation, transmission and distribution. Any entity installing conductors or equipment, in, on or outdoors of any building or structure for utilization of electrical energy, should be required to follow the safety driven provisions of the NEC. Mr. Hittinger clarifies this issue in the first sentence of his negative statement. The question is not, "who will do the work?" The question is, "which code or standard will apply?"

Panel Meeting Action: Accept

Panel Statement: The panel does not necessarily agree with all of the commentors substantiation.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 8 Negative: 4

Explanation of Negative:

ANTHONY, M.: Our interest group is interested in the outcome of Proposal 1-5 because many colleges and universities have power plants and utility distribution systems that operate much like utilities. I see the point and I hear the passion of the submitter and the interest group. But I have not seen evidence that utility-like "entities" are using the flexibility the existing language allows to permit hazards. Some common practices -- such as allowing overhead transformers to overload to destruction -- have been safely managed in the past and are built into the transformer construction itself. Rare are the utilities that can afford to avoid the more rigorous standard. Indeed, the risk management offices are busy making sure litigation risk is a minimum.

In town-gown site-lighting relationships, for example, the term "other agreements" allows for flexibility--even the application of a more rigorous standard if the AHJ determines it is necessary.

The panel statement indicates that the panel did "necessarily" agree with all of the commenters substantiation; but apparently the evidence presented was sufficient. Respectfully speaking: I do not believe sufficient evidence has been presented.

FISKE, W.: The panel action at the ROP stage to reject Proposal 1-5 was correct and should be maintained. Easements and rights-of-way are not the only means by which utilities can exercise exclusive control over electric installations. Those are specific legally-defined terms which relate to areas with boundaries that can be plotted on survey maps. There are other instruments that authorize utilities to maintain certain electric installations. Those instruments are the "other agreements" to which the 2002 and 2005 editions of the NEC refer.

The 1999 and earlier editions of the NEC said, "outdoors on private property by established rights such as easements." Note "such as," indicating that easements are simply examples of the "established rights." The text of 90.2(B)(5)b, "in legally established easements, rights-of-way, or by other agreements", conveys fundamentally the same meaning as the language in the 1999 NEC. Accepting Proposal 1-5 would fundamentally change the meaning, in that ONLY easements or rights-of-way could be used to enable electric utilities to establish and maintain electric installations. Neither the submitter of Proposal 1-5 nor the submitter of Comment 1-3 has offered a technical substantiation for limiting instruments of authorization to easements and rights-of-way.

Comments made in voting indicate that some code panel members think the fundamental issue is whether installation and maintenance is performed by electric utilities or private contractors (or other organizations), and other members think the issue is whether the NEC or the NESC shall be the governing document. We conclude that nether of these issues is directly relevant to 90.2(B)(5)b. Where a utility has been granted authority to install or maintain an installation, the utility can do the work with its own personnel, or contract it out to a private I & M firm. Similarly, the "other agreements" in 90.2(B)(5)b may stipulate that NESC, NEC, or some other specification shall govern any given electric installation.

The question is "not who does the work?", and it is not, "which code shall be used?" The question is, "when utilities are authorized to operate on property they do not own, what legal instruments will grant such authorization?"

LABRAKE, JR., N.: This comment and Proposal 1-5 should be rejected. 90.2(B)(5)(b) describes the location of utility facilities on private property that are covered by the NESC including those locations covered by "other agreements" in lieu of easements or rights-of way. The submitter improperly extrapolates this location agreement to suggest it would permit the application of the NESC to utilization wiring. Deleting the text "or by other agreements" will cause a conflict with existing governing laws; i.e., local, state, federal that regulate utility installations under their exclusive control on private property. This action will require utilities to obtain easements for all of their equipment on private property where contractual service agreements of their regulated tariffs have been adequate. Requiring unnecessary easements will increase costs to all utility customers and possibly impact installation schedules without benefit to anyone. No fact found evidence has been presented that the existence of a recorded easement has any bearing on the safety of the installation. No technical justification has been presented for a requirement that a utility installation on private property, made solely for the supply of service to that property, needs to be covered by an easement to be considered as not covered by the NEC. An easement for utility facilities on private property assures the utility can meet its obligation to supply all of its customers served through those facilities. No such assurance is generally needed from a property owner for facilities installed on and serving only that property.

Further addressing the Submitter's substantiation, EEI notes the following:

1. The statement "No code or standard applies when the utility enters into "other agreements."" is not accurate. When a utility enters into deregulated activity, they are bound to the same local laws and ordinances as would contractors.

There is no "exemption" for utilities contained in the NEC. 90.2(A)(4) describes those utility installations that are covered and 90.2(B)(5) describes those utility installations that are not covered. Utility installations described in 90.2(B)(5) and not under their exclusive control are covered by the NEC regardless of whether they are a part of a premises wiring system or not. Utility installations under their exclusive control and on the supply side of the service point are under the jurisdiction of their regulatory authorities, typically Public Service Commissions, who are the AHJ's and prescribe the appropriate safety standards, generally ANSI C2, National Electrical Safety Code (NESC). The Scope of the NESC clearly states that it covers utility facilities and functions up to the Service Point and that the NEC covers utilization wiring requirements beyond the Service Point. Therefore any "other agreements" would preclude the installations of utilization wiring on the load side of the service point not in conformance with the NEC.

2. The NESC covers area lighting of utilities on the supply side of the service point of a premises wiring system. In response to each of 57 comments recorded on pages 12 to 37 of the 1998 NEC Committee Report on Comments, the Panel is on record as stating that "no evidence was submitted that installations performed by utilities in accordance with the NESC are unsafe". This statement continues to be true.

3. The term "Service Point" is clearly defined and correlated in both the NEC and NESC and is not subject to "utility interpretation". For example, the service point could be on the supply side of a transformer whose installation must conform to the requirements of the NEC, or it could be on the secondary side of the transformer whose installation must be under the exclusive control of the utility and conform to the requirements of the NESC as well as being subject to the location provisions of 90.2(B)(5)(b). The service point cannot be located such that utilization wiring outside the scope of the NESC would exist on its supply side.

4. The statement that utilities completely ignore the NEC is inaccurate. The utilities cannot ignore the NEC as it is essential to the acceptance of premises wiring for energization at the service point. And regarding the statement as to which code applies, utilities operate under the rules of the NESC for their generation, transmission, and distribution supply facilities and under the NEC for any utilization wiring as part of a premises wiring system.

The Panel members are encouraged to reconsider their action in revising the text in 90.2(B)(5)b for the unintended consequences and reject Comment 1-3 and Proposal 1-5.

MCCARVER, R.: The comment should have been rejected and the Code text left unchanged. The commenter's claim that "the use of the term "or by other agreement' is in essence, a total exemption of the NEC for utilities" is not true. The agreements referred to are either designated by or recognized by public service commissions, utility commissions or other regulatory agencies having jurisdiction for such installations. Such agreements are necessary in order for a utility to provide service to a location that does not have a specific easement.

1-4 Log #992 NEC-P01 **Final Action: Reject**
(90.2(B)(5)(b))

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 1-5
Recommendation: Revise text to read as follows:

Are located in legally established easements, rights-of-way, or by other agreements ~~either~~ designated by ~~or recognized by~~ the public service commissions, utility commissions, or other regulatory agencies having jurisdiction for such installations.

Substantiation: If the CMP believes it important from a legal standpoint that these public agencies be able to make other types of agreement that put installations outside the purview of the AHJ enforcing the NEC, let's at least require the exceptions to be designated rather than merely "recognized."

Panel Meeting Action: Reject
Panel Statement: The panel concludes that the term "other agreements" is vague and should be eliminated. See Panel Action on Comment 1-3.

The panel does not necessarily agree with all of the commentor's substantiation.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

LABRAKE, JR., N.: This comment and Proposal 1-5 should be rejected. Refer to my negative ballot statement on Comment 1-3.

1-5 Log #1046 NEC-P01 **Final Action: Accept in Part**
(90.2(B)(5)(b))

Submitter: Gilbert L. Thompson, MEIA Codes and Standards
Comment on Proposal No: 1-5
Recommendation: The Panel should reconsider their action and accept, not reject, this proposal.

After removing the words "or by other agreements" from Part (b) our inspectors feel that Section 90.2(B)(5) should be rearranged so that the wording in Part c comes first in the listing of things not covered rather than last.

The inspectors associations wholeheartedly agrees with Mr. Robinson's substantiation and the negative comments expressed by Mr. Hickman and Mr. Hittenger that the proposal should be accepted.

Substantiation: The affirmative comment by Mr. LaBrake is not valid, really, as electrical ordinances or laws of AHJ always exempt electric utilities when they provide the "service or service point" to local, state and federal properties because they are regulated by the National Electrical Safety Code. The expansion of the scope of work by electric utilities in providing installations on public and private premises without complying with NEC rules and then circumventing the permit and inspection process by "having some agreement" is in direct conflict with Section 90.2(A)(1)(2). Electric utilities have enough work, control, responsibility and accountability in providing the generation, transmission, distribution and maintenance of wiring on the "service" part of any installation. If they want to expand in other areas, then they should do like everyone else does by complying with local laws and the NEC.
Panel Meeting Action: Accept in Part

The panel accepts only the first sentence of the commentors recommendation which results in removing the words "or by other agreements either" and rejects the second and third sentences of the commentors recommendation.
Panel Statement: The panel concludes that the commentor's recommendation in sentence 2 does not add clarity and that the existing order is correct. Sentence 3 in the recommendation contains no recommended action. The panel does not necessarily agree with all of the commentor's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

ANTHONY, M.: See my explanation of negative vote on Comment 1-3.

LABRAKE, JR., N.: This comment and Proposal 1-5 should be rejected. Refer to my negative ballot statement on Comment 1-3.

MCCARVER, R.: Please see my Explanation of Negative Vote on Comment 1-3.

1-6 Log #1667 NEC-P01 **Final Action: Accept in Principle**
(90.2(B)(5)(b))

Submitter: Philip Denault, Bear Electric
Comment on Proposal No: 1-5
Recommendation: Revise as follows:

Are located in legally established easements, rights-of-way, ~~or by other agreements either~~ designated by or recognized by the public service commissions, utility commissions, or other regulatory agencies having jurisdiction for such installations.

Substantiation: The words chosen, other agreements, is not specific and may create a lot of gray areas. Removing these words can prevent future issues by utilities interpreting them the way they see fit. It is important to stay code compliant anywhere electricity is in use. Seeing how some of these other agreements are taking place on private property, the owner or other persons may get injured or worse thinking it's ok to service equipment on this type of property. Having a guideline permits, and inspections will prevent liability problems.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 1-3. The panel does not necessarily agree with all of the commentor's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

ANTHONY, M.: See my explanation of negative vote on Comment 1-3.

LABRAKE, JR., N.: This comment and Proposal 1-5 should be rejected. Refer to my negative ballot statement on Comment 1-3.

1-7 Log #991 NEC-P01 **Final Action: Reject**
(90.2(D)and (E) (New))

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 1-2
Recommendation: Revise text to read as follows:

...Additions, alterations, installations, or repairs shall not cause an existing building to become unsafe or ~~to~~ adversely affect the performance of the building, as determined by the authority having jurisdiction. When e~~E~~lectrical wiring is added to an existing service, feeder, or branch circuit, the ~~shall not~~ resulting ~~in an~~ installation ~~that~~ shall not violate~~s~~ the provisions of the code in force at the time the additions are made...

Substantiation: The NEC addresses grandfathering rarely, but does address it. This leaves contractors and inspectors up in the air. It will be a far greater service to include some kind of mandatory language on grandfathering, which jurisdictions can remove if they choose, than to leave it up to them to add something. This way it gets refined through the international Code process. My proposed modifications correct grammar or clarify language.
Panel Meeting Action: Reject
Panel Statement: It is unclear as to what the submitter is recommending for revision as Proposal 1-2 was rejected by CMP-1. The proposed text does not provide substantiation or justification to change CMP-1's position on retroactive application of the NEC. Further, CMP-1 does not agree that the revised text corrects grammar or clarifies language.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-8 Log #448 NEC-P01 **Final Action: Accept**
(90.3)

Submitter: Allen C. Weidman, The Society of the Plastics Industry, Inc.
Comment on Proposal No: 1-7
Recommendation: Continue to reject this proposal.
Substantiation: Code-Making Panel 16, in developing requirements for optical fiber and communications systems, takes into account applicable requirements in other areas of the NEC, and specifically references them where appropriate. An example is the grounding requirements of Article 250 (Chapter 5) that have been referenced over many Code cycles, and are now excerpted, as applicable, in Article 770. Requiring that Chapter 8 be "... subject to the requirements of Chapters 1 through 7 unless the requirements are specifically excluded in Chapter 8", will require a tremendous, unnecessary reworking of the NEC.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-9 Log #664 NEC-P01 **Final Action: Reject**
(90.3)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 1-7
Recommendation: The proposal should be Accepted in Principle by editorially modifying 90.3 to read as shown in the panel statement:

90.3 Code Arrangement. This Code is divided into the introduction and nine chapters, as shown in Figure 90.3. Chapters 1, 2, 3, and 4 apply generally; Chapters 5, 6, 7, and 8 apply to special occupancies, special equipment, special conditions, or communications systems. These latter chapters supplement or modify the general rules. Chapters 1 through 4 apply except as amended by Chapters 5, 6, 7, and 8 for the particular conditions.

Delete the existing second paragraph of 90.3.

The last two paragraphs of 90.3 are unchanged from the 2005 Code.

Revise Figure 90.3 as follows:

Under the box containing the text "Chapter 7 - Special Conditions", add an additional box containing the text "Chapter 8 - Communications Systems" and include this additional box within the parenthesis on the left so the parenthesis includes Chapters 5, 6, 7, and 8.

Delete the box, on the lower left side of the Figure, containing the text "Chapter 8 - Communications Systems", the parenthesis to the right of the box, and the text "Chapter 8 is not subject to the requirements of Chapters 1 through 7 except where the requirements are specifically referenced in Chapter 8."

The remainder of the Figure would be unchanged from the 2005 Code.

Substantiation: I agree with the Panel's conclusion that the intent of the submitter would be met by this editorial modification.

The submitter correctly pointed out that when Chapter 8 was initially created (more than 40 years ago), it addressed low voltage wiring normally associated with the telephone communications systems in existence at that time and did not anticipate the phenomenal growth and changes in communications that would develop during the subsequent years. The changes in communications technology have also resulted in the increasing use of power and control cables

with communications systems. These are exactly the same cables used in residential, commercial and industrial occupancies and, therefore, should be subject to the same installation requirements of Chapters 1 through 4 that apply to other installations unless there is a valid technical reason to supplement or modify those requirements in Chapter 8.

The rapid expansion of communications systems and the ever-increasing demands for more power make it imperative that Chapter 8 comply with the requirements of Chapters 1 through 4 to ensure compliance with the purpose of the Code as stated in 90.1(A).

Panel Meeting Action: Reject

Panel Statement: CMP-1 rejected Proposal 1-7 as it was incomplete. In addition, the recommendations in Proposal 1-7 would have a major impact on other code panels and create potential conflicts with existing code requirements. Obviously, companion proposals would need to be submitted to address those potential conflicts. Since Proposal 1-7 was lengthy, CMP-1 editorially modified the submitter's proposal for clarification purposes, ease in understanding the intent, and referral to the Technical Correlating Committee. CMP-1 reiterates to the submitter that Proposal 1-7 was rejected.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-10 Log #993 NEC-P01 **Final Action: Reject**
(90.4)

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing

Comment on Proposal No: 1-8

Recommendation: Revise text to read as follows:

"...having jurisdiction ~~of~~ for enforcement...".

Substantiation: I know of a number of jurisdictions that have decided to restrict certain uses despite their NRTL Listing. Mr. Stolz's amendment will not prevent them from doing so, but will increase the pressure on them to adopt formal Local Amendments when adding such rules. This is a greatly desirable outcome from the standpoint of fair enforcement. One minor grammatical tweak.

Panel Meeting Action: Reject

Panel Statement: The Panel reaffirms its statement on Proposal 1-8. The commentor has not addressed the issues presented in that statement. Any suggestion of automatic approval of equipment and materials would usurp the AHJ's responsibility and be in direct conflict with the provisions of Section 90.4.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

ARTICLE 100 — DEFINITIONS

16-1 Log #1472 NEC-P16 **Final Action: Accept**
(100. Abandoned (as applied to cable))

Submitter: Allen C. Weidman, The Society of the Plastics Industry, Inc.

Comment on Proposal No: 16-1

Recommendation: Continue to reject these proposals.

Substantiation: The Society of the Plastics Industry supports the removal of abandoned cables. One of our member companies is in the business of removing abandoned cables from buildings.

A single definition of "abandoned cable" is inappropriate to cover audio, information technology, class 2, class 3, fire alarm, optical fiber, communications, CATV and network-powered broadband because each of these cable types has its own installation practices that must be accommodated in the definition of "abandoned cable" to avoid inappropriate and unnecessary removal.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

3-1 Log #1435 NEC-P03 **Final Action: Accept**
(100.Abandoned Cable)

Submitter: Allen C. Weidman, The Society of the Plastics Industry, Inc.

Comment on Proposal No: 3-1

Recommendation: Continue to reject these proposals.

Substantiation: The Society of the Plastics Industry supports the removal of abandoned cables. One of our member companies is in the business of removing abandoned cables from buildings.

A single definition of "abandoned cable" is inappropriate to cover audio, information technology, class 2, class 3, fire alarm, optical fiber, communications, CATV and network-powered broadband because each of these cable types has its own installation practices that must be accommodated in the definition of "abandoned cable" to avoid inappropriate and unnecessary removal.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

1-11 Log #319 NEC-P01 **Final Action: Accept**
(100. Bedroom)

Submitter: Code-Making Panel 2,

Comment on Proposal No: 1-17

Recommendation: Reject the proposal.

Substantiation: The definition proposed by the submitter is unenforceable. The NEC Style Manual, in 3.3.4, requires that words and terms used in the NEC shall be specific and clear in meaning. The wording "which are, or could be used" is too vague.

This comment was balloted through CMP-2 with the following results:

12 Eligible to Vote

11 Affirmative

1 Not Returned (B. Nenninger)

Mr. J. Pauley voted affirmatively stating: "For clarity, item 3 of the comment form should have the "deleted text" box checked and should state "CMP-2 recommends that CMP-1 reject the proposal."

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Abstain: 1

Explanation of Abstention:

ANTHONY, M.: Our interest group has an interest in this proposal because of its implications for the design of student housing. An imperfect definition now would be better than an perfect one later.

I do not agree that with CMP's conclusion that this language is a violation of the clarity rules of the NEC Manual of Style in the use of the term "or could be" any more than "likely to be serviced" is clear in the flash protection requirements. Ultimately, the submitter is trying to stop installers or designers from avoiding the AFCI rules by changing the name or nature of the room. (See my Comment on the Affirmative on Proposal -- Log 3411).

As the writers of the Life Safety Code have long recognized, sleeping/bedroom units are places where people stay for 1/3 of their lives while unconscious. Writers of the NEC need to define bedroom now because it is a key criterion in the application of AFCI protection. In future code cycles we should work harder to correlate language of the NEC with the terms sleeping areas as used in the Life Safety Code.

1-12 Log #994 NEC-P01 **Final Action: Reject**
(100. Bedroom)

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing

Comment on Proposal No: 1-17

Recommendation: Revise the definition to read as follows:

Bedroom. An area ~~separated by walls or partitions from other similar parts of the structure or building which are, or could be,~~ that is being used, or whose design or layout lends itself to being used, primarily for sleeping.

Substantiation: It is indeed worth our while to clarify this issue, to enhance safety. However, in some apartments, and even houses, the presence of walls or partitions is not key. Furthermore, "could be used" seems too broad a characterization. A grammatical quibble: it is preferable to have agreement between the singular word "area" and the verb, originally the plural, "are".

Panel Meeting Action: Reject

Panel Statement: The proposed revisions do not improve clarity. In particular, "lends itself to being used, primarily for sleeping," is a vague or unenforceable phrase, and thus prohibited by 3.2.1 of the NEC Style Manual. See panel action on Comment 1-11.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Abstain: 1

Explanation of Abstention:

ANTHONY, M.: See my explanation of abstention on Comment 1-11.

2-2 Log #513 NEC-P02 **Final Action: Reject**
(100. Branch Circuit Individual)

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 2-2

Recommendation: Accept the proposal.

Substantiation: Panel statement indicates an individual branch circuit may supply a multiple receptacle. However, a 20 ampere circuit supplying a multiple receptacle is limited to a 12 ampere load for a 15 ampere multiple receptacle and 16 amperes for a 20 ampere multiple receptacle. Such a circuit could not supply a 20 ampere load in accordance with 210.23 for individual branch circuits.

Panel Meeting Action: Reject
Panel Statement: The submitter's substantiation does not address the panel statement from the proposal. The panel statement was clear that the configuration or arrangement of the equipment could be used to limit the load to a single utilization equipment.

The submitter presumes that all installations will be for equipment that has a current rating that is equal to the receptacle rating. That is not always the case. For example, a refrigerator could be supplied from a duplex receptacle and be within the appropriate ratings and still be a single utilization equipment, provided the arrangement of the receptacle is such that it will limit the application to only the refrigerator.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-1 Log #1416 NEC-P10 **Final Action: Reject**
(100. Branch Circuit Overcurrent Device)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 10-1a
Recommendation: The panel should reconsider the action taken on this proposal and Reject the Proposal.
Substantiation: The proposed definition of a Branch-Circuit Overcurrent Device establishes unnecessary confusion. Instead of focusing on branch circuit protection the definition also deals with service and feeder protection. In addition to being confusing, the proposed definition is also incorrect. For example, Branch-Circuit Overcurrent Devices may not provide protection of service equipment over the full range of overcurrents described in the NEC definition of overcurrent: overload, short circuit, or ground fault. Thus, at 1000 amperes or more, service equipment protection involves the additional feature of ground fault protection (240.13). Does this definition, with its reference to service equipment, require ground fault protection for all overcurrent devices of 1000 amperes or more? The new definition also states that the Branch-Circuit Overcurrent Device will protect "equipment". However, a review of the equipment definition in Article 100 shows that equipment includes such items as appliances. But, the Branch-Circuit Overcurrent device is neither evaluated for, or intended for, appliance protection. That can be the role of supplementary overcurrent protective devices. The proposed definition raises additional questions. Does a listed self-protected combination motor controller fit within this definition? These devices are evaluated for branch circuit protection in a motor circuit. Does this definition give credence to using such devices in areas other than a motor circuit? Is the self-protected combination motor controller suitable for use to protect feeders or service conductors? That application was never intended as it is specific to Article 430. However, a listed self-protected combination motor controller fits the proposed definition.
Panel Meeting Action: Reject
Panel Statement: The proposed definition does not establish unnecessary confusion. On the contrary, the definition clarifies that a branch-circuit overcurrent protective device is a full-range overcurrent protective device and is required to provide protection for service, feeder and branch circuit conductors, and equipment. Further, the definition improves safety by identifying the performance characteristics of a branch-circuit overcurrent protective device, thereby eliminating confusion, especially where supplementary and non-full-range overcurrent protective devices are misapplied.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

KIMBLIN, C.: The accepted definition remains confusing. In particular, the definition deals with a branch-circuit overcurrent protection device. The first sentence of that definition, however, immediately discusses service and feeder applications in addition to branch circuit applications. Since the proposed definition is intended to distinguish between branch circuit overcurrent devices and supplementary overcurrent protective devices, the TCC should review the definition of a branch circuit. For clarity, the TCC could consider inserting "branch circuit" between the words "final" and "overcurrent device" in that definition. This would make sure that the user does not misinterpret the branch circuits being the conductors between a supplementary overcurrent protective device and the outlet.

10-1a Log #995 NEC-P10 **Final Action: Reject**
(100. Branch Circuit Overcurrent Device)

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 10-1a
Recommendation: I agree with Mr. Clive Kimblin that this definition is unnecessary.
Substantiation: I would rather look in the White Book for definitions and applications of equipment. I also consider it quite unfortunate to create a new definition where the wording of the term, "branch circuit," and the definition, being more inclusive, clash.

Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 10-1.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

KIMBLIN, C.: NEMA opposes the panel action for the reason expressed with Comment 10-1.

1-13 Log #3 NEC-P01 **Final Action: Accept**
(100. Bundled)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 1-19
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the TCC's recommendation directing further consideration of the comments expressed in the ROP voting. Comments 1-16 from CMP-6, 1-17 from CMP-7, and 1-14 from CMP-12 accept the term moved to Article 100, but CMP-15 in Comment 1-15 rejects the move since the term is unique in Article 520.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-14 Log #288 NEC-P01 **Final Action: Reject**
(100. Bundled)

Submitter: Code-Making Panel 12,
Comment on Proposal No: 1-19
Recommendation: Code-Making Panel 12 agrees that the definition for "Bundled" in Article 520 is applicable to 640.8 and that the definition can be moved to Article 100.
Substantiation: The term is used in 310.15(B)(2), 334.80, 520.53(M)(2), 520.53(M)(3), 520.53(M)(4), and 640.8, and according to the NEC Style Manual Article 100 should contain definitions of terms used in two or more articles of the NEC.

This comment was balloted through CMP-12 with the following ballot results:

15 Eligible to Vote
11 Affirmative
3 Negative
1 Not Returned (D. Quave)

Mr. K. Givens voted negatively stating: "The Aluminum Association agrees with the Explanations of Negative Vote provided by Messrs. N. LaBrake and J. Minick on Proposal 1-19."

Mr. R. Jones voted negatively stating: "The definition of "bundled" in 520.2 is specific to Article 520. If that definition is moved to Article 100 then the requirement of 310.15(B)(2) could not be enforced unless the cables where physically tied together. For instance, several nonmetallic-sheathed cables (romex) could be installed horizontally through framing members and not be physically bound together. The framing members would provide the required support, provided they are less than 54 in. apart, and cable ties would not be required. The bundled cables would be more than 24 in. in length but since they are not physically bound together the requirement for derating would not apply.

Section 310.15(B)(2) also uses the term "stacked" however that term might be difficult to enforce using a general English language dictionary definition."

Mr. K. White voted negatively stating: "This proposal should be Rejected. There is not a clear understanding of what definition will be in Article 100, as what was proposed in 520.2 is not satisfactory and adding "during installations" does not clarify the definition."
Panel Meeting Action: Reject
Panel Statement: The Panel concludes from CMP-15's substantiation and the Panel action on Comment 1-15 that Proposal 1-19 is rejected, since the term "bundled" as used in Articles 520 and 640 is specific.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

MCMAHILL, L.: For consistency and ease in understanding code requirements, CMP-1 should have accepted a standard definition for the term "bundled." There is no logical reason for the term "Bundled" to be unique in various code articles. A standard definition should suffice throughout the NEC and can be modified with the use of adverbs as necessary. It should be noted that CMP's, 6, 7 and 12 support placing the definition of "Bundled" in Article 100.

1-15 Log #295 NEC-P01 **Final Action: Accept**
(100. Bundled)

Submitter: Code-Making Panel 15,
Comment on Proposal No: 1-19
Recommendation: Reject Proposal 1-19.
Substantiation: A task group comprised of members of CMP-15, on Proposal 1-19 recommends this proposal be rejected. This is consistent with the Final Action taken by CMP-15 on comment 15-56 at the Report on Comments meeting in December 2004 on a similar proposal. As used in 520.53(H)(2), the term "bundled" is unique and the definition should remain in 520.2. Task group member Eddie Kramer has prepared a comprehensive background of past proposals and panel actions that is provided with this comment for CMP-1's information.
This comment was balloted through CMP-15 with the following ballot results:
17 Eligible to Vote
12 Affirmative
5 Not Returned (T. Dunn, D. Marshall, H. Nash, B. Shelly, and M. Skinner)
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
MCMAHILL, L.: See my explanation of negative vote on Comment 1-14.

1-16 Log #317 NEC-P01 **Final Action: Reject**
(100. Bundled)

Submitter: Code-Making Panel 6,
Comment on Proposal No: 1-19
Recommendation: The definition in Article 100 should read: "Bundled. Cables or conductors that are physically tied, wrapped, taped or otherwise periodically bound together during installation."
Substantiation: Discussions during CMP-6's proposal stage raised the issue that the use of the word "bundled" was not necessarily clear. A code-wide definition in Article 100 should clarify the intent and limits of its use, making it less ambiguous.
The 2005 520.2 definition is: "Cables or conductors that are physically tied, wrapped, taped or otherwise periodically bound together." "Bundling" is but one condition which places conductors in close proximity. The use of "bundled" does not preclude imposing other conditions with additional text.
"Bundled" certainly should not apply to an individual Triplexed or Quadruplexed construction, nor to any individual multi-conductor cable. The words "during installation" need to be added at the end of the 520.2 definition to clarify that manufactured "bundling" is not involved.
The word, as it pertains to use within Article 310, has to do with the decrease in cooling effect which some types of conductor grouping causes. The number of cables or conductors involved is clarified. The uses of "bundled" in 310.15(B)(2) correlate to the definition. Its application is further clarified as only to lengths over 600 mm (24 in.). The condition where close proximity occurs simply due to conditions of installation (stacked) without intentional bundling is separately addressed. Conditions which are not "bundling", but which should qualify for deration, can be similarly addressed in any other section.
This comment was balloted through CMP-6 with the following ballot results:
11 Eligible to Vote
6 Affirmative
5 Negative
Mr. S. Friedman voted negatively stating: "CMP-6 did not agree that one definition for bundling covers all. In this case, I do not agree that bundling in Article 310 requires that the conductors be "periodically bound". Bundling could also mean in close proximity, which is the intent of CMP 6." CMP-6's comment should be "CMP-6 does not support CMP-1's action on Proposal 1-19."
Mr. R. Huddleston voted negatively stating: "Definition of "bundled" not needed. Addition of the phrase "during installation" only adds more confusion to an unneeded definition."
Mr. P. Picard voted negatively stating: "The proposed definition for "bundled" does not meet the use of the term as used in the 2005 NEC 310.15(B)(2)(a)."
Mr. C. Wall voted negatively stating: "This comment should be rejected. The definition of "bundled" in 520.2 is appropriate to the use of the term in Article 520, but it is not necessarily suitable for application in other sections. The addition of the term "during installation" does not make the term suitable for application and use in other articles."
Mr. J. Zimnock voted negatively stating: "The CMP-6 comment should be: "CMP-6 does not support the CMP-1 action to Accept Proposal 1-19 to move the definition of "Bundled" from 520.2 to Article 100 Definitions."
The definition of "Bundled" should not be moved from Article 520 to Article 100.
The definition of "Bundled" in 520.2 is very explicit in that it specifies "cables or conductors that are physically tied, wrapped, taped, or otherwise periodically bound together."
The term "Bundled" as used by CMP-6 in 310.15(B)(2)(a), and Exception No. 5(3), including the last paragraph, does not require that the cables or conductors be physically bound together and the installation would not comply with the definition in 502.2 and, therefore, Table 310.15(B)(2)(a) would not apply; this is not the intent of CMP-6.
The term "Bundled" as used by CMP-6 applies to conductors or cables in close proximity "without maintaining spacing and are not installed in raceways," such as through holes in framing materials. There is no requirement for them to be "physically bound together." It was not the intent of CMP-6 that "Bundling" required that the conductors or cables be "physically bound together." The definition of "Bundled" should remain in 502.2 since it appears to specifically convey the intent of CMP-15 as used in Article 502."
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 1-14.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
MCMAHILL, L.: See my explanation of negative vote on Comment 1-14.

1-17 Log #323 NEC-P01 **Final Action: Reject**
(100. Bundled)

Submitter: Code-Making Panel 7,
Comment on Proposal No: 1-19
Recommendation: CMP-7 recommends that Proposal 1-19 be accepted. Per 2.2.2.1 of the NEC Style Manual, Article 100 shall contain definitions of terms that appear in two or more other articles of the NEC.
Substantiation: The definition of bundled should be moved to Article 100. Per Section 2.2.2.1 of the NEC Style Manual: "Article 100 shall contain definitions of terms that appear in two or more other articles of the NEC."
This comment was balloted through CMP-7 with the following ballot results:
14 Eligible to Vote
8 Affirmative
5 Negative
1 Not Returned (W. Crist)
Mr. J. Daly voted negatively stating: "The CMP-7 comment should be: "CMP-7 does not support the CMP-1 action to accept Proposal 1-19 to move the definition of "Bundled" from 520.2 to Article 100 definitions.
Reasons: The definition of "Bundled" should not be moved from Article 520 to Article 100.
I agree with the Explanation of Negative Votes on Proposal 1-19 by CMP-1 members N. LaBrake and John Minick.
The definition of "Bundled" in 520.2 is very explicit in that it specifies "Cables or conductors that are physically tied, wrapped, taped, or otherwise periodically bound together."
The term "bundled" as used by CMP-7 applies to cables in close proximity "without maintaining spacing and are not installed in raceways," such as through holes in framing materials. It was not the intent of CMP-7 that "bundling" required that the cables be "physically bound together."
CMP-7 Accepted in Principle Proposal 7-72 and stated in the Panel Statement: "The Panel agrees that "bundled" is not defined, and the revised wording more accurately describes the installation." This action removed the only instance where "bundled" was used in Article 334. The panel action to accept Proposal 7-74 also resulted in the term "bundled" not being used. "the term "bundled" will no longer appear in Article 334.
The definition of "Bundled" should remain in 502.2 since it appears to specifically convey the intent of CMP-15 as used in Article 502."
Mr. D. Nielsen voted negatively stating: "The use of the word "Bundled" is specific to the application. The substantiation does not provide a technical basis for clarifying all applications and or functional arrangements. The use of the word should remain in the article specific to the application."
Mr. P. Pollak voted negatively stating: "The Aluminum Association agrees with the Explanation of Negative provided by Messrs. Labrake and Minick on Proposal 1-19."
Mr. J. Ray voted negatively stating: "This proposal should be rejected. The definition of "Bundled" in Article 520 is a general definition applicable to the wiring methods in that article. However, this definition is not necessarily suitable for the other sections referenced in the proposal."
Mr. G. Strainiero voted negatively stating: "While CDA agrees that a definition of "Bundled" could be placed in Article 100, we, however, support the negative comments that were cast on the proposal which must be addressed before adding a definition."
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 1-14.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
MCMAHILL, L.: See my explanation of negative vote on Comment 1-14.

1-18 Log #340 NEC-P01 **Final Action: Reject**
(100. Bundled)

Submitter: Bryan P. Holland, City of North Port
Comment on Proposal No: 1-19
Recommendation: I continue to support this proposal.
Substantiation: I have found the enforcement of ampacity derating due to required adjustments when cables and conductors are bundled varies widely among jurisdictions and AHJs. This change will, in the least, provide guidance for proper enforcement within the intent of the NEC. The terms "periodically bound together" can include bundling that does not have a "physical" means of bounding the cables and conductors such as multiple cables passed through a single hole or notch in a framing member.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 1-14.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
MCMAHILL, L.: See my explanation of negative vote on Comment 1-14.

1-19 Log #665 NEC-P01 **Final Action: Accept**
(100. Bundled)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 1-19
Recommendation: Proposal 1-19 should be Rejected.
Substantiation: The definition of "Bundled" in 520.2 is very explicit in that it specifies "Cables or conductors that are physically tied, wrapped, taped, or otherwise periodically bound together."

The use of the term "bundled" as used by CMP 6 and CMP 7 does not require that the cables or conductors be "physically bound together"; it applies to conductors or cables where spacing is not maintained.

Therefore, if the 502.2 definition of "bundling" is included in Article 100, Table 310.15(B)(2)(a) would no longer apply since the conductors or cables are not required to be physically bound together, and the installation would not comply with the definition proposed for Article 100. Also, 2.2.2 of the NEC Style Manual stipulates that "Definitions shall not contain requirements or recommendations."

The term "bundled" as used by CMP 6 in 310.15(B)(2)(a) applies "...where single conductors or multiconductor cables are stacked or bundled longer than 600 mm (24 in.) without maintaining spacing and are not installed in raceways...". 310.15(B)(2)(a) Exception No. 5(3), including the last paragraph, does not require that the cables or conductors be physically bound together.

In the 2005 NEC, the term "bundled" as used by CMP 7 in the second paragraph of 334.80 reads: "...are bundled together and pass through wood framing..." applies to cables in close proximity such as through holes in framing materials. There is no requirement that the cables be "physically bound together."

CMP 7 Accepted in Principle Proposal 7-72 and stated in the panel statement, "The panel agrees that "bundled" is not defined, and the revised wording more accurately describes the installation." This action removed the only instance where "bundled" was used in Article 334. The panel action to Accept Proposal 7-74 also resulted in the term "bundled" not being used. The term "bundled" will no longer appear in Article 334.

640.8 Grouping of Conductors, states: "Insulated conductors of different systems grouped or bundled so as to be in close physical contact with each other in the same raceway or other enclosure, or in portable cords or cables, shall comply with 300.3(C)(1)." 300.3(C)(1) stipulates that it only applies where the insulated conductors, rated 600 V or less, are installed in the same raceway or enclosure, or in portable cords or cables, and does not include the requirements of 520.2 that the cables or conductors be "physically tied, wrapped, taped or otherwise periodically bound together."

Also, Proposal 16-290, which was Rejected, included in the first paragraph of the substantiation, a reference to "...NEC 830 provided guidelines for many aspects of delivering bundled services." Article 830 covers Network-Powered Broadband Communications Systems and the use of "bundled" in this instance is clearly not within the definition of "bundled" as defined in 520.2.

The definition of "bundled" as it appears in 520.2 appears to be specifically applicable to Article 520 and not applicable to 310.15(B)(2) or Articles 334 and 640. Therefore, since the proposed definition specifically applies to only one Article, it should remain in 520.2 and not be included in Article 100.

I agree that there is confusion regarding the use of the term "bundled" as evidenced by the various interpretations that currently exist, but this confusion can easily be resolved by replacing the term "bundled" with text specifically defining the exact installation conditions where 310.15(B)(2)(a) applies or does not apply, such as CMP 7 has done in 334.80.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
MCMAHILL, L.: See my explanation of negative vote on Comment 1-14.

1-20 Log #1895 NEC-P01 **Final Action: Accept**
(100. Bundled)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 1-19
Recommendation: The proposal should be rejected.
Substantiation: The word must be free to assume subtle differences in meaning as used in different places in the NEC. The most troublesome of the proposed is the physical binding attribute. This is appropriate in Article 520, but not in Article 334, for example, where it is clear that running multiple cables through a single set of holes in succeeding framing members will create the objectionable condition addressed in the rule, even though the cables are not tie-wrapped together.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
MCMAHILL, L.: For clarity and consistency, definitions should be clear, concise and unambiguous. By accepting the submitter's comment, CMP-1 superficially supports an NEC term that is "free to assume subtle differences in meaning." This is contrary to the NEC Style Manual Sections 1.1 and 3.3. See my explanation of negative vote on Comment 1-14.

1-21 Log #996 NEC-P01 **Final Action: Reject**
(100. Clothes Closet (New))

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 1-20
Recommendation: Revise the definition to read as follows:

Clothes Closet. A small room, chamber, or area used primarily for storage of clothes and not designed for nor, in normal circumstances lending itself to, uses other than storage.

Substantiation: I believe that Mr. Johnston's new text should be accepted without the CMP's proposed modification. The manual's warning against circular definitions is not at issue, and the CMP's circumlocution adds nothing.

However, I've seen bedrooms, bathrooms, even stairways that were given over to piles of clothing. His definition technically would include them, and I doubt that is anybody's intention. It's far better to say this clearly than to rely on "You know what we mean." I thought twice about suggesting the phrase, "in normal circumstances," but scenarios came to mind making it worthwhile. For example, an inspector shows up and finds boxes piled in an area while construction work is being performed in the next room
.**Panel Meeting Action: Reject**
Panel Statement: The recommendation does not add clarity to the definition as accepted by the Panel on Proposal 1-20.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-22 Log #2099 NEC-P01 **Final Action: Accept in Principle**
(100. Clothes Closet (New))

TCC Action: The Technical Correlating Committee notes that the action on this comment does not result in a change to the panel action on the proposal.
Submitter: James H. Maxfield, Dover, NH
Comment on Proposal No: 1-20
Recommendation: Add:

A new habitable room or space intended primarily for storage of garments and apparel.

Substantiation: The definition of clothes closet should be added to Article 100 as revised by CMP 1 because of the facts outlined in the original submitter's proposal, CMP-1 definition includes the term "non-habitable room" which should assist the industry in classifying these areas, which have an infinite number of design possibilities whether located indoors or out. The addition of this definition will help achieve the minimum standards of NFPA 70.
Panel Meeting Action: Accept in Principle
Add:

A ~~new~~ non-habitable room or space intended primarily for storage of garments and apparel.

Panel Statement: CMP-1 concurs with the submitter's comments and suggestion to accept (add) the revised definition as noted in Panel action in Proposal 1-20. CMP-1 concludes that the submitter meant to use the word "non" as opposed to "new" in the recommended text.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-23 Log #2113 NEC-P01 **Final Action: Accept in Principle**
(100. Clothes Closet (New))

Submitter: Michael Estes, Barrington, NH
Comment on Proposal No: 1-20
Recommendation: Add a new definition to read as follows:
Clothes Closet. A small room, chamber, or area used primarily for storage of clothes.
Substantiation: Defining an area as a clothes closet will address the problems associated with general requirements for wiring walk-in type closets and closets with windows. [410.8, 240.24(D), and 550.11(A) – vs. – 210.52, 210.70, and 210.12].
Panel Meeting Action: Accept in Principle
Panel Statement: The Panel Action on Proposal 1-20 addresses the concern of the submitter.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

5-2 Log #1026 NEC-P05 **Final Action: Reject**
(100. Commercial Occupancy (New))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-146
Recommendation: Add a new definition to read as follows:
Commercial Occupancy. An area consisting of a structure or structures, outdoor areas, or portions of structures separated by suitable firewalls, not devoted to residential, agricultural or industrial use, but including other uses such as institutions.
Substantiation: Two members of CMP 5 considered Proposal 5-146 material for Article 100. Along with the proposer and two CMP members, I see problems with the use of the terms, "commercial and industrial" when many, albeit not all, institutional occupancies may warrant similar treatment, and may even be intended to be covered by the terms, "commercial and industrial." If this wording does not suit, or if it seems appropriate to define other occupancies at the same time, perhaps a task group could be established to examine the matter.
Panel Meeting Action: Reject
Panel Statement: The definition is not clear, since it defines what the area is not devoted to. There are numerous items that are not identified in the list that are not commercial occupancies, such as penitentiary and institutional. This definition may need to be submitted to CMP-1.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

1-24 Log #1438 NEC-P01 **Final Action: Reject**
(100. Concealed Space)

Submitter: Allen C. Weidman, The Society of the Plastics Industry, Inc.
Comment on Proposal No: 1-23
Recommendation: Accept this proposal in principle by accepting the proposed definition of concealed space and also modifying the definition of "concealed" as shown below:
Concealed Space. That portion(s) of a building behind walls, over suspended ceilings, in pipe chases, attics, and in whose size might normally range from 44.45 mm (1 3/4 in.) stud spaces to 2.44 m (8 ft) interstitial truss spaces and that might contain combustible materials such as building structural members, thermal and/or electrical insulation, and ducting. [NFPA 96:3.3.42.1]
Concealed (as applied to wiring methods). Rendered inaccessible by the structure or finish of the building. Wires in concealed raceways are considered concealed, even though they may become accessible by withdrawing them.
Substantiation: The proposal cited the following uses of the term concealed space in the NEC:
320.30(D)(1)
(D) Unsupported Cables. Type AC cable shall be permitted to be unsupported where the cable complies with any of the following:
(1) Is fished between access points through **concealed spaces** in finished buildings or structures and supporting is impracticable
330.30(D)(1)
(D) Unsupported Cables. Type MC cable shall be permitted to be unsupported where the cable:
(1) Is fished between access points through **concealed spaces** in finished buildings or structures and supporting is impractical; or
332.30(B)
332.30 Securing and Supporting. Type MI cable shall be supported and secured by staples, straps, hangers, or similar fittings, designed and installed so as not to damage the cable, at intervals not exceeding 1.8 m (6 ft).
(A) Horizontal Runs Through Holes and Notches. In other than vertical runs, cables installed in accordance with 300.4 shall be considered supported and secured where such support does not exceed 1.8 m (6 ft) intervals.
(B) Unsupported Cable. Type MI cable shall be permitted to be unsupported where the cable is fished between access points through **concealed spaces** in finished buildings or structures and supporting is impracticable.
334.30(B)
(B) Unsupported Cables. Nonmetallic-sheathed cable shall be permitted to be unsupported where the cable:
(1) Is fished between access points through **concealed spaces** in finished buildings or structures and supporting is impracticable.
376.10
376.10 Uses Permitted. The use of metal wireways shall be permitted in the following:
(1) For exposed work
(2) In **concealed spaces** as permitted in 376.10(4)
604.4,
604.4 Uses Permitted. Manufactured wiring systems shall be permitted in accessible and dry locations and in ducts, plenums, and other air-handling spaces where listed for this application and installed in accordance with 300.22.
Exception No. 1: In **concealed spaces**, one end of tapped cable shall be permitted to extend into hollow walls for direct termination at switch and outlet points.
760.30(A)(1)
760.30 Multiconductor NPLFA Cables. Multiconductor non–power-limited fire alarm cables that meet the requirements of 760.81 shall be permitted to be used on fire alarm circuits operating at 150 volts or less and shall be installed in accordance with 760.30(A) and 760.30(B).
(A) NPLFA Wiring Method. Multiconductor non–power-limited fire alarm circuit cables shall be installed in accordance with 760.30(A)(1), (A)(2), and (A)(3).
(1) Exposed or Fished in **Concealed Spaces**. In raceway or exposed on surface of ceiling and sidewalls or fished in **concealed spaces**. Cable splices or terminations shall be made in listed fittings, boxes, enclosures, fire alarm devices, or utilization equipment. Where installed exposed, cables shall be adequately supported and installed in such a way that maximum protection against physical damage is afforded by building construction such as baseboards, door frames, ledges, and so forth. Where located within 2.1 m (7 ft) of the floor, cables shall be securely fastened in an approved manner at intervals of not more than 450 mm (18 in.).
760.52(B)(1)
(B) PLFA Wiring Methods and Materials. Power-limited fire alarm conductors and cables described in 760.82 shall be installed as detailed in 760.52(B)(1), (B)(2), or (B)(3) of this section. Devices shall be installed in accordance with 110.3(B), 300.11(A), and 300.15.
(1) Exposed or Fished in **Concealed Spaces**. In raceway or exposed on the surface of ceiling and sidewalls or fished in **concealed spaces**. Cable splices or terminations shall be made in listed fittings, boxes, enclosures, fire alarm devices, or utilization equipment. Where installed exposed, cables shall be adequately supported and installed in such a way that maximum protection against physical damage is afforded by building construction such as baseboards, door frames, ledges, and so forth. Where located within 2.1 m (7 ft) of the floor, cables shall be securely fastened in an approved manner at intervals of not more than 450 mm (18 in.).
770.154(A) FPN
Nonconductive and conductive optical fiber cables shall comply with any of the requirements given in 770.154(A) through 770.154(E) or where cable substitutions are made as shown in 770.154(F).
(A) Plenums. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type OFNP or OFCP. Abandoned cables shall not be permitted to remain. Types OFNR, OFCR, OFNG, OFN, OFCG, and OFC cables installed in compliance with 300.22 shall be permitted. Listed plenum optical fiber raceways shall be permitted to be installed in ducts and plenums as described in 300.22(B) and in other spaces used for environmental air as described in 300.22(C). Only type OFNP and OFCP cables shall be permitted to be installed in these raceways.
FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in **concealed spaces** containing exposed combustibles.
800.154(A) FPN
(A) Plenum. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type CMP. Abandoned cables shall not be permitted to remain. Types CMP, CMR, CMG, CM, and CMX and communications wire installed in compliance with 300.22 shall be permitted. Listed plenum communications raceways shall be permitted to be installed in ducts and plenums as described in 300.22(B) and in other spaces used for environmental air as described in 300.22(C). Only Type CMP cable shall be permitted to be installed in raceways.
FPN: See 8.14.1 of NFPA 13-2002, Installation of Sprinkler Systems, for requirements for sprinklers in **concealed spaces** containing exposed combustibles.
820.154(A)FPN

(A) Plenums. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type CATVP. Abandoned cables shall not be permitted to remain. Types CATVP, CATVR, CATV, and CATVX cables installed in compliance with 300.22 shall be permitted. Listed plenum CATV raceways shall be permitted to be installed in ducts and plenums as described in 300.22(B) and in other spaces used for environmental air as described in 300.22(C). Only Type CATVP cable shall be permitted to be installed in these raceways.
FPN: See 8.14.1 of NFPA 13-2002, Installation of Sprinkler Systems, for requirements for sprinklers in **concealed spaces** containing exposed combustibles.
The panel rejected the proposal because of the Standards Council directive to maintain the status quo on issues related to plenum cables. The panel should reconsider its position relative to the applicability of the standards council directive to this proposal.

Clearly, the use term "concealed spaces" in Articles 320, 330, 332, 334, 376, 604 and 760 has no relation to plenum cables.

The use of the term "concealed spaces" in the plenum cable applications sections of Articles 770, 800 and 820 is in nonmandatory fine print notes. Defining the a term in a fine print note does not change plenum cable requirements because the fine print note is for information only; it is not a mandatory requirement.

This definition is an extract from NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations. It is the only definition of concealed space in the NFPA Glossary.

The definition of "Concealed" currently in the NEC is:

"Concealed. Rendered inaccessible by the structure or finish of the building. Wires in concealed raceways are considered concealed, even though they may become accessible by withdrawing them."

The recommended change to the definition of "Concealed" will clarify that the current definition deals with wiring methods just as one of the definitions of "Accessible" applies to wiring methods.

"Accessible (as applied to equipment). Admitting close approach; not guarded by locked doors, elevation, or other effective means.

Accessible **(as applied to wiring methods)**. Capable of being removed or exposed without damaging the building structure or finish or not permanently closed in by the structure or finish of the building.
Accessible, Readily (Readily Accessible). Capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, and so forth."
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its statement on proposal 1-23.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-25 Log #1606 NEC-P01 **Final Action: Reject**
(100. Concealed Space)

Submitter: Allen C. Weidman, Society of the Plastics Industry, Inc.
Comment on Proposal No: 1-23
Recommendation: Accept this proposal in principle by accepting the proposed definition of concealed space and also modifying the definition of "concealed" as shown below:
Concealed Space. That portion(s) of a building behind walls, over suspended ceilings, in pipe chases, attics, and in whose size might normally range from 44.45 mm (1 3/4 in.) stud spaces to 2.44 m (8 ft) interstitial truss spaces and that might contain combustible materials such as building structural members, thermal and/or electrical insulation, and ducting. [NFPA 96:3.3.42.1]
Concealed (as applied to wiring methods). Rendered inaccessible by the structure or finish of the building. Wires in concealed raceways are considered concealed, even though they may become accessible by withdrawing them.
Substantiation: The proposal cited the following uses of the term concealed space in the NEC:
320.30(D)(1)
(D) Unsupported Cables. Type AC cable shall be permitted to be unsupported where the cable complies with any of the following:
(1) Is fished between access points through **concealed spaces** in finished buildings or structures and supporting is impracticable
330.30(D)(1)
(D) Unsupported Cables. Type MC cable shall be permitted to be unsupported where the cable:
(1) Is fished between access points through **concealed spaces** in finished buildings or structures and supporting is impractical; or
332.30(B)
332.30 Securing and Supporting. Type MI cable shall be supported and secured by staples, straps, hangers, or similar fittings, designed and installed so as not to damage the cable, at intervals not exceeding 1.8 m (6 ft).
(A) Horizontal Runs Through Holes and Notches. In other than vertical runs, cables installed in accordance with 300.4 shall be considered supported and secured where such support does not exceed 1.8 m (6 ft) intervals.
(B) Unsupported Cable. Type MI cable shall be permitted to be unsupported where the cable is fished between access points through **concealed spaces** in finished buildings or structures and supporting is impracticable.
334.30(B)
(B) Unsupported Cables. Nonmetallic-sheathed cable shall be permitted to be unsupported where the cable:
(1) Is fished between access points through **concealed spaces** in finished buildings or structures and supporting is impracticable.
376.10
376.10 Uses Permitted. The use of metal wireways shall be permitted in the following:
(1) For exposed work
(2) In **concealed spaces** as permitted in 376.10(4)
604.4,
604.4 Uses Permitted. Manufactured wiring systems shall be permitted in accessible and dry locations and in ducts, plenums, and other air-handling spaces where listed for this application and installed in accordance with 300.22.
Exception No. 1: In **concealed spaces**, one end of tapped cable shall be permitted to extend into hollow walls for direct termination at switch and outlet points.
760.30(A)(1)
760.30 Multiconductor NPLFA Cables. Multiconductor non–power-limited fire alarm cables that meet the requirements of 760.81 shall be permitted to be used on fire alarm circuits operating at 150 volts or less and shall be installed in accordance with 760.30(A) and 760.30(B).
(A) NPLFA Wiring Method. Multiconductor non–power-limited fire alarm circuit cables shall be installed in accordance with 760.30(A)(1), (A)(2), and (A)(3).
(1) Exposed or Fished in **Concealed Spaces**. In raceway or exposed on surface of ceiling and sidewalls or fished in **concealed spaces**. Cable splices or terminations shall be made in listed fittings, boxes, enclosures, fire alarm devices, or utilization equipment. Where installed exposed, cables shall be adequately supported and installed in such a way that maximum protection against physical damage is afforded by building construction such as baseboards, door frames, ledges, and so forth. Where located within 2.1 m (7 ft) of the floor, cables shall be securely fastened in an approved manner at intervals of not more than 450 mm (18 in.).
760.52(B)(1)
(B) PLFA Wiring Methods and Materials. Power-limited fire alarm conductors and cables described in 760.82 shall be installed as detailed in 760.52(B)(1), (B)(2), or (B)(3) of this section. Devices shall be installed in accordance with 110.3(B), 300.11(A), and 300.15.
(1) Exposed or Fished in **Concealed Spaces**. In raceway or exposed on the surface of ceiling and sidewalls or fished in **concealed spaces**. Cable splices or terminations shall be made in listed fittings, boxes, enclosures, fire alarm devices, or utilization equipment. Where installed exposed, cables shall be adequately supported and installed in such a way that maximum protection against physical damage is afforded by building construction such as baseboards, door frames, ledges, and so forth. Where located within 2.1 m (7 ft) of the floor, cables shall be securely fastened in an approved manner at intervals of not more than 450 mm (18 in.).
770.154(A) FPN
Nonconductive and conductive optical fiber cables shall comply with any of the requirements given in 770.154(A) through 770.154(E) or where cable substitutions are made as shown in 770.154(F).
(A) Plenums. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type OFNP or OFCP. Abandoned cables shall not be permitted to remain. Types OFNR, OFCR, OFNG, OFN, OFCG, and OFC cables installed in compliance with 300.22 shall be permitted. Listed plenum optical fiber raceways shall be permitted to be installed in ducts and plenums as described in 300.22(B) and in other spaces used for environmental air as described in 300.22(C). Only type OFNP and OFCP cables shall be permitted to be installed in these raceways.
FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in **concealed spaces** containing exposed combustibles.
800.154(A) FPN
(A) Plenum. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type CMP. Abandoned cables shall not be permitted to remain. Types CMP, CMR, CMG, CM, and CMX and communications wire installed in compliance with 300.22 shall be permitted. Listed plenum communications raceways shall be permitted to be installed in ducts and plenums as described in 300.22(B) and in other spaces used for environmental air as described in 300.22(C). Only Type CMP cable shall be permitted to be installed in raceways.
FPN: See 8.14.1 of NFPA 13-2002, Installation of Sprinkler Systems, for requirements for sprinklers in **concealed spaces** containing exposed combustibles.
820.154(A)FPN

(A) Plenums. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type CATVP. Abandoned cables shall not be permitted to remain. Types CATVP, CATVR, CATV, and CATVX cables installed in compliance with 300.22 shall be permitted. Listed plenum CATV raceways shall be permitted to be installed in ducts and plenums as described in 300.22(B) and in other spaces used for environmental air as described in 300.22(C). Only Type CATVP cable shall be permitted to be installed in these raceways.
FPN: See 8.14.1 of NFPA 13-2002, Installation of Sprinkler Systems, for requirements for sprinklers in **concealed spaces** containing exposed combustibles.

The panel rejected the proposal because of the Standards Council directive to maintain the status quo on issues related to plenum cables. The panel should reconsider its position relative to the applicability of the standards council directive to this proposal.

Clearly, the use term "concealed spaces" in Articles 320, 330, 332, 334, 376, 604 and 760 has no relation to plenum cables.

The use of the term "concealed spaces" in the plenum cable applications sections of Articles 770, 800 and 820 is in nonmandatory fine print notes. Defining the a term in a fine print note does not change plenum cable requirements because the fine print note is for information only; it is not a mandatory requirement.

This definition is an extract from NFPA 96, Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations. It is the only definition of concealed space in the NFPA Glossary.

The definition of "Concealed" currently in the NEC is:

"Concealed. Rendered inaccessible by the structure or finish of the building. Wires in concealed raceways are considered concealed, even though they may become accessible by withdrawing them."

The recommended change to the definition of "Concealed" will clarify that the current definition deals with wiring methods just as one of the definitions of "Accessible" applies to wiring methods.

"Accessible (as applied to equipment). Admitting close approach; not guarded by locked doors, elevation, or other effective means.
Accessible **(as applied to wiring methods)**. Capable of being removed or exposed without damaging the building structure or finish or not permanently closed in by the structure or finish of the building.

Accessible, Readily (Readily Accessible). Capable of being reached quickly for operation, renewal, or inspections without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, and so forth."

Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its statement on proposal 1-23.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

4-1 Log #33 NEC-P04 **Final Action: Accept**
(100. Conductor, open, Cable, open multiconductor)

TCC Action: The Technical Correlating Committee understands that the action on Proposal 6-2 occurs in Comment 4-2a.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 6-2
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 4 for action in Article 225. This action will be considered by Code-Making Panel 4 as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-2 Log #34 NEC-P04 **Final Action: Accept**
(100. Conductor, open, Cable, open multiconductor)

TCC Action: The Technical Correlating Committee understands that the action on Proposal 6-2 occurs in Comment 4-2b.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 6-3
Recommendation: It was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 4 for action in Article 225. This action will be considered by Code-Making Panel 4 as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-2a Log #CC400 NEC-P04 **Final Action: Accept**
(100. Conductor, open, Cable, open multiconductor)

Submitter: Code-Making Panel 4,
Comment on Proposal No: 4-1
Recommendation: Reject proposal 6-2
Substantiation: The two proposed definitions are very generic definitions where a general dictionary definition for "open" can be used without inserting this definition into Article 100 or into Article 225. There was a concentrated effort during the 2005 NEC cycle to clarify the differences between "open" conductors and "exposed" conductors. The usage of "open" in Article 225 is dealing with the general dictionary definition of being open or exposed. Inserting these definitions into Article 100 or into Article 225 could also be confusing to the user of the NEC since Article 398 addresses Open Wiring on Insulators.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-2b Log #CC401 NEC-P04 **Final Action: Accept**
(100.Conductor, open, Cable, open multiconductor)

Submitter: Code-Making Panel 4,
Comment on Proposal No: 4-2
Recommendation: Reject proposal 6-3
Substantiation: The two proposed definitions are very generic definitions where a general dictionary definition for "open" can be used without inserting this definition into Article 100 or into Article 225. There was a concentrated effort during the 2005 NEC cycle to clarify the differences between "open" conductors and "exposed" conductors. The usage of "open" in Article 225 is dealing with the general dictionary definition of being open or exposed. Inserting these definitions into Article 100 or into Article 225 could also be confusing to the user of the NEC since Article 398 addresses Open Wiring on Insulators.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

9-1 Log #541 NEC-P09 **Final Action: Reject**
(100. Conduit Body)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-2
Recommendation: Accept the proposal.
Substantiation: Conduit bodies are not restricted to conduit or tubing systems. "Proper" use by attachment to a raceway is not mandated by Code. A cord or cable could enter a properly supported conduit body for purpose of splicing, or where the conduit body is attached to a cabinet, box, enclosure, or housing of equipment with a chase nipple (a fitting not conduit or tubing). A conduit body supporting a floodlight lampholder and connected to a box with a chase nipple has no conduit or tubing involved.
Panel Meeting Action: Reject
Panel Statement: For the purposes of this definition, a chase nipple is both a fitting as well as an element of a raceway. The definition of the term raceway includes, but is "not limited to" various Chapter 3 methods. There is no evidence that the existing definition is causing confusion in the field.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

2-3 Log #508 NEC-P02 **Final Action: Reject**
(100. Connected Load (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-3
Recommendation: Accept the proposal.
Substantiation: "Calculated" load is well defined by tables, va/sq ft, va per outlet, demand factors, etc. An unconnected calculated load is not the same as a connected load since no equipment is necessarily connected. 210.11(B) uses the terms "calculated load" and "connected load" which infers a difference.
Panel Meeting Action: Reject
Panel Statement: As with the original proposal, the submitter has not presented substantiation that the term "connected load" needs to be specifically defined. The term is well understood within the context of how it is used.
Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-26 Log #419 NEC-P01 **Final Action: Reject**
(100. Connection, Permanent (Direct) Connection, Cord-and-Plug (new))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-24
Recommendation: Accept revised:
Conductors that are connected by means other than attachment plug, receptacle. Cord connector body, or motor base inlet, such as lugs, terminals. Wire connectors, clamps, solder, screws, and the like.
Substantiation: A definition for permanently connected is useful and has nothing to do whether permanently installed equipment is cord and plug connected, whether portable or fixed. This would also apply to equipment permitted to be cord connected without a plug/receptacle such as elevators, motors, etc. The perception of some code users is that all cord wiring is not "permanently installed" or "fixed wiring" or "permanently connected".
Panel Meeting Action: Reject
Panel Statement: The term being defined is not used in the Code and the proposal is not consistent with NEC Style Manual 2.2.2.1.
CMP-1 is not totally clear on what the submitter of this comment is recommending. Regardless, the revised text proposed in this comment does not change CMP-1's position on accepting a new definition (see CMP-1's panel statement during the Proposal stage). CMP-1 suggests that the submitter of this comment see the NEC Style Manual Section 2.2.2 - definitions shall not contain the term being defined. In addition the comment lacks simple declarative sentence structure as required by 3.3.1.2.2 of the NEC Style Manual.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-27 Log #540 NEC-P01 **Final Action: Reject**
(100. Disconnecting Means)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-26
Recommendation: Accept the proposal.
Substantiation: The proposal is no more a "requirement" than that of other definitions, e.g., "accessible" (wiring methods) "without damaging the building structure or finish"; "cabinet" "provided with a frame"; "in sight from" "visible and not more than 15 m (50 ft) distant"; "rainproof" "constructed protected or treated"; "switch, general use snap" "constructed so that it can be installed"; switch. Motor circuit "rated in horsepower that is capable of"; ventilated "provided with a means".
Panel Meeting Action: Reject
Panel Statement: The substantiation for submitter's original proposal (1-26) describes devices which de-energize circuits. They do not disconnect conductors from their source of supply. Only disconnecting means do that. Neither the original proposal nor the comment indicates that Code users are confused by the existing definition of Disconnecting Means.
The Panel reaffirms its statement on Proposal 1-26. The Proposal clearly, and improperly, adds a requirement to the definition. Such a requirement, if necessary, could be requested by the submitter for inclusion in the appropriate Code Sections through proposals for the 2011 NEC.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-28 Log #689 NEC-P01 **Final Action: Hold**
(100. Dwelling Unit)

TCC Action: After reviewing the entire record, including the existing rules in 210.18 and 210.60, the Technical Correlating Committee directs that Comment 1-28 and Proposal 1-27 be reported as "Hold" for review during the 2011 revision cycle. Although the revised definition is suitable for application in NFPA 101 and 5000, the lack of other occupancies being defined in the NEC (such as dormitories, rooming houses, etc.) creates a concern for how the definition will be applied in the application of the NEC.
Submitter: Timothy M. Croushore, Allegheny Power
Comment on Proposal No: 1-27
Recommendation: Please reject the original proposal.
Substantiation: The proposed statement in the substantiation that "the definition does not change the intent of any of the codes..." is not correct. Rather, adding the new term "housekeeping purposes" introduces a new concept that is not currently in any of the NFPA standards. Deleting the term "permanent provisions for..." eliminates a long standing clarification for cooking between a portable microwave oven and an installed cook-top in a counter top. Also, the revised definition would now have all guest rooms of hotels and motels and college dormitories as dwelling units. The revised definition does not add clarity to the definition of dwelling unit. Rather, it changes the definition.
Panel Meeting Action: Reject
Panel Statement: The panel is eliminating the distinction between portable microwave ovens (as well as toaster-ovens and similar appliances) and installed cooktops, as many dwelling units do not contain permanent cooking appliances. The panel is also including those hotel rooms and dormitory rooms that meet the proposed definition among "dwelling units".
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-29 Log #1859 NEC-P01 **Final Action: Reject**
(100. Dwelling Unit)

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 1-27
Recommendation: Include the word "permanent", as follows:
Dwelling Unit. One or more rooms arranged for complete independent housekeeping purposes, with space for eating, living, and sleeping, permanent facilities for cooking, and provisions for sanitation.
Substantiation: Accepting this change as proposed would make any guest room or guest suite containing a microwave a dwelling unit. The proponent did not include any technical data that would justify incorporating the dwelling unit provisions into hotel/motel applications, such as AFCIs, GFCIs, receptacle placements, and so forth.
Panel Meeting Action: Reject
Panel Statement: See CMP-1's action and statement on Comment 1-28.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

13-1 Log #4 NEC-P13 **Final Action: Accept**
(100. Electrical Power Production and Distribution Network)

TCC Action: The Technical Correlating Committee notes that the direction given to the panel is addressed by their action on Comment 13-2.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 1-28
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 13 for action. This action will be considered by Code-Making Panel 13 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-2 Log #768 NEC-P13 **Final Action: Accept**
(100. Electrical Power Production and Distribution Network)

Submitter: Louis A. Barrios, Shell Global Solutions
Comment on Proposal No: 1-28
Recommendation: Editorial change to revise text as follows:
Power production, distribution, and utilization equipment and facilities, such as ~~a~~ electric utility systems that deliver electric power to the connected loads, that are ~~is~~ external to and not controlled by an interactive system.
Substantiation: Editorial change on original panel action to improve grammar of definition. Refer also to Mr. Barrios' affirmative comment.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

5-3 Log #1671 NEC-P05 **Final Action: Accept**
(100. Equipment Grounding Conductor (EGC))

Submitter: Phil Simmons, Olympia, WA
Comment on Proposal No: 5-6
Recommendation: Revise the definition to read as follows:
Equipment Grounding Conductor (EGC). The conductive path installed to connect normally non-current-carrying metal parts of equipment together and to the system grounded conductor or to the grounding electrode conductor, or both.
Retain the two FPNs.
Substantiation: The words "or both" should be added to the end of the definition to recognize that in many cases, the equipment grounding conductor is connected to both the system grounded conductor and to the grounding electrode.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

13-3 Log #85 NEC-P13 **Final Action: Accept**
(100. Fault Tolerant External Control Circuit (GOT))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-1
Recommendation: The Technical Correlating Committee understands that the Panel Action was to accept the proposed secondary definition which is the same text that appears in the 2005 Code.
The Technical Correlating Committee directs that the definition remain in 695.2, since it is only used in Article 695.
This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

3-2 Log #449 NEC-P03 **Final Action: Reject**
(100. Fire Stop)

Submitter: Allen C. Weidman, The Society of the Plastics Industry, Inc.
Comment on Proposal No: 3-2
Recommendation: Accept this proposal.
Substantiation: 300.21 uses the term "firestopped" with an additional FPN. It seems reasonable to include a definition of "fire stop," considering the importance of firestopping identified in 300.21.

Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any technical substantiation in his comment to justify adding this definition to the NEC. This term is only used once in the NEC, in Section 300.21, and generally a definition is only placed in Article 100 where that term is used in two or more articles of the Code. The panel reaffirms the panel statement from the proposal as follows: "Fire Stop" is a common phrase used in the building industry, similar to "fire rating" and "fire resistance" used in various sections in the NEC, that does not require a definition be inserted into Article 100 for the user of the NEC. Where these terms are used, the user of the Code can access other documents, such as NFPA 914 and the various building codes, to determine the meaning of these terms if he or she doesn't already know the definition. Inserting all the building code definitions would make Article 100 totally unwieldy and difficult to use.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

5-4 Log #1853 NEC-P05 **Final Action: Accept**
(100. Ground)

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 5-8
Recommendation: Continue to Accept this Proposal as submitted.
Substantiation: The deletion of the unnecessary text will provide clarity to a widely misunderstood topic.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

2-4 Log #1886 NEC-P02 **Final Action: Reject**
(100. Ground-Fault Circuit Interrupter)

Submitter: Paul S. Hamer, Richmond, CA
Comment on Proposal No: 2-6
Recommendation: This proposal (and its companion Proposals 2-88, 2-285, 11-48 and 11-49 - Comments submitted separately) should be accepted. Add to the end of the proposed wording: <u>This definition shall become effective January 1, 2011.</u> This aligns with Mr. Weber's Explanation of Negative for Proposal 2-88 regarding the development of new, life-saving concepts. Adding the delayed effective date would provide the incentive and the necessary time for the Three-Phase Ground-Fault Circuit-Interrupter System (GFCIS-3Ph) to be further developed and commercialized.
Substantiation: The Panel Statement of Proposal 2-88 (referred to in this Panel Statement) includes "...The submitter's substantiation notes that the hazard is when unqualified persons work on equipment without taking the appropriate precautions to deenergize the circuit and verify that circuit is disconnected...". There are numerous instances where unqualified persons were electrocuted by faulty or defective equipment (see the supporting material submitted with the proposals), and these people may have been protected from electrocution by the proposed GFCIS-3Ph. See also the Explanation of Negatives of Mr. King and Mr. Weber for Proposal 2-88. The patent applications are pending for the GFCIS-3Ph as of this date, but further field measurements made since the Proposal submittal date indicate that the distributed phase capacitances on an actual installed three-phase 480 volt power system are balanced enough to permit the sensitivity described in the proposals.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree with the addition of the system as proposed in Comment 2-62, and as such the definition is not added because it is not used in the NEC. See the panel action and statement on Comment 2-62.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: Panel 2 should give further consideration to this proposed system. See my explanation of negative on Comment 2-62.

5-5 Log #1221 NEC-P05 **Final Action: Accept**
(100. Grounded)

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 5-9
Recommendation: The TCC Grounding and Bonding Task Group recommends that CMP-5 continue to Accept in Principle Proposal 5-9.
Substantiation: The TCC Grounding and Bonding Task Group agrees with the CMP-5 editorial revision to the Definition of the word "Grounded".
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-7 Log #2074 NEC-P05 **Final Action: Reject**
(100. Grounding Conductor)

Submitter: Chuck Mello, Underwriters Laboratories
Comment on Proposal No: 5-11
Recommendation: Revise definition to read as follows:
Grounding Conductor. ~~A conductor used to connect equipment or the grounded circuit of a wiring system to a grounding electrode or electrodes~~ A general term used to include all conductors that connect equipment or systems to ground and that connect normally non-current carrying metal parts of equipment together.
FPN: Grounding electrode conductors, bonding conductors, and equipment grounding conductors all are types of grounding conductors.
Substantiation: The actions of the panel were correct to reject the deletion of this definition. After the full deliberations it appears the definition of "grounding conductor" should be considered for revision to ensure the concept of being all-inclusive. The proposed text clarifies that a "grounding conductor" would include grounding electrode conductors, equipment grounding conductors and bonding conductors. The term "grounding conductor" Is still used many times in various articles of the 2008 Draft NEC and the context has different meanings that would be covered by this revised definition.
Panel Meeting Action: Reject
Panel Statement: The panel affirms that the original objectives of the TCC assigned Grounding and Bonding Task Group were to provide more accurate and specific definitions for words and terms related to grounding and bonding. This type of proposed generalization of the term "grounding conductor" reintroduces some of the inaccuracies and vagueness that the work of the grounding and bonding task group was responsible for reducing. The term "Grounding Conductor" is presently used in Articles 800, 810, 820, and 830 to identify the conductor that connects the communications system grounding conductors to a grounding electrode. Changing the term to include equipment grounding conductors would add confusion.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
BOKSINER, J.: This comment should be accepted or accepted in principle. As a result of the change to the definition of "Grounding Electrode Conductor," the definition of "Grounding Electrode Conductor" and "Grounding Conductor" are almost identical. With the change in definitions, the term "Grounding Conductor," as presently defined, has become superfluous. The definition of "Grounding Conductor" should be revised to describe the full set of grounding conductors including equipment grounding conductors and grounding electrode conductors. Otherwise, this term should be deleted from the NEC.
BRETT, JR., M.: I am voting negative, I agree with the negative vote. The proposed definitions do not add clarity to the NE,. The definition of "Grounding Coductor" should be deleted.
The defined conductors, such as, the Equipment Grounding Conductor, the Grounding Electrode Conductor and even the Grounded Conductor (Neutral), have been referred to as a grounding conductor.

5-8 Log #1223 NEC-P05 **Final Action: Accept**
(100. Grounding Electrode)

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 5-14
Recommendation: The TCC Grounding and Bonding Task Group recommends that CMP-5 continue to Accept in Principle Proposal 5-14.
Substantiation: The TCC Grounding and Bonding Task Group agrees with the CMP-5 editorial revision to the Definition of the word "Grounding Electrode".

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.

Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-6 Log #2079 NEC-P05 **Final Action: Accept**
(100.Grounding Electrode Conductor)

Submitter: Chuck Mello, Underwriters Laboratories
Comment on Proposal No: 5-18
Recommendation: Revise proposed definition to read as follows:
Grounding Electrode Conductor. A conductor used to connect the system grounded conductor or the equipment to a grounding electrode or to a point on the grounding electrode system.
Substantiation: The definition in the proposal effectively prevents the connection of the grounding electrode conductor to the building "master" or "central" ground bus that is specifically permitted in 250.64(C) and 250.64(F). Under the revised definition the ends of the grounding electrode conductor can terminate only either on a grounding electrode, defined in Article 100 and specified in 250.52, or on a system conductor, to establish a system grounded conductor, or on equipment enclosures. A better definition would be as stated above so as to not limit the terminations that are allowed by prescriptive text.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-9 Log #30 NEC-P05 **Final Action: Accept**
(100. Grounding Electrode Conductor)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 5-18
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the Code-Making Panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. See panel action on Comment 5-6.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

15-1 Log #542 NEC-P15 **Final Action: Reject**
(100. Hospital Grade Receptacles)

Submitter: Deborah J. Mann, Debbie Mann Consulting, Inc.
Comment on Proposal No: 15-34
Recommendation: Define "Hospital Grade Receptacles" and place the term in the Index. It is currently used in regard to patient bed areas, but is not defined or referenced in the index.
Substantiation: I asked ten people, including two inspectors, what a hospital grade receptacle actually is and nobody knew correctly. Several people thought it was an insulated ground receptacle, including an electrical inspector.
Panel Meeting Action: Reject
Panel Statement: The term "Hospital Grade" used in reference to a receptacle refers to a standard of device manufacture and performance. Article 100 Definitions describe general conditions or installation considerations rather than device specifications.

In addition, the submitter did not provide a specific recommendation for action on Proposal 15-34.

Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

5-10 Log #671 NEC-P05 **Final Action: Reject**
(100. Intersystem Bonding Termination)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 5-20
Recommendation: The proposal as modified by the Panel Action should be Rejected.
Substantiation: The Panel Action to Accept in Principle by accepting the term "Intersystem Bonding Termination" into Article 100 is not in accordance with 2.2.2.1 of the NEC Style Manual which states that Article 100 shall contain definitions of terms that appear in two or more other articles of the NEC. The term "intersystem bonding termination" appears 6 times in the 2008 draft of the Code, once in Article 100 and the other 5 in 250.94. The definition of "intersystem bonding termination" may be included in 250.2 until such time as it appears in additional articles.

The definition "Intersystem Grounding Termination" in the original proposal could be accepted into Article 100 since it is used 33 times in 770.100, 800.100, 810.21, 820.100, and 830.100.

This Proposal should be correlated with Proposals 16-167 [800.100(B)], 16-236 [810.21(F)], 16-299 [820.100(B)], and 16-395 [830.100(B)] that address the use of the term "intersystem grounding termination" in those articles.
Panel Meeting Action: Reject
Panel Statement: The panel concludes that the term "Intersystem Bonding Termination" is in fact the correct terminology for this connection and that where the term "Intersystem Grounding Termination" appears in Articles 770, 800, 810, 820, and 830 it should be changed to "Intersystem Bonding Termination" to be consistent with the proposed definition and 250.94. The panel requests that the TCC correlate the terminology as indicated here.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:

BOKSINER, J.: I support the panel action but would like to point out that the necessary correlation has already been accomplished. See CMP 16 actions on Comments 16-18, 16-43, 16-128, 16-130, 16-187, 16-190, 16-231, 16-234, 16-308, 16-310.

5-11 Log #1670 NEC-P05 **Final Action: Accept in Principle**
(100. Intersystem Bonding Termination)

Submitter: Phil Simmons, Olympia, WA
Comment on Proposal No: 5-20
Recommendation: Revise the definition to read as follows:

Intersystem Bonding Termination. A device that provides a means of connecting ~~bonding~~ communications system(s) grounding conductor(s) ~~equipment~~ at the service equipment or at the disconnecting means for ~~any additional~~ buildings or structures supplied by a feeder or branch circuit.
Substantiation: The revised wording uses terms CMP-5 has chosen to be more descriptive in Article 250 and to rely less on definitions. Article 800 uses the term "grounding conductor" in 800.100. The Intersystem Bonding Termination device is intended to provide a means of connecting these grounding conductors to the service, building or structure grounding electrode system.
Panel Meeting Action: Accept in Principle

Revise the definition to read as follows:

Intersystem Bonding Termination. A device that provides a means ~~of~~ for connecting ~~bonding~~ communications system(s) grounding conductor(s) and bonding conductor(s) ~~equipment~~ at the service equipment or at the disconnecting means for ~~any additional~~ buildings or structures supplied by a feeder or branch circuit.
Panel Statement: The panel accepts the comment and revises the proposal further by adding the words "and bonding conductors" after the words "system(s) grounding conductors." The terms "grounding conductors" and "bonding conductors" are both used in the Chapter 8 articles and would be required to terminate on this same equipment to meet the requirements in those rules.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

2-5 Log #5 NEC-P02 **Final Action: Accept**
(100. Kitchen (New))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 1-36
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 2 for action. This action will be considered by Code-Making Panel 2 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Accept Proposal 1-36, and, in addition, delete the words "for the purposes of this requirement, a kitchen is defined as an area with a sink and permanent facilities for food preparation and cooking" from 210.8(B)(2).
Panel Statement: The panel agrees with adding the term to Article 100 and has deleted the same material from 210.8(B)(2) to avoid the definition appearing in two places.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-30 Log #303 NEC-P01 **Final Action: Accept in Part**
(100. Lighting Outlet)

Submitter: Code-Making Panel 18,
Comment on Proposal No: 1-39
Recommendation: Change the definition of "Lighting Outlet" in Article 100 as follows:

"Lighting Outlet. An outlet intended for the direct connection of a lampholder~~,~~ or luminaire (lighting fixture), ~~or a pendant cord terminating in a lampholder.~~

FPN: A receptacle outlet, switched or unswitched, is never by definition a lighting outlet, even if the receptacle is dedicated solely to lighting service as in 410.30(C)(1). A receptacle outlet may be counted in lieu of a required outlet as permitted by Exception No. 1 to 210.70(A)(1).

Substantiation: The submitter of Proposal 1-39 is incorrect in stating that the existing definition of "lighting outlet" could be interpreted to disallow the installation of a luminaire as described in 410.30(C)(1). Section 410.30 does not state that the receptacle to which the electric-discharge fixture is connected by cord and plug is a "lighting outlet". This outlet is, in fact, a switched receptacle outlet. But the outlet could be converted to a "lighting outlet" by removing the receptacle and directly wiring the luminaire to the branch circuit at that point. Nowhere in the code is it stated that a luminaire must be connected to a lighting outlet, nor does it state or imply that connecting a luminaire with a cord and plug to a receptacle converts the receptacle to a lighting outlet. An outlet becomes a lighting outlet when a luminaire is directly wired to the branch circuit at the outlet, i.e., not connected to the branch circuit through a plug/receptacle connection.

The submitter's statement: "This would also negate Exception No. 1 of 210.70(A)(1)" is confusing since the definition of "this" is unclear. 210.70(A)(1) requires a switched lighting outlet in all habitable rooms in a dwelling unit. Exception No. 1 permits a switched receptacle to be counted as the required lighting outlet in all of the habitable spaces except the bathroom and kitchen. These switched receptacles are still receptacle outlets, they are just permitted to be counted as the required lighting outlet by the code, but there is no guarantee that a luminaire will be plugged into it. The requirement for direct-wired luminaires in bathrooms and kitchens is a safety issue that assures lighting for the bath and kitchen can be made available without having to resort to cord and plug connected luminaires in zones around bathtubs and sinks. Whichever way we interpret the submitter's statement, the proposed modification to the definition of lighting outlet would not change the meaning or the application of this exception in the code, nor does the definition as it exists now negate the need for this exception.

CMP-1 erred in deleting the word "direct" from the definition of "lighting outlet." This change does not fix the problem that the submitter believes is present, and introduces conflict in other portions of the code that would have to be repaired. For example, this change would permit any switched receptacle outlet in a dwelling unit with a cord and plug connected luminaire connected to it, to qualify as a lighting outlet. A code-compliant dwelling could be constructed without having any luminaires installed.

The submitter's concerns seem to revolve around confusion, especially among inspectors and electrical contractors, regarding the meaning of the term "lighting outlet". The proposer's fix, and the CMP-1 fix, seem to cause more problems than they correct. This confusion could simply be cleared up by adding a fine print note to the definition in Article 100. This would clarify the meaning of the definition without introducing changes that would impact other code sections.

CMP-18 also recommends removing the phrase "or a pendant cord terminating in a lampholder" from the definition. There are no listed cord-connected lampholders. There are "cord-connected luminaires," but these are covered by the definition of "luminaire" and do not need to be specifically addressed in the definition of "lighting outlet."

This comment was balloted through CMP-18 with the following ballot results:

14 Eligible to Vote
14 Affirmative

Panel Meeting Action: Accept in Part
The panel accepted the definition of "Lighting Outlet" in Article 100, with a minor editorial change,as submitted by CMP-18 as follows:

"Lighting Outlet. An outlet intended for the direct connection of a lampholder or luminaire (lighting fixture)."

The panel rejects the inclusion of the FPN.
Panel Statement: The panel accepts the revised definition, but rejects the addition of the FPN because it contains a requirement which is not allowed in 3.1.3 of the NEC Style Manual.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

MCMAHILL, L.: I concur with the removal of the FPN; however, I disagree with CMP-1's action of adding the word "direct" to the definition and deleting "or a pendant cord terminating in a lampholder" from the definition. An "Outlet" is defined as "A point on the wiring system at which current is taken to supply utilization equipment." Lampholders and luminaires are utilization equipment. Utilization equipment can be permanently connected or cord- and plug- connected to the wiring system. Adding the word "direct" appears to negate the use of a cord- and plug connection allowed by Section 410.30(C)(1), Exception. In addition, deletion of "or a pendant cord terminating in a lampholder" appears to prohibit field installed pendant lampholders. I doubt that this was the intent of CMP-1

1-31 Log #320 NEC-P01 **Final Action: Reject**
(100. Lighting Outlet)

Submitter: Code-Making Panel 2,
Comment on Proposal No: 1-39
Recommendation: Accept the proposal in principle. Revise the definition to read as follows:

Lighting Outlet. An outlet intended for the connection of a lampholder, luminaire (lighting fixture), or a pendent cord terminating in a lampholder.

Substantiation: The Task Group agrees this action meets the intent of the submitter. The submitter of this change was concerned that the existing definition would not allow a receptacle to be used to supply a cord and plug luminaire allowed by 210.70(A)(1) Exception No. 1. In the future, possibly moving Exception No. 1 up into the main body of the text may put this section into a more positive language. The Task Group disagrees that the existing wording negates the exception allowed in 210.70(A)(1).

This comment was balloted through CMP-2 with the following ballot results:

12 Eligible to Vote
10 Affirmative
1 Negative
1 Not Returned (B. Nenninger)

Mr. J. Pauley voted negatively stating: "I do not agree with the Task Group action to support the proposal. The revision by CMP-1 creates an unintended conflict with the provisions in Article 210 that require lighting outlets. 210.70 requires specific lighting outlets in dwelling units and habitable rooms to have wall switched controlled lighting outlets. The revision to the definition by CMP-1 would allow a switched receptacle to be used as a lighting outlet in all cases (instead of those limited by the exception) because any receptacle could be "intended for the connection of a luminaire." The use of the definition in Article 210 relies on the provision that these outlets are intended for direct connection of a luminaire. I do agree with CMP-1 that the submitter is incorrect in claiming that the current definition negates 210.70(A)(1), Exception No. 1. That exception is specific to note that the provision to use a switched receptacle is in lieu of a lighting outlet. CMP-1 should consider different language to accommodate the 410.30(C) concern without deleting the "direct connect" provision.

Panel Meeting Action: Reject
Panel Statement: The Panel concludes that "pendant cord terminating in a lampholder" is extraneous and inclusion of "direct" connection is appropriate. See panel action and statement on Comment 1-30.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

MCMAHILL, L.: See my explanation of negative vote on Comment 1-30.

1-32 Log #833 NEC-P01 **Final Action: Accept in Principle**
(100. Lighting Outlet)

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 1-39
Recommendation: Reject the Proposal.
Substantiation: The revision by CMP 1 creates an unintended conflict with the provisions in Article 210 that require lighting outlets. NEC 210.70 requires specific lighting outlets in dwelling units and habitable rooms to have wall switched controlled lighting outlets. The revision to the definition by CMP 1 would allow a switched receptacle to be used as a lighting outlet in all cases (instead of those limited by the exception) because any receptacle could be "intended for the connection of a luminaire". The use of the definition in Article 210 relies on the provision that these outlets are intended for direct connection of a luminaire. I do agree with CMP 1 that the submitter is incorrect in claiming that the current definition negates 210.70(A)(1) Exception No. 1. That exception is specific to note that the provision to use a switched receptacle is in lieu of a lighting outlet. CMP 1 should consider different language to accommodate the 410.30(C) concern without deleting the "direct connection" provision.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 1-30.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

MCMAHILL, L.: Removing the word "direct" does not "allow a switched receptacle to be used as a lighting outlet in all cases" as the submitter has noted. Section 210.70(A)(1), Exception 1 specifica
lly allows switched receptacles controlled by a wall switch in lieu of lighting outlets - an exception to the rule. In addition, and unlike a portable lamp,

a luminaire (fixture) is a complete lighting unit generally intended to be permanently connected to the premises wiring system. The use of a receptacle and cord and plug to connect a luminaire is an exception to the rule. Also see my explanation of negative vote on Comment 1-30.

19-1 Log #223 NEC-P19 **Final Action: Accept**
(100.Manufactured Home)

TCC Action: The Technical Correlating Committee understands that through this panel action, the sentence "For the purpose of this Code and unless otherwise indicated, the term mobile home includes manufactured homes." will become the second paragraph to the definition of "Manufactured Home".

The Technical Correlating Committee also understands that the two FPNs from the 2005 NEC will remain in the definition.

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 19-1
Recommendation: It was the action of the Technical Correlating Committee that the panel reconsider the proposal and make clear the intended status of the existing second paragraph. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel accepts the recommendation of the Technical Correlating Committee to reconsider the proposal and retains the existing second paragraph.
Panel Statement: The panel reaffirms its position that the second paragraph adds clarity and correlates with the definition of Mobile Home.
Number Eligible to Vote: 8
Ballot Results: Affirmative: 8

19-2 Log #958 NEC-P19 **Final Action: Accept**
(100. Manufactured Home)

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 19-1
Recommendation: Use non-mandatory text in the definition text that has been added to the existing definition as follows: "The term manufactured home includes any structure that meets all the provisions of this paragraph except the size requirements and with respect to which the manufacturer voluntarily files a certification required by the regulatory agency, and except that such term does shall not include any self-propelled recreational vehicle."

In addition, redo the metric measurements first with English method within parenthesis as follows: "A structure, transportable in one or more sections, that, in the traveling mode, is 2.4 m (8 body-ft) (2.4 m) ~~(2.5m)~~ or more in width or 12.2 m (40 body-ft) ~~(12.2 m)~~ ~~(12 m)~~ or more in length or, when erected on site, is 29.7 m2 (320 ft2) ~~(29.7 m2)~~ or more".
Substantiation: Definitions cannot contain mandatory text. Measurements in the NEC must have the metric measurements first with the English measurements in parentheses. These two issues have been corrected by this comment.
Panel Meeting Action: Accept
Number Eligible to Vote: 8
Ballot Results: Affirmative: 8

9-2 Log #1482 NEC-P09 **Final Action: Reject**
(100. Metal Enclosed Power Switchgear)

Submitter: Charles Ball, S & C Electric Company
Comment on Proposal No: 9-6
Recommendation: Add a new FPN to the definition of metal-enclosed power switchgear.

FPN: Medium-voltage (1,000-38,000 volts) Metal-Enclosed Power Switchgear is available with arc-resistant construction. Arc-resistant switchgear provides extra protection for personnel from the effects of an internal fault.
Substantiation: Some companies have decided to use arc-resistant equipment to provide additional protection for personnel. Their reason may be high fault current levels or that the switchgear is installed indoors. Motor control centers as well as medium-voltage metal-clad and metal-enclosed switchgear with arc-resistant construction are commonly available. The NEC needs to acknowledge the existence of this type of switchgear so it can make its readers aware of additional considerations such as required clearances for proper venting.
Panel Meeting Action: Reject
Panel Statement: Metal enclosed power switchgear should not be just medium voltage. The text added from Proposal 9-6 adequately identifies that arc-resistant type switchgear is available. The NEC should not be used as a design guide by identifying potential applications for certain types of equipment. The second sentence in the proposed FPN does not further define the term; instead it describes performance attributes of the product. It does not belong in Article 100.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

5-12 Log #1896 NEC-P05 **Final Action: Reject**
(100. Neutral (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-24
Recommendation: Accept the proposal as written.
Substantiation: A major focus of effort recently has been the effort to make the NEC a truly international document, in order to better assure its long term success. I have no additional arguments to offer in support of my entry in the define a neutral contest, except this: I am very worried that the neutral definition settled on by CMP 5, squarely based as it is in trade slang and not technical rigor, will diminish the credibility of the overall document. Canada does not use the CMP 5 approach; the IEC does not use the CMP 5 approach; the IEEE does not use the CMP 5 approach; and our own utilities do not use the CMP 5 approach. I have grave doubts as to how this will all play out down the road. CMP 5 is a great panel; where we ended up on the great equipment grounding vs bonding brouhaha was panel and task group work at its finest and the result was excellent. But I just can't get my head around where we are headed with the new neutral definition.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its actions and statement on Proposal 5-36 that resulted in the new definition. After reviewing the task group report, CMP-5 concludes that there is no single unique definition for the term "neutral conductor" in the electrical industry. The definition adopted by CMP-5 serves the needs of the NEC and is fully consistent with the IEC definition (see IEV 195-02-06) and is largely consistent with the NESC definition.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-13 Log #1036 NEC-P05 **Final Action: Reject**
(100. Neutral Conductor)

Submitter: Charles M. Trout, Maron Electric Co. Inc.
Comment on Proposal No: 5-28
Recommendation: This proposal should be Accepted. This proposal properly defines the neutral conductor as the common conductor in a multiwire circuit that carries the current caused by an unbalance of the load on the phase conductors of a multiwire circuit. It does not suggest, as the accepted Proposal 5-36 does, that an unbalanced load is a normal condition and, therefore, a presumably correct wiring design. It also maintains the technical correctness that a two wire circuit cannot contain a neutral conductor. It does not pretend that because a conductor is connected to the neutral point of a system that it is a neutral conductor anymore than trying to say that a grounding electrode conductor is a neutral conductor because it is connected to the neutral bar. A neutral conductor must function as a neutral conductor and carry only the unbalanced load in multiwire circuits and remain noncurrent-carrying in multiwire circuits supplying balanced loads.
Substantiation: See above.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-12.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-14 Log #1676 NEC-P05 **Final Action: Reject**
(100. Neutral Conductor)

Submitter: Charles M. Trout, Maron Electric Co. Inc.
Comment on Proposal No: 5-36
Recommendation: This Proposal should be Rejected.
Substantiation: The proposal suggests that the neutral conductor is intended to carry current under normal conditions. What are normal conditions? Is a balanced multiwire circuit a normal condition? Is an unbalanced multiwire circuit a normal condition? The substantiation suggests that a conductor can be neutral even though it does not function as a neutral conductor. This doesn't make sense and will only confuse the issue more.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comments 5-12 and 5-17.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-15 Log #1829 NEC-P05 **Final Action: Reject**
(100. Neutral Conductor)

Submitter: Fred W. Brown, HI Electron
Comment on Proposal No: 5-21
Recommendation: Add a new definition:

Neutral Conductor. A grounded conductor that is connected to the neutral point of a symmetrical electrical system and carries the vectorial summation currents of the ungrounded to grounded conductor loads in multiwire branch circuit, feeder, and service entrance conductors.

Substantiation: It is important for the National Electrical Code (NEC) to be technically correct. The current excepted definition of Neutral Conductor (Proposal 5-36 Log #1554) may lend itself to miss application of some of the NEC. By the present accepted definition, when looking at the application of 310.15(B)(4) a neutral conductor may never be counted as a current-carrying conductor.

NEC Panel 2 has found it important to require the grouping and identification of the grouping for ungrounded and grounded conductors of each multiwire branch circuit (Proposal 2-17 Log #3378). The importance of this is found in my definition of neutral conductor, not in fact that the conductor is grounded.

I would encourage the committee to accept this comment.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 5-12.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-16 Log #1960 NEC-P05 **Final Action: Reject**

(100. Neutral Conductor)

Submitter: Noel Williams, Herriman, UT

Comment on Proposal No: 5-36

Recommendation: This Proposal should have been Accept in Principle with additional modification of the definition of Neutral Conductor as follows:

"Neutral Conductor. The conductor connected to the neutral point of a system that is intended to carry unbalanced current under normal conditions and may carry fault current or unbalanced current under abnormal conditions."

Substantiation: Unfortunately, the accepted definition does not accomplish all of the clarifications needed, and so it is not technically accurate. As noted in the panel statement, the neutral conductor will carry current "under some normal conditions", but that does not mean all normal conditions. For example, a neutral conductor in a three-phase wye system that supplies only three phase loads will never carry current under normal conditions. However, a neutral conductor will carry any unbalanced current in the system that may occur normally if there are connected single phase loads, or abnormally because of some phase failure conditions. The neutral service conductor or the neutral conductor ahead of the bonding point of a separately derived system will also be called on to carry fault current - also not normal conditions. In addition, this definition does not address the neutrals of impedance-grounded systems that carry current only under abnormal conditions.

Panel Meeting Action: Reject

Panel Statement: The additional wording does not add clarity. The neutral conductor can carry current other than unbalanced current, e.g. nonlinear loads. The term "unbalanced" is not defined. The panel reaffirms its actions and statement on Proposal 5-36 that resulted in the new definition.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-17 Log #2139 NEC-P05 **Final Action: Reject**

(100. Neutral Conductor)

Submitter: Ryan Jackson, West Valley City, UT

Comment on Proposal No: 5-36

Recommendation: Accept the Proposal with the following change:

Neutral Conductor. The conductor connected to the neutral point of a system.

Neutral Point. Unchanged.

FPN: Unchanged.

Substantiation: The condition that the defined conductor "is intended to carry current under normal conditions" makes the existing language in 250.36 a discrepancy. The conductor between XO and the impedance of an impedance grounded system is currently referred to as a neutral conductor. This conductor does not carry current under normal conditions, but does carry current under fault conditions.

A similar comment is being made to the proposed change in 250.36 (5-133) that would allow the technical committees to change all of the language in 250.36 so that it doesn't conflict with all of section 250.36. These two comments should be correlated so the discrepancy between 250.36 and the definition does not occur.

Panel Meeting Action: Reject

Panel Statement: The phrase "is intended to carry current under normal conditions" is needed to differentiate the neutral conductor from the equipment grounding conductor.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-18 Log #1501 NEC-P05 **Final Action: Accept**

(100.Neutral Conductor and Neutral Point)

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc

Comment on Proposal No: 5-36

Recommendation: Technical Correlating Committee Task Group on the definition of "Neutral Conductor" concurs with the panel action on this proposal.

Substantiation: This comment was developed by the Technical Correlating Committee (TCC) Task Group (TG) on the definition of "Neutral Conductor." Task Group members were: Jeffrey Boksiner (Chair) (CMP 5, TCC), Paul Dobrowsky (CMP 5), Walter Skuggevig (CMP 5), Doug White (CMP 5), Michael Toman (CMP 2, TCC), Bob Wilkinson (CMP2), Jim Daly (CMP 6, CMP 7, TCC), Bill Laidler (CMP 6), and Oran Post (CMP 6). The TCC directed that the action on this proposal be sent to the TG for review and comment.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

1-33 Log #769 NEC-P01 **Final Action: Reject**

(100. Premises Wiring (System))

Submitter: Louis A. Barrios, Shell Global Solutions

Comment on Proposal No: 1-43

Recommendation: The panel action should have been to "accept" rather than "accept in principle."

Substantiation: The Panel's revised definition changes the intent of the submitter's proposal, which was to eliminate the list of "separately derived systems", does not add clarity to the original proposal and may introduce more confusion.

Panel Meeting Action: Reject

Panel Statement: The Proposal was modified by the Panel so as to be technically correct.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

MCMAHILL, L.: Proposal 1-43 should have been accept as submitted - the substantiation justified the change. The proposal simply recommended eliminating the list of "source of power" examples and use the definition of "separately derived system" in place of the examples. The revised definition simply adds further confusion. CMP-1 noted that "premises wiring can exist on the supply side of a separately derived system." This is a true statement; however, "where there is no service point" premise wiring is typically supplied by a separately derived system. A separately derived system being "a source of electric energy or equipment other than a service."

1-34 Log #1851 NEC-P01 **Final Action: Reject**

(100. Premises Wiring (System))

Submitter: Mike Holt, Mike Holt Enterprises, Inc.

Comment on Proposal No: 1-43

Recommendation: The Proposal should be Accepted as originally proposed.

Substantiation: The intent of this proposal was to make this definition simpler. The changes proposed by the panel simply make this definition more difficult, without adding any benefit to the code user.

Panel Meeting Action: Reject

Panel Statement: The Proposal was modified by the Panel so as to be technically correct.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

MCMAHILL, L.: See my explanation of negative vote on Comment 1-33.

8-1 Log #536 NEC-P08 **Final Action: Reject**

(100. Raceway)

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 8-1

Recommendation: Accept the proposal or alternatively add:

"Cablebus and auxiliary gutters are not considered raceways."

Substantiation: Cable bus and auxiliary gutters are also designed to hold wires and cables. Though cablebus is not completely enclosed neither is lighting or trolley busway. Auxiliary gutters are usually listed also as wireways; does use determine if it is a raceway? "Not limited to" appears to leave an option for the AHJ to consider them as raceways as there is no specific prohibition against considering them as such.

Panel Meeting Action: Reject

Panel Statement: While the panel agrees cablebus and auxiliary gutters are not raceways, there is no justification for placing electrical products that are not raceways in this definition.

The Panel reiterates that cablebus and auxiliary gutters are used in some ways similarly to raceways. The restrictive of use of cablebus and auxiliary gutters prevents them from being grouped with raceways. Cablebus is an assembly of components furnished or specified by the manufacturer. Auxiliary gutters are permitted to supplement wiring spaces at meter centers, distribution centers, switchboards, and similar points of wiring systems.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

8-2 Log #1377 NEC-P08 **Final Action: Reject**
(100. Rigid Nonmetallic Conduit (RNC))

Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 8-2
Recommendation: This Proposal should be Accepted in the form originally proposed.

Rigid Nonmetallic Conduit (RNC). A non-flexible thermoplastic or thermosetting resin raceway of circular cross section, with integral or associated couplings, connectors, and fittings for the installation of electrical conductors and cables. Includes Rigid Polyvinyl Chloride Conduit (Type PVC), High Density Polyethylene Conduit (Type HDPE), and Reinforced Thermosetting Resin Conduit (Type RTRC).

Substantiation: The definition of what constitutes Rigid Nonmetallic Conduit (RNC) is needed in Article 100, as can be seen from the Panel statement that "The panel took exception to including HDPE as RNC." The 1993 - 2002 NECs clearly indicated that HDPE was covered by Articles 347 and 352, and, therefore, a form of RNC. If this is a point of contention among the CMP itself, it will present even more of a problem for the casual user of the Code.

While it is true that no other raceway has its definition in Article 100, it is necessary for RNC. Throughout the NEC there are repeated references to RNC, a designation that will disappear from the heading of Code Article 352. While it is true that CMP-8 is recommending the inclusion of text indicating that rigid PVC conduit (Article 352) and RTRC (Article 355) are forms of RNC, it should not be necessary for the user to read each individual Code Article to determine whether or not this designation applies. It would be much more "user friendly" to have a single location within Article 100 to rely on for determining what types of conduit this designation applies to.
Panel Meeting Action: Reject
Panel Statement: The definitions for specific wiring methods are found in XXX.2 of each article. There's no justification for defining rigid nonmetallic conduit since the individual types are specifically defined with each having differing permitted application allowances. The use of RNC (rigid nonmetallic conduit) throughout the Code should be reviewed and replaced by the properly identified types of raceways or conduits prior to adding RNC to the definition of Type HDPE Conduit.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 110 — REQUIREMENTS FOR ELECTRICAL INSTALLATIONS

1-35 Log #333 NEC-P01 **Final Action: Reject**
(110.3(A)(6))

Submitter: Don Lucy, IBEW-L.U. 295-LRJATC Instructor
Comment on Proposal No: 1-51
Recommendation: This proposal should be accepted in principle with the proposed FPN relocated in 110.16 - Flash Protection as a new FPN No. 3.
Substantiation: The submitter has demonstrated the need for this information, however, he has submitted it to the wrong section. Designers, Installers, and Maintenance/Operators should be informed to the degree of Arc protection of the equipment. This information regarding a standard with information on the availability and performance of "arc resistant switchgear" is essential to the code user. This proposed change would be better suited in 110.16 as FPN No. 3.
Panel Meeting Action: Reject
Panel Statement: CMP-1 had considered the addition of this same text as an FPN to 110.16 under Proposal 1-88. The Panel continues to conclude that such an FPN would not explain the application of the marking requirement of 110.16.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
HICKMAN, P.: We are voting in the negative to the panel action to reject Comment 1-35. This comment should have been accepted. We feel this comment is related to arc-flash hazard and,therefore, should be included as a FPN under the Section 110.16 Flash Protection. A FPN referring users of the NEC to IEEE C37.20.7 for description and testing of listed arc-resistant switchgear designed and tested to withstand the effects of internal arcing faults is appropriate. The addition of this FPN would greatly enhance worker safety by improving the awareness of this type of equipment.
Comment on Affirmative:
FLOYD, H.: The application of Arc Resistant Switchgear in US markets has grown over the past decade, to the point that all major manufacturers now offer this design. Experience in installations in the US and longer-term experience in other global regions demonstrate that arc resistant designs can reduce the frequency of personnel exposure to hazardous arcing faults. While I support the concept of recognizing this type of equipment in the NEC, I agree with the panel action.

1-36 Log #703 NEC-P01 **Final Action: Reject**
(110.3(B))

Submitter: Edward G. Kroth, Westphal & Company Electrical Construction
Comment on Proposal No: 1-52
Recommendation: Revise as follows:
Listed or labeled equipment shall be installed and used in accordance with any instructions included with the listing and labeling, provided the instructions, listing or labeling do not conflict with this code.
Substantiation: I agree with the Panel's rejections of Proposals 1-52 and 1-53, however, I will take this opportunity to address another problem with 110.3(B) that I have come across. Over the years I've seen various instructions from manufacturers that have contradicted some code article or section. I have provided the latest one that I recently came upon. Note that the manufacturer on page 3 of their instructions have figures 3 and 4 incorrect and instruct the installer to violate section 110.15 (High leg marking) of the NEC. The above added portion of 110.3(B) relieves me of the conflict of following the instructions [present 110.3(B)], but violating 110.15. This may seem to be a minor error on the manufacturer's part, but could become a safety (or legal) issue when someone goes to service the item and does not realize that things are not as they should be according to the code.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: Listed and labeled equipment is clearly identified for installation in accordance with applicable Codes including the NEC. Instructions for listed and labeled equipment are reviewed for compatibility with the NEC. Code users are never "required" to violate Code requirements and 90.4, 110.2 and 110.3(A) clearly support this. In the event an error in instructions is identified, it should be brought to the attention of the manufacturer, the listing or labeling body and the standards developing organization using dedicated processes.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-37 Log #808 NEC-P01 **Final Action: Reject**
(110.3(B))

Submitter: Joseph A. Hertel, Safety and Buildings
Comment on Proposal No: 1-53
Recommendation: Revise text to read:
(B) Installation and Use. Listed or labeled equipment shall be installed or used, or both, in accordance with any instructions included in the listing and labeling, provided the instructions, listing or labeling do not conflict with this code.
Substantiation: Not all listed and labeled equipment is installed and used. In some cases, it is one or the other. The additional statement "provided the instructions, listing or labeling do not conflict with this Code" is necessary to rule out the use of products that are listed and used in ways other than intended by the listing or appropriate standard to which they were evaluated. As an example, cabinets for health care offices such as dental clinics where the cabinets were supplied with receptacles supplied through cords. While they were listed, they could not be used in the intended location without the redundant equipment ground required in 517.13.
Panel Meeting Action: Reject
Panel Statement: Listed and labeled equipment is clearly identified for installation in accordance with applicable Codes including the NEC. Rejection of listed or labeled equipment that is being used in a manner inconsistent with its listing or labeling is already addressed in 110.3 and the additional proposed text is not necessary for this instance.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-38 Log #283 NEC-P01 **Final Action: Accept in Principle**
(110.7)

Submitter: Code-Making Panel 5,
Comment on Proposal No: 1-58
Recommendation: It is recommended that CMP-1 accept the proposal as submitted.
Substantiation: The revised text proposed is technically correct. The revision in this section is also consistent with current proposed and accepted revisions to the definition of the word "ground" as "the earth". See CMP-5 action and statement on Proposal 5-8 (Log #1515). The submitter clearly indicated that the proposal was part of a larger effort to clarify the use of words and terms related to grounding and bonding. The word "ground" is one such word. The word "grounds" was also used in three other sections of the 2005 edition and previous editions of the NEC where the words "ground fault" or "ground faults" should be used. The proposals submitted to CMP-11 to revise those sections where the undefined word "grounds" is used were accepted as they

add clarity and consistency in the use of a defined term. See panel actions and statements on Proposal 11-39 (Log #409) and 11-97 (Log #412). For for reasons of consistency, correlation, and technical accuracy it is recommended that CMP-1 consider accepting this proposal.

This comment has been balloted through CMP-5 with the following ballot results:

15 Eligible to Vote
14 Affirmative
1 Not Returned (W. Helfrich)

Mr. J. Boksiner voted affirmatively stating: "Generally, I support the CMP-5 comment and the original proposal. However, editorially, I believe the phrase "in Article 250" is no longer necessary as this is already covered by the phrase "elsewhere in the Code."

Panel Meeting Action: Accept in Principle
Panel Statement: The panel concludes that the revised text meets the intent of the commentor. The panel concludes that the phrase " elsewhere in the code" includes Article 250 and is in accordance with 4.1.1 of the NEC Style Manual. See panel action and statement on Comment 1-39 and Comment 1-39a (Log #CC100).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-39 Log #770 NEC-P01 **Final Action: Accept in Principle (110.7)**

Submitter: Louis A. Barrios, Shell Global Solutions
Comment on Proposal No: 1-58
Recommendation: The panel action should have been to "accept in principle" rather than "accept in principle in part" with proposed changes as suggested in Mr. Barrio's negative ROP ballot comment shown below.

110.7 Insulation Integrity. Completed wiring installations shall be free from short circuits and ~~from grounds~~ ground faults and from any connections to ground other than as required or permitted ~~in Article 250~~ elsewhere in the Code.

Substantiation: CMP-1 should have accepted the submitter's intent to clarify the term "grounds". The following wording is proposed which should meet the submitter's intent and eliminate the redundancy of referencing Article 250 and "elsewhere in the Code."
Panel Meeting Action: Accept in Principle

Revise the commentors recommendation to read as follows:

110.7 Insulation Integrity. Completed wiring installations shall be free from short circuits, ground faults, or any connections to ground other than as required or permitted elsewhere in this Code.

Panel Statement: The panel concludes that the revised text more clearly explains three conditions in 110.7. The panel also concludes that the revisions satisfy the commentors concerns.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-39a Log #CC100 NEC-P01 **Final Action: Accept (110.7 (Title))**

Submitter: Code-Making Panel 1,
Comment on Proposal No: 1-58
Recommendation: Change the title of 110.7 from "Insulation Integrity" to "Wiring Integrity".
Substantiation: The panel concludes that this revision more accurately describes the subject matter of this section.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-40 Log #1321 NEC-P01 **Final Action: Reject (110.9)**

Submitter: Vincent J. Saporita, Cooper Bussmann
Comment on Proposal No: 1-60
Recommendation: The panel should accept a modified version of the original proposal and place it as the new third paragraph of 110.9. Modify the proposal to read:

An enclosure containing main or feeder overcurrent protective devices shall be field marked with the available short-circuit current.

Substantiation: The proposal change in this comment limits the marking requirement to enclosures for main and feeder overcurrent protective devices, where there is a greater chance that 110.9 will be violated.

The panel statement given for rejecting the original proposal was basically that the available fault current was dependent upon the utility and utility systems change, so the available short-circuit current would change. Therefore, it would be misleading. I've heard that logic compared to a doctor's office refusing to take a patient's blood pressure "because it will surely change", and "that could be misleading". It's far better (and safer) for an electrician to know the available short-circuit current at one time in the past than not to have any clue as to the available short-circuit current. Yes, the value can and likely will change over time, it could go up or down. But, isn't it better to have a baseline with which to operate than to have no clue at all. Let's give future electricians the extra degree of safety that we can by informing them of the available short-circuit current so that they can make the most intelligent decisions possible.

Gathering this information is already a requirement in order to comply with 110.9, so it's not a matter of creating a lot of extra work. Once the values are obtained, it becomes a simple task to mark the enclosure.

Panel Meeting Action: Reject
Panel Statement: The Panel reaffirms its statement on Proposal 1-60. Although at the time of installation, utility available fault currents are provided so that adequate equipment can be installed, those values may be conservative so as to allow for anticipated or possible future system changes. From a personnel protection standpoint, it would be misleading to base PPE requirements on either the rating of the equipment or the actual fault current at the time of installation. To be sure proper PPE is selected, the system parameters must be known and the available fault current calculated at the time work is performed.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

HICKMAN, P.: We are voting negative to the panel action to reject Comment 1-40. Our explanation is as follows: The comment should have been accepted. Accepting this comment will, in our opinion, greatly enhance electrical safety. We feel the submitter's comment is a reasonable recommendation and we agree with the submitter that this will help ensure compliance with 110.9. In addition, we strongly disagree with the panel reaffirming its statement on Proposal 1-60 and the additional statement offered on Comment 1-40. We submit that the statement "marking of the equipment with actual fault current would be misleading" is not accurate. Clearly, the actual fault current is not static. However, if the intent of this panel statement is to convey to those who look to the written record for guidance of what a code panel meant when they wrote a rule, then this panel statement could be sending a message that evaluating series combination systems and determining motor contribution is not achievable. The industry simply cannot continue to hide behind this argument and not move to help inspectors, electricians, and others who maintain and install electrical equipment.

MCMAHILL, L.: To an extent, I concur with CMP-1's action on Proposal 1-60. I agree, "The actual fault current at an installation is a variable"; however, I disagree that it "must be determined with knowledge of the system parameters (including those of the utility supply system) at any given time." If this were truly the case, it would be difficult to design an electrical installation in compliance with NEC Sections 110.9 and 10. Generally, the available-fault current is a fixed value at the power source. This fixed value is provided by the utility company or calculated by the electrical engineer. The available fault-current value can vary; however, not to the extreme that it would need to be calculated "at any given time." If it did, it would be difficult to design a series-rated circuit breaker system. In addition, I disagree that "Marking of the equipment with "actual" fault current would be misleading." It is perhaps more misleading not to provide such information. Where additional equipment is to be installed, should one be expected to do the fault current calculation every time? I think not. Field marking the equipment with the available fault-current is important for the installer and inspector. It provides necessary information for selecting the appropriate interrupting devices, equipment short-circuit current rating, and withstand rating of conductors. At the minimum, CMP-1 should have considered a starting point for marking equipment with the available fault-current. As an example, a code requirement that "Equipment rated 1200 amperes or more that contains overcurrent devices shall be field marked with the available short-circuit current." 1200A is a reasonable starting point as it correlates with existing requirements in Section 110.26(C)(2) for large equipment. Such requirement could do much to enhance installation and worker safety. See my comments on Proposal 1-59 (Log 2846), as they are valid here.

1-41 Log #300 NEC-P01 **Final Action: Accept (110.11)**

Submitter: Code-Making Panel 11,
Comment on Proposal No: 1-61
Recommendation: Continue to accept Proposal 1-61.
Substantiation: It was the action of the Technical Correlating Committee that Proposal 1-61 be referred to CMP-11 for comment. This comment is the result of that request. CMP-11 supports the continued acceptance of Proposal 1-61. This is in addition to the continued support of Proposal 1-95, which provides requirements for all types of enclosures, not just for motor controller enclosures as is currently found in 430.91. Proposal 11-55, a companion proposal which deletes similar requirements as they apply specifically to motor controller enclosures, was passed by a vote of 15 to 0 by CMP-11.

This comment has been balloted through CMP-11 with the following ballot results:

15 Eligible to Vote
14 Affirmative
1 Not Returned (R. Widup)

Mr. J. Caccamese voted affirmatively stating: "Acceptance of Proposal 1-61 is consistent with my previous comment to the affirmative for Proposal 11-55 by addressing my concern to ensure that both Panel 1 and Panel 11 are in agreement."

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-42 Log #1512 NEC-P01 **Final Action: Accept**
(110.11)

Submitter: James Wiseman, Schneider Electric / Square D
Comment on Proposal No: 1-61
Recommendation: The Panel should continue to accept Proposal 1-61.
Substantiation: This revision will significantly ease the determination of which enclosures require protection against permanent damage from the weather during building construction.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-43 Log #997 NEC-P01 **Final Action: Reject**
(110.12)

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 1-62
Recommendation: Revise text to read as follows:

Electrical equipment shall be installed in a manner consistent with ~~the requirements of this code and~~ accepted industry practices.

Substantiation: I agree with Mr. Lanny McMahill that it is well worth our while to rephrase this, as the submitter, Mr. Young, proposed, so as to make compliance and enforcement easier. It would be tautological to say that this code requires compliance with this code, and the issue of incorporating specific other standards by reference also is valid. However, removing the term "neat" as a global requirement is important, because too many undertrained enforcement personnel fall back on this characteristic where it is irrelevant to safety. Neatness has nothing to do with practical safeguarding. Workmanship is an issue of following accepted industry practices. The term, "accepted practices" is consistent with other NEC usage. I have seen, for example, many a panel installation with conductors ever-so-neatly trained and lined up perfectly parallel where they leave the breakers-but two grounded conductors in one terminal opening, or grounded and grounding conductors sharing a terminal in the grounding bar. I'd rather see the workmanlike practice of following the instructions on the schematic, and forget neatness, leave the conductors all calliwampus.
Panel Meeting Action: Reject
Panel Statement: If the comment were accepted, Section 110.12 would allow "accepted industry practices" to override any Code requirement.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

MCMAHILL, L.: CMP-1 should have accepted this comment. CMP-1's statement that accepting this comment would "override any Code requirement" is incorrect. Section 110.12 is titled "Mechanical Execution of Work." "Mechanical Execution of Work" is not intended to override minimum code requirements. No different than "installed in a neat and workman like manner" is. See my comment on Proposal 1-62.

1-44 Log #1790 NEC-P01 **Final Action: Reject**
(110.12)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 1-65
Recommendation: The panel is encouraged to accept proposal 1-65 for the following reasons.
Substantiation: 1) The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.

2) There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.

3) The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.

4) Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).

5) If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Reject
Panel Statement: The panel concludes that the FPN reference to ANSI/NECA 1-2006 is both appropriate and useful, and responds to the submitter's concerns as follows:

1) The submitter does not document his assertion that CMPs have acted over the last several Code cycles to limit the use of FPNs, and no such injunction appears in 3.1.3 of the NEC Style Manual.

2) The submitter does not document "correlation issues," and the panel is not aware that proposal 1-65 was submitted to multiple Code panels.

3) The panel concurs that the Code is not intended to be an instruction manual for untrained persons. The scope of ANSI/NECA 1-2006 specifically states that only qualified persons should perform the work described in it. In addition, ANSI-approved standards, like the Code itself, are seen as representing broad consensus and are developed with participation from many industry interests (including CMPs). Other types of standards and installation manuals may not represent this level of electrical industry consensus.

4) FPNs are informational in nature, and not enforceable requirements of the Code. Further, the scope of ANSI/NECA 1-2006 specifically states that all electrical products and systems should be installed in accordance with manufacturers' instructions.

5) Annex A contains only product listing standards. Many other standards referenced in Fine Print Notes throughout the Code are not included in Annex A. See the FPNs to 450.9 and 505.4(B), among many others.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

HITTINGER, D.: We do not agree with the panel action and statement. However, we do agree with the panel Comment 1-44(a) Log #CC101 NEC-P01 recommending that a new Annex "X" be created for all standards currently referenced in the NEC FPNs, other than product safety standards which are already located in Annex A, be moved to the new annex. This would provide a useful resource to users of the code.

MINICK, J.: Comment 1-44 to delete this FPN should have been accepted as the FPN to 110.12 references "other ANSI-approved installation standards" that are of unknown content and of unknown publication dates. CMP-1 considered accepting Proposal 1-63 that would have deleted the FPN but the vote was 6-6. The accept motion on Proposal 1-63 to delete the FPN was because the standard publication, ANSI/NECA 1-2006, was not ready for distribution and thus review by CMP-1. CMP-1 then, after much discussion, finally accepted Proposal 1-64 that requested updating the publication date of the referenced standard without CMP-1 review by a vote of 7-5. However that vote changed in the ballot vote to 10-2 in favor of accepting the new publication date of 1-2006. It is now disingenous that CMP-1 would accept referencing "other ANSI approved installation standards" without knowing the content of those standards and their publication date.

Comment on Affirmative:

ANTHONY, M.: Fine Print Notes are essentially hyperlinks (tags) we put at critical points in the NEC where we sustain the NEC's place at the center of world wide electrical safety practice. We should anticipate using more of them in the future as the world markets become more interconnected and our technology permits us to use the code in delivery formats other than the printed page. We should not be taking them out but reserving them for the future and working harder to get codes and standards to agree as they evolve.

1-44a Log #CC101 NEC-P01 **Final Action: Reject**
(110, FPN)

TCC Action: The Technical Correlating Committee advises that creation of a new annex is the responsibility of the Technical Correlating Committee and the Technical Correlating Committee rejects the panel action. Location of all references in an Annex does not enhance usability.
Submitter: Code-Making Panel 1
Comment on Proposal No: 1-165
Recommendation: The panel recognizes that the TCC has purview over the creation of a new annex. The panel recommends that a new Annex "X", be created in accordance with the 2003 NFPA Manual of Style, sections 1.9.1.10 & 11 and 3.6.4, and that all standards currently referenced in the NEC FPNs, other than product safety standards which are already located in Annex A, be moved to the new annex. The panel notes that the 2003 NEC Style Manual section 4.2, requires that references to other Standards shall be in the FPNs.
Substantiation: The panel concludes that item #5 in the substantiation of Comment 1-44 has merit. Locating all referenced documents in an annex is intended to enhance usability.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

BARRIOS, L.: The present format of using FPNs immediately following the applicable sections to reference standards containing supplemental information should be retained. Moving all references to standards from existing Fine Print Notes (FPNs) to a single annex at the end of the code will make the code less user friendly. For example, FPNs No. 1 and 2 in Section 110.16 refer the code reader to NFPA 70E and ANSI Z535.4 for additional information on arc flash hazards and equipment labeling. Moving these two references to an Annex, would essentially have the same effect as removing the references altogether. The typical code user is not going to flip to an annex to see what standards may be applicable to a given section.

STAUFFER, H.: I am voting against this recommendation to the Technical Correlating Commitee, and feel that references to industry standards other than product safety standards should remain in Fine Print Notes for two reasons:

1. Usability - Having references to industry standards located near the NEC rules to which they apply is more convenient for users. Segregating these references in an annex at the back of the Code book decreases the chance that users will be aware of them.

2. Copyright protection - having more FPNs in the NEC helps protect NFPA's intellectual property. There is continuing debate about whether, when states and local jurisdictions adopt the Code into law, the resulting document is still a copyrighted NFPA publication, or whether it enters the public domain. However, state and local governments typically adopt only the mandatory text of the NEC, not including explanatory information in FPNs and annexes. Since annexes come at the end of the Code book, they can be deleted without affecting the main NEC text. However, the existence of the Fine Print Notes located within the mandatory text of the Code helps differentiate the NEC-as-published-by-NFPA from the NEC -as-adopted-into-law. For this reason, keeping more FPNs, rather than consolidating the same information in an annex, helps protect the copyright of the National Electrical Code.

Comment on Affirmative:

LABRAKE, JR., N.: EEI agrees with the Panel that an Annex would provide user friendliness of this Code. It is recommended that the TCC include in the Annex a list of standards required and a list for further information based on the FPNs throughout this Code. In the text of the Code, a footprint item should refer the reader to the Annex for the expanded description of the referenced material. EEI supports the listing of ANSI C2 the National Electrical Safety Code in the Annex with its reference to 2005 NEC Sections 90.2(A), FPN and 110.31(C)(1), FPN for example.

1-45 Log #738 NEC-P01 **Final Action: Reject**
(110.12, FPN)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 1-64
Recommendation: The action should be to delete this Fine Print Note.
Substantiation: The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement, for generic, readily available, information, which must be purchased by the code user. Code Making Panel 1 should consider taking an action to delete this FPN to coordinate with the other technical committees in the NEC project. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). In the action to reject proposal 8-3, one technical committee member promotes NECA standards as "….a tool to assist untrained electricians to make safer and better installations." The TCC should intervene, uphold the provisions of 90.1(C) and prohibit these types of Fine Print Notes. CMP1 should reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If CMP 1 continues to accept this Fine Print Note in any form an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 1-44.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
HITTINGER, D.: See my explanation of negative vote on Comment 1-44.
MINICK, J.: See my explanation of negative vote on Comment 1-44.

1-46 Log #739 NEC-P01 **Final Action: Reject**
(110.12, FPN)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 1-63
Recommendation: This Proposal should be Accepted.
Substantiation: The submitter is correct, the addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement, for generic, readily available, information, which must be purchased by the code user. Code-Making Panel 1 should consider taking an action to delete this FPN to coordinate with the other technical committees in the NEC project. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). In the action to reject proposal 8-3, one technical committee member promotes NECA standards as "…a tool to assist untrained electricians to make safer and better installations." The TCC should intervene, uphold the provisions of 90.1(C) and prohibit these types of Fine Print Notes. CMP 1 should reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If CMP 1 continues to accept this Fine Print Note in any form, an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 1-44.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
HITTINGER, D.: See my explanation of negative vote on Comment 1-44.
MINICK, J.: See my explanation of negative vote on Comment 1-44.

1-47 Log #740 NEC-P01 **Final Action: Reject**
(110.12, FPN)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 1-65
Recommendation: This Proposal should be Accepted.
Substantiation: The submitter is correct, the addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement, for generic, readily available, information, which must be purchased by the code user. Code-Making Panel 1 should consider taking an action to delete this FPN to coordinate with the other technical committees in the NEC project. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). In the action to reject proposal 8-3, one technical committee member promotes NECA standards as "…a tool to assist untrained electricians to make safer and better installations." The TCC should intervene, uphold the provisions of 90.1(C) and prohibit these types of Fine Print Notes. CMP 1 should reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If CMP 1 continues to accept this Fine Print Note in any form, an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 1-44.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
HITTINGER, D.: See my explanation of negative vote on Comment 1-44.
MINICK, J.: See my explanation of negative vote on Comment 1-44.

1-48 Log #777 NEC-P01 **Final Action: Reject**
(110.12, FPN)

Submitter: Danny Grant, National Electric Company
Comment on Proposal No: 1-63
Recommendation: This Proposal should have been Accepted to delete the FPN:
FPN: ~~Accepted industry practices are described in ANSI/NECA 1 2000, Standard Practices for Good Workmanship in Electrical Contracting and other ANSI approved installation standards.~~

Substantiation: I agree with Mr. Miller's substantiation in Proposal 1-63 which states: "this is one more example of extra material which does not benefit the NEC or its user". Not only does it not benefit the NEC, it contradicts what is already mandatory and also causes confusion. In addition, it is an unnecessary burden for the industry to have to purchase a copy of a standard at significant cost for each installer that tells us little beyond what we already know and that is already readily available for free from various sources.

For example, in Section 3 of the Standard (General Requirements), it states that neat and workmanlike manner shall be apparent. The word "shall" constitutes mandatory language which, coupled with the word apparent, is likely not enforceable, is subjective, and, therefore, may be unattainable. A Standard that requires neat and workmanlike to be "apparent" is not appropriate for inclusion, even as a fine print note, into the NEC.

In addition to requiring something that is unenforceable, vague, and ambiguous, the scope of the document tells installers that they should follow the NEC. While this standard requires me to do something that is vague and unenforceable, it also tells me that following the NEC is optional.

Those are just two examples of problems I see in this document. Even the title suggests that these rules are only for contractors (Good Workmanship in Electrical Contracting). What about work done by the maintenance staffs in facilities? Do these rules not apply to them? Do these rules only apply to contractors?

I, as a NECA contractor, along with very knowledgeable inspectors, have never had a problem understanding what a neat and workmanlike installation is. I wonder why NECA chooses to engage in the publishing business when there are real challenges facing contractors in today's market.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 1-44.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

HITTINGER, D.: See my explanation of negative vote on Comment 1-44.

MINICK, J.: See my explanation of negative vote on Comment 1-44.

1-49 Log #308 NEC-P01 **Final Action: Accept in Principle**
(110.12(A))

Submitter: Code-Making Panel 9,
Comment on Proposal No: 1-71
Recommendation: Accept the proposal as originally submitted.
Substantiation: The panel action unnecessarily broadens this requirement without technical merit. The panel text does not address one of the key reasons CMP-9 used the "cable or raceway" qualification when it had jurisdiction over this topic, namely, the desire to allow weep holes in outdoor equipment. The original proposal correctly incorporated this concept. CMP-9 is also uncertain as to whether the phrase "operation of equipment" would be enforced consistently.

NEMA comment on ROC 1-201 from the last cycle is still relevant and read:

"There is no need to expand the list of unused openings that must be closed. The wording is clear that unused openings be effectively closed to provide substantially equivalent protection to that of the original enclosure. UL or equivalent standards development organizations develop the required product standards to ensure that the intent of the code is met. This ensures that all new products meet the intent of the code without having to continuously revise the code for every new product that is introduced.

This comment has been balloted through CMP-9 with the following balloting results:

11 Eligible to Vote
10 Affirmative
1 Not Returned (H. deVega)

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 1-50 which the panel concludes meets the commentors intent.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-50 Log #834 NEC-P01 **Final Action: Accept**
(110.12(A))

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 1-70
Recommendation: Revise text to read as follows:

(A) Unused Openings. Unused openings, other than those intended for the operation of equipment, intended ~~or~~ for mounting purposes or permitted as part of the design for listed equipment, shall be closed to afford protection substantially equivalent to the wall of the equipment. Where metallic plugs or plates are used with nonmetallic enclosures, they shall be recessed at least 6 mm (1⁄4 in.) from the outer surface of the enclosure.

Substantiation: The text accepted by the panel continues to create concern for manufacturers of equipment enclosures. This comment is to fix two significant areas of concern:

1) The addition of "intended" to the panel text is to make it clear that there may be openings that are there, but not necessarily used as part of that particular installation. A good example is drainage openings in a 3R enclosure that is installed indoors. Clearly the openings are there, but they are not used in that application. Another example is mounting holes that are in the back of the enclosure, but are not used because the enclosure is mounted from its side.

2) The new words "or permitted as part of the design for listed equipment" is intended to address a conflict that is created by the proposed wording and the product standards. For example, UL 50 – Standard for Enclosures has specific allowances for additional (albeit small) openings in an enclosure. These openings may have been necessary for the manufacturing process (such as drain openings for paint during the painting process) and have no application in the final use of the product.

It is important that this language be adjusted to avoid contractors having to find ways to fill openings that were intended by design and by allowance in the product standard to remain open.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

MCMAHILL, L.: I concur with CMP-1's action; however, to simplify the section it may have been appropriate to say, "Unused openings, other than those intended for operation or mounting purpose, or those permitted as part of the design of the equipment, shall be closed..."

1-51 Log #627 NEC-P01 **Final Action: Reject**
(110.16)

Submitter: Phillip Goehring, Jr., Electrical Inspectors, Inc.
Comment on Proposal No: 1-84, 1-82
Recommendation: Revise text to read as follows:

Labels should be placed by the manufacturers on all switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are likely to require examination, adjustment, servicing, or maintenance while energized. The marking shall warn that only qualified person(s) should access the equipment and warn of the potential electric arc flash hazard. The marking shall be located so as to be clearly visible to any person before examination, adjustment, servicing, maintenance or the installation of the equipment.

Substantiation: It should be noted that in many states home owners are legally allowed to work on electrical equipment in their own homes. These warnings should be in place for their protection, and to make them aware that a qualified person should be doing the work.

Panel Meeting Action: Reject
Panel Statement: The marking is intended to be field applied. It would be difficult for the manufacturer to know where to apply the label and to what equipment. In addition, CMP-1 notes that NEC text must be written as mandatory requirements – see the NEC Style Manual, Section 1.3 - Regulatory Adoption.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-52 Log #787 NEC-P01 **Final Action: Reject**
(110.16)

Submitter: C. E. Gibson, III, Lawson Electric Company Inc.
Comment on Proposal No: 1-85
Recommendation: Revise proposed 110.16 to read:

Switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers that are in other than dwelling occupancies and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential electric arc hazards. The marking shall indicate the available fault current. The marking shall reflect the date the calculations for available fault current was performed and ~~The marking~~ shall be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

Substantiation: This proposal should have been Accepted in Part. While I agree somewhat that the marking of the shock protection boundary and flash protection boundary would be more of an electrically related safe work practice suited more for NFPA 70E, the marking of the available fault current is an installation requirement. The available fault current is a vital part in establishing the design and engineering criteria for switchgear and service equipment in all installations. Posting this information would be a tremendous aid to the installer/maintainer to determine the proper rating and sizing of replacement parts and the selection of the proper personal protective equipment to be used. I agree completely
with Mr. Hickman's comment stating the industry cannot continue to hide behind the argument "actual fault current is not fixed". Using this rationale, the conscientious and painstaking chore of designing and engineering service equipment and switchgear to fall within the limits of a given fault

current would be a fruitless task, as the fault current could change before the equipment is energized. This would render the new equipment unsafe from the outset. As Mr. Floyd stated in his comment to the affirmative, there are "other approaches" that may be more useful. By including the date on the marking requirement, would aid the installer/maintainer in making the proper choices as they enter into the equipment. As I stated in my substantiation on Proposal 1-85, "clearly, labels would need to be updated when changes are made in the system".

Panel Meeting Action: Reject

Panel Statement: The Panel reaffirms its statement on Proposal 1-85. Available fault current is necessary but not all the information needed to establish PPE levels.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

HICKMAN, P.: We are voting negative to the panel action to reject Comment 1-52. Our explanation is as follows: The comment should have been accepted. Accepting this comment will, in our opinion, greatly enhance electrical safety. Knowledge of the available fault current is absolutely necessary for proper compliance with 110.9 and 110.10. In addition, we strongly disagree with the panel reaffirming its statement on Proposal 1-85. We submit that the statement "marking of the equipment with actual fault current would be misleading" is not accurate. We recognize the actual fault current is not fixed. The industry simply cannot continue to hide behind this argument and not move to help inspectors, electricians, and others who maintain and install electrical equipment.

The concept recommended here in this comment is simply asking for documentation of something that has been required by the NEC for a number of years and a crucial piece of information necessary to help protect workers from arc flash and arc blast.

Comment on Affirmative:

FLOYD, H.: I am in support of the concept of providing more information to people who are at risk of exposure to arc flash hazards; however, there are other approaches that may be more useful in that they are less dependent on variations in available short circuit current. For example, if the label were to indicate the performance rating of personal protective equipment required, it cold be specified to cover anticipated variations in the available short circuit current.

1-53 Log #788 NEC-P01 **Final Action: Reject**
(110.16)

Submitter: C. E. Gibson, III, Lawson Electric Company Inc.

Comment on Proposal No: 1-85

Recommendation: Revise proposed 110.16 to read:

Switchboards, panelboards, industrial control panels, meter socket enclosures and motor control centers that are in other than dwelling occupancies and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential electric arc hazards. The marking shall indicate the available fault current. The marking shall be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

Substantiation: This proposal should have been Accepted in Part. While I agree somewhat that the marking of the shock protection boundary and flash protection boundary would be more of a electrically related safe work practice suited more for NFPA 70E, the marking of the available fault current is an installation requirement. The available fault current is a vital part in establishing the design and engineering criteria for switchgear and service equipment in all installations. Posting this information would be a tremendous aid to the installer/maintainer to determine the proper rating and sizing of replacement parts and the selection of the proper personal protective equipment to be used. I agree completely with Mr. Hickman's comment stating the industry cannot continue to hide behind the argument "actual fault current is not fixed". Using this rationale, the conscientious and painstaking chore of designing and engineering service equipment and switchgear to fall within the limits of a given fault current would be a fruitless task, as the fault current could change before the equipment is energized. This would render the new equipment unsafe from the outset. As Mr. Floyd stated in his comment to the affirmative, there are "other approaches" that may be more useful. As I stated in my substantiation on Proposal 1-85, "clearly, labels would need to be updated when changes are made in the system".

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 1-52.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

HICKMAN, P.: See our explanation of negative vote on Comment 1-52.

1-54 Log #835 NEC-P01 **Final Action: Accept**
(110.16)

Submitter: Jim Pauley, Square D Company

Comment on Proposal No: 1-82

Recommendation: Reject this Proposal.

Substantiation: Both the submitter's language and that accepted by the panel is unnecessary. The current text of the NEC exempts the equipment in the dwelling occupancy. Even in a multi-family installation, the panel that is within the occupancy itself is not a significant arc flash concern. The current NEC language would still apply the requirement to the service equipment (meter center, switchboard, etc.) that supplies the dwelling unit panelboards.

Although many panelboards used even in dwelling units already have a marking that warns against an arc flash hazard. Adding a specific requirement to this section could encourage some AHJs to require a separate and distinct label on the front of the enclosure. Given that these are often installed in the living space, we are simply inviting the resident to paint over the label or remove it because of the unpleasant aesthetics. The label adds no value in these applications.

Panel Meeting Action: Accept

Panel Statement: The panel does not necessarily agree with all of the submitters substantiation.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

HICKMAN, P.: We are voting negative to the panel action to accept Comment 1-54. Our explanation is as follows: The comment should have been rejected. We support the panel action on Proposal 1-82 as written. The submitter's substantiation for Proposal 1-82 states: "Many dwellings have services that are 400 amperes or more, and some services are located within commercial occupancies where there are stores and dwelling units served by the same electrical system." We agree that the available fault currents in multifamily dwellings could very well rival fault currents found in many commercial and industrial applications. We feel that adding the 110.16 marking requirements would greatly enhance worker safety and awareness of potential arc-flash hazards.

The substantiation provided in Comment 1-54 states: "many panelboards used in dwelling units already have a marking that warns against an arc-flash hazard." We feel that marking the rest of the panelboards (other than the "many" the submitter has identified as already being marked) makes sense. Someone has already seen the need to do it. It makes sense to be consistent and require that they all be marked, not just the ones that the comment submitter recognizes as being done voluntarily.

The argument has been raised that adding an arc flash label on equipment would diminish awareness because the labels would become commonplace and, therefore, be ignored. I offer the analogy of a speed odometer in a vehicle. While it could be argued that we should not bother to put speed odometers in vehicles because they are ignored, it could also be argued that they are nice to have when you need them.

Adding a label is inexpensive in both terms of cost of the label and manpower to apply it. With such a huge upside for safety, there seems little reason not to add this requirement.

1-55 Log #836 NEC-P01 **Final Action: Reject**
(110.16)

Submitter: Jim Pauley, Square D Company

Comment on Proposal No: 1-84

Recommendation: Reject this Proposal.

Substantiation: The panel needs to reconsider the words that expand this to an infinite list. Mr. Minick's comments are correct that the addition actually makes the section more ambiguous. NEC 110.16 has accomplished its original intended goal which was to increase the awareness and understanding of the arc flash hazard. The existing list of equipment does provide the most likely products where the hazard will be present. However, as pointed out by Mr. Minick, should the 30A GD switch installed in a barn really have an arc flash marking by itself?

The panel should also be aware that some manufacturers have integrated arc flash into their normal warning labels on products. This increases the needed awareness and does so without a burden on the installing contractor or user. Leave 110.16 as it is and allow it to continue to do the job of increasing awareness.

Panel Meeting Action: Reject

Panel Statement: CMP-1 disagrees that the revised text expands the list to "an infinite list" and that it "actually makes the section more ambiguous." The text uses the words "such as" to give examples of what equipment requires the arc flash marking. A 30A General Duty switch installed in a barn is not such equipment. Without such change, the NEC currently worded has no requirement to mark an 800A fusible switch mounted on a wall.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:
BARRIOS, L.: The panel action should have been to accept this comment, rejecting Proposal 1-84. The panel action expands the present clearly identified list to equipment subject to the interpretation of the AHJ.

1-56 Log #998 NEC-P01 **Final Action: Reject**
(110.16)

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 1-85
Recommendation: Revise text to read as follows:
The marking shall include the date when these characteristics were calculated.
Substantiation: Mr. Gibson, Mr. Hickman, and others have an inarguable point that it is far more effective to provide specific warnings, detailing the precise danger and the protective measures, than to paste a general caution on equipment. At the same time, the CMP and others have a valid point that outdated warnings could mislead. Dated warnings, especially ones of the format, "As of 8/20/06, the incident energy available..." will put people on alert that these characteristics may have changed. The characteristics of Listed equipment installations change over time.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 1-52.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
HICKMAN, P.: See our explanation of negative vote on Comment 1-52.

1-57 Log #1323 NEC-P01 **Final Action: Reject**
(110.16)

Submitter: Vincent J. Saporita, Cooper Bussmann
Comment on Proposal No: 1-85
Recommendation: Remove the requirement for marking the shock protection boundary, and make minor changes to the wording. Replace the original proposed wording with:
The marking shall additionally indicate the incident energy and the flash protection boundary.
Substantiation: The Panel was correct in its statement that the shock protection boundaries are outside the scope of 110.16. However, the Panel may wish to reconsider its position relative to not marking the incident energy and arc-flash boundary. It is agreed that the available short-circuit current will and does change with time, and that translates into a change in the incident energy and arc-flash boundary. But, isn't it better and safer to provide the electrical worker with the values at some point in time than to provide nothing at all. If you were an electrical worker that was called out at 2:00 AM to get a motor control center back up and running, wouldn't you like to know the incident energy and arc-flash boundary, even if it was calculated several years ago. If there is no marking on the equipment, the electrical worker is left with nothing but the tables in NFPA 70E, and they have to know the available short-circuit current and opening time of the upstream overcurrent protective device in order to apply the tables. At 2:00 AM, you are not going to be able to find the available short circuit and opening time of the overcurrent protective device. You need to take some voltage measurements. What do you do? Now, if the MCC were marked with the incident energy and flash protection boundary, even though it was obtained years before, you have a basis to make an intelligent decision. Yes, you are taking a risk that the fault current may have gone up or down and that the incident energy and flash protection boundary may have increased, but you are certainly better off than not knowing anything about the hazard level that exists. I urge the panel to pass this one for the safety of the electrical workers that are putting their health and lives at risk while most of the rest of the country sleeps.
Panel Meeting Action: Reject
Panel Statement: What the submitter is proposing is a work practice issue. Such information does not belong in an installation code. More appropriately, it belongs in NFPA 70E - Standard for Electrical Safety in the Workplace. Additionally, the incident energy and flash protection boundary should be determined prior to working on or near energized electrical equipment.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
HICKMAN, P.: See our explanation of negative vote on Comment 1-52.
Comment on Affirmative:
ANTHONY, M.: Our industry has had an abiding interest in this issue because it cares about electrician safety. We have considered it carefully over the past three code cycles. Our abstention remains unchanged since the proposal stage (See 2008 ROP Log # 2672). Organizations need to find ways to de-energize electrical equipment first. We look forward to a development in materials technology that will improve PPE such that necessary protection can be achieved with lighter weight materials permitting greater flexibility over a greater range. This is a challenge to the materials industry innovators and product development specialists to simplify PPE selection and with improvements in material technology.

1-58 Log #1857 NEC-P01 **Final Action: Reject**
(110.16)

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 1-84
Recommendation: Delete the word "socket" from the term "meter socket enclosures" in the proposed text.
Substantiation: Deleting the word socket makes it clear that CT meter enclosures are to be included. This also creates a parallel with Proposal 5-294 of this cycle.
Panel Meeting Action: Reject
Panel Statement: The panel concludes that the comment would significantly expand the equipment covered by this requirement beyond that covered by the term "meter socket enclosure" without adequate technical substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-59 Log #582 NEC-P01 **Final Action: Reject**
(110.17)

Submitter: Russell LeBlanc, Peterson School of Engineering
Comment on Proposal No: 1-89
Recommendation: This proposal needs to be accepted in an effort to increase electrical worker safety.
Substantiation: Disappearing work spaces put workers in peril. As the panel's statement indicates maybe a warning sign won't help the problem...but maybe, just maybe, it may prevent even one incident from happening. We should be proactive with this problem. We should not wait for even one incident which would make us be reactive.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 1-60.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
ANTHONY, M.: While the Proposal 1-89 has merit that panel I agree with the panel's action. The submitter did not provide new substantiation in the comment phase. I disagree, however, that the original proposal does not meet the requirements for clarity asserted in the 3.2.1 in the NEC Manual of Style. Clarity can be very subjective.

1-60 Log #999 NEC-P01 **Final Action: Reject**
(110.17)

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 1-89
Recommendation: Accept, but add:
Infringement on this working space could endanger workers requiring clear access to the equipment.
Substantiation: Mr. LeBlanc is correct that this requirement would reduce hazard. It is puzzling that in rejecting the proposal the CMP offers the correct statement that it may, in fact it will, not prevent infringement on the working space. Compliance with Code rules provides no guarantees, but an increased chance of safety at small cost is well worth our while.
The change I propose is due to the fact that warning signs ideally not only catch the attention and instruct their readers, but also specify the nature of the hazards/consequences.
Panel Meeting Action: Reject
Panel Statement: The Panel reaffirms its statement on Proposal 1-89. The submitter's substantiation does not address the expressed Panel concerns.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-61 Log #1000 NEC-P01 **Final Action: Reject**
(110.17)

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 1-89
Recommendation: Accept as proposed.
Substantiation: Access requirements are very possibly the number one type of NEC requirement with regard to which I see installations put into violation by non-electricians. Mr. LeBlanc is correct that this requirement would reduce hazard. It is puzzling that in rejecting the proposal the CMP offers the correct statement that it may, in fact it will, not prevent infringement on the working space. Compliance with Code rules provides no guarantees, but an increased chance of safety at small cost is well worth our while.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 1-60.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-62 Log #299 NEC-P01 **Final Action: Accept in Principle**
(110.20 (New))

Submitter: Code-Making Panel 11,
Comment on Proposal No: 1-95
Recommendation: Continue to Accept Proposal 1-95.
Substantiation: It was the action of the Technical Correlating Committee that Proposal 1-95 be referred to CMP-11 for comment. This comment is the result of that request. CMP-11 supports the acceptance of Proposal 1-95. It appropriately provides requirements for all types of enclosures, not just for motor controller enclosures as is currently found in 430.91. Proposal 11-55, a companion proposal which deletes similar requirements, as they apply specifically to motor controller enclosures, was passed by a vote of 15 to 0 by CMP-11.

This comment has been balloted through CMP-11 with the following ballot results:

15 Eligible to Vote
14 Affirmative
1 Not Returned (R. Widup)

Mr. J. Caccamese voted affirmatively stating: "See my Affirmative Comment on CMP 11's Comment on Proposal 1-61."
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 1-65.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-63 Log #309 NEC-P01 **Final Action: Reject**
(110.20 (New))

Submitter: Code-Making Panel 9,
Comment on Proposal No: 1-95
Recommendation: Make the following changes in the panel action text:

1. Locate the new table in Chapter 9, perhaps using the now unused position of Table 3. If this is accepted, the FPN in 110.11 as revised by Proposal 1-61 will need to be correlated.

2. Change the note to the Table to read as follows:

Table 3 ~~110.20~~ provides the basis for selecting ~~the above~~ enclosures for ~~use in~~ certain equipment for which specific protection from various environmental conditions is required in other than hazardous (classified) locations. The enclosures are not intended to protect against conditions such as condensation, icing, corrosion, or contamination that may occur within the enclosure or enter via the conduit or unsealed openings.

FPN: The term raintight is typically used in conjunction with Enclosure Types 3, 3S, 3SX, 3X, 4, 4X, 6, and 6P. The term rainproof is typically used in conjunction with Enclosure Types 3R and 3RX. The term watertight is typically used in conjunction with Enclosure Types 4, 4X, 6, and 6P. The term driptight is typically used in conjunction with Enclosure Types 2, 5, 12, 12K, and 13. The term dusttight is typically used in conjunction with Enclosure Types 3, 3S, 3SX, 3X, 5, 12, 12K, 13.

3. Relocate the requirement as 110.28, as follows:

110.28 Enclosure Types, Not Over 600 Volts, Nominal. Enclosures of all switchboards, panelboards, industrial control panels, meter sockets, motor control centers, enclosed switches, enclosed circuit breakers, transformers, motor controllers, and other equipment enclosures required to be identified as being suitable for the specific environmental conditions that apply at their location, shall be marked with a type number marked on the enclosure by their manufacturer in accordance with Table 3 in Chapter 9.

4. Revise the "Notes to Tables" located after Chapter 9, Table 1 to read: "Notes to Tables 1, 4, 5 and 5A."

Substantiation: This comment raises issues presented in the CMP-9 Proposal 1-94 that were not addressed in the panel action to accept in principle. CMP-9 respectfully requests that CMP-1 revisit the technical issues raised in its proposal, as follows:

1. The Chapter 9 location has the virtue of being immune from the Chapter 5 modification provisions of 90.3. This will then allow the inclusion of NEMA 7, 8, and 9 enclosures in a future code cycle, providing a single location for all the enclosure types, which would be very useful for code users. In fact, this location could also include IEC ingress protection tables as well.

2. To correlate with this suggested location, the operational text has been modified to say, "for which specific protection from various environmental conditions is required". This wording allows the various code making panels to decide whether to implicitly (or explicitly) reference the new table in the future. In addition, this comment retains the present FPN to Table 430.91 that appears to have been omitted in the CMP-1 action on this proposal, although it may be in the portion of the table that apparently truncated due to possible processing error in the Report on Proposals.

3. The requirement relocation to Section 28 moves the rule from the general part of the article, which might be interpreted to apply over 600 volts, to Part II of the article that only applies to 600V and below systems. This is the appropriate location based on the actual text of the rule. In addition, the text suggested here includes other enclosures for which the type designation is routinely applied, and for which no substantiation was provided to omit.

4. The Final Action suggested in this comment corrects an error in the present Chapter 9 table notes that only became worse after the inclusion of the new Table 2 in the 2005 cycle.

This comment has been balloted through CMP-9 with the following balloting results:

11 Eligible to Vote
10 Affirmative
1 Not Returned (H. deVega)

Panel Meeting Action: Reject
Panel Statement: The Panel concludes that the proposed table should be included in Article 110 to enhance usability. The reasons expressed in the Comment to relocate the table to Chapter 9 while retaining the requirement in Article 110 are not persuasive.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-64 Log #976 NEC-P01 **Final Action: Accept in Principle in Part**
(110.20 (New))

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 1-95
Recommendation: Revise text to read as follows:

110.20 Enclosure Types. Enclosures (other than surrounding fences or walls) of switchboards, panelboards, industrial control panels, motor control centers, meter sockets, and motor controllers, rated not over 600 volts nominal and intended for such locations, shall be marked with an Enclosure Type number as shown in Table 0.20.

Table 110.20 ~~provides the basis~~ shall be used for selecting the above enclosures for use in specific locations, other than hazardous (classified) locations. The enclosures ~~are~~ shall not be intended to protect against conditions, such as condensation, icing, corrosion, or contamination that may occur within the enclosure or enter via the conduit or unsealed openings.

Substantiation: The accepted text in the proposal does not comply with the NEC Style Manual and Section 90.5(A) to use mandatory language. The suggested text in this comment will provide the mandatory text necessary to comply with 90.5(A) and the NEC Style Manual.
Panel Meeting Action: Accept in Principle in Part

The panel accepts the change to the 1st sentence of the second paragraph, but rejects the change to the 2nd sentence. The panel accepts in principle aligning the text with the NEC Style manual so that the paragraph reads:

"Table 110.20 shall be used for selecting enclosures for use in specific locations other than hazardous (classified) locations. The enclosures are not intended to protect against conditions such as condensation, icing, corrosion, or contamination that may occur within the enclosure or enter via the conduit or unsealed openings."

Panel Statement: In accordance with the NEC Style Manual, Section 3.1.1, CMP-1 concurs with the submitter that using the mandatory code language "shall be used" in lieu of "provides the basis" is appropriate. CMP-1, however, disagrees with changing the words "are not intended" to "shall not be intended." In the context of the sentence, there is no need for this sentence to be written as mandatory code language. CMP-1 has also removed the words "the above" as they are unnecessary and in violation of NEC Style Manual, Section 3.3.4 – Word Clarity.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-65 Log #1513 NEC-P01 **Final Action: Accept in Principle**
(110.20(New))

Submitter: James Wiseman, Schneider Electric / Square D
Comment on Proposal No: 1-95
Recommendation: The Panel should continue to accept Proposal 1-95 and its companion proposals.
Substantiation: Having the enclosure requirements in a general application area of the Code, rather than in 430.91, and specifically stating the kinds of equipment to which they apply will greatly improve usability.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 1-114. The panel accepts the relocation of the table and the text with the inclusion of the revisions noted in comment 1-114.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-66 Log #1097 NEC-P01 **Final Action: Reject**
(110.21)

Submitter: Michael Thibeau, Bear Electric
Comment on Proposal No: 1-96
Recommendation: Revise text to read as follows:
(a) Minimum Space. Switchboards, panel boards, disconnects, panels, meter~~-mains~~ enclosures, and any electrical cabinet or, enclosure that may require ~~any~~ examination, adjustment, service, or ~~reset~~, maintenance shall be field marked: [Warning: minimum ~~3~~ (x) ft. clearance required by NEC code] (x) shall be derived from table 110.26(A)(1). Field marking shall not be required if the equipment is accessible only to qualified personnel.
Substantiation: This submission was edited to more fully comply with the style manual, specifically 2.1.5.2, 3.2.4, and 3.3.5. I also completely agree with the submitter, Donald Wiess that this simple signage would of significant benefit. I believe that although many unqualified persons may be aware of electrical hazards, many are unaware of the space requirements set forth in 110.26 not only in dwelling units but commercial/retail spaces as well. This will not only serve as a deterrent towards encroaching miscellaneous storage, but also as a reminder to other tradesmen making installations around electrical equipment about NEC space requirements. In one instance, an oil tank was installed directly in front of a panel that needed to be worked on.
Panel Meeting Action: Reject
Panel Statement: The Panel reaffirms its statement on Proposal 1-96 as the comment does not provide any additional information to address the Panel's expressed concern.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: We agree with the substantiation presented by Mr. Hickman in the proposal stage. We do not want to "oversign" an already oversigned world but we need something to keep stuff in front of electrical panels. The proposed marking would serve as a deterrent to unqualified persons and an important reminder to qualified persons.
HICKMAN, P.: We are voting negative to the panel action to reject Comment 1-66. Our explanation is as follows: We do not necessarily agree with the panel statement on Comment 1-66 which reaffirms its panel statement on Proposal 1-96. We still maintain the proposed marking would serve as a deterrent to unqualified persons. We do not agree with the panel statement which states: "such marking would be of little benefit."

1-67 Log #1001 NEC-P01 **Final Action: Reject**
(110.21(A))

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 1-96
Recommendation: Accept, but add:
Infringement on this working space could endanger workers requiring clear access to the equipment.
Substantiation: Mr. Weiss is correct that this requirement would prevent costly mistakes and even deaths. What the CMP asserts in rejecting the proposal is puzzling. By definition of "qualified," a qualified person would know the rule, but there are a great many more non-qualified working around electrical equipment, and some of them do heed signs. Otherwise, why would we bother with "Danger! Shock hazard-keep out."?
The change I propose is due to the fact that warning signs ideally not only catch the attention and instruct their readers, but also specify the nature of the hazards/consequences.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 1-66.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: See my explanation of negative on Comment 1-66.
HICKMAN, P.: See our explanation of negative vote on Comment 1-66.

1-68 Log #1002 NEC-P01 **Final Action: Reject**
(110.21(A))

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 1-96
Recommendation: Accept.
Substantiation: Mr. Weiss is correct that this requirement would prevent costly mistakes and even deaths. What the CMP asserts in rejecting the proposal is puzzling. By definition of "qualified," a qualified person would know the rule, but there are a great many more non-qualified working around electrical equipment, and some of them do heed signs. Otherwise, why would we bother with "Danger! Shock hazard-keep out."?
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 1-66.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
ANTHONY, M.: See my explanation of negative on Comment 1-66.
HICKMAN, P.: See our explanation of negative vote on comment 1-66.

1-69 Log #269 NEC-P01 **Final Action: Accept in Principle**
(110.22)

Submitter: John D. Minick, Grand Prairie, TX
Comment on Proposal No: 1-98
Recommendation: Revise Proposal 1-98 as accepted by Code-Making Panel 1 as shown below:
110.22 Identification of Disconnecting Means.
(A) General. Each disconnecting means shall be legibly marked to indicate its purpose unless located and arranged so the purpose is evident. The marking shall be of sufficient durability to withstand the environment involved.
(B) Engineered Series Combination Systems. Where circuit breakers or fuses are applied in compliance with the series combination ratings selected under engineering supervision and marked on the equipment as directed by the engineer, the equipment enclosure(s) shall be legibly marked in the field to indicate the equipment has been applied with a series combination rating. The marking shall be readily visible and state the following:
CAUTION — ENGINEERED SERIES COMBINATION SYSTEM RATED ____ AMPERES. IDENTIFIED REPLACEMENT COMPONENTS REQUIRED.
FPN: See 240.86(A) for ~~interrupting rating marking for end-use equipment~~ requirements for Engineered Series Combination Systems.
(C) Tested Series Combination Systems. Where circuit breakers or fuses are applied in compliance with the series combination ratings marked on the equipment by the manufacturer, the equipment enclosure(s) shall be legibly marked in the field to indicate the equipment has been applied with a series combination rating. The marking shall be readily visible and state the following:
CAUTION — SERIES COMBINATION SYSTEM RATED ____ AMPERES. IDENTIFIED REPLACEMENT COMPONENTS REQUIRED.
FPN: See 240.86(B) for ~~interrupting rating marking for end-use equipment~~ requirements for Tested Series Combination Systems.
Substantiation: This Comment was developed by a Task Group of CMP-1 members while reviewing actions taken by CMP-10 on Proposal 10-52, which was referred to CMP-1 by CMP-10. Members of the Task Group included Louis Barrios, Jr., Kenneth Boyce, Mark Christian, Neil LaBrake, Lanny McMahill, Gil Moniz, and John Minick. The developed Comment to CMP-10 states CMP-1 agrees that markings are required for Engineered Series Combination Systems (240.86(A)). However the specifics of the marking should appear in 110.22 that already contains marking requirements for Tested Combinations (240.86(B)). CMP-1 considers that Proposal 1-98 as modified by this comment meets the intent of 10-52 relative to specific markings associated with 240.86(A). Additionally, CMP-1 suggested that CMP-10 add a FPN to 240.86 that would state - FPN: See 110.22 for marking requirements for Series Combination Systems.
The added (A), (B), (C) paragraph style proposed as a revision to the accepted Proposal 1-98 is intended to separate and clarify the three main requirements contained in 110.22. The revision of the fine print notes accepted by CMP-1 in Proposal 1-98 are necessary in that the current fine print notes appear to reference markings in 240.86 and that may in fact confuse NEC users.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 1-70.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-70 Log #350 NEC-P01 **Final Action: Accept**
(110.22)

Submitter: Code-Making Panel 10,
Comment on Proposal No: 1-98
Recommendation: This proposal should be Accepted in Principle, and modified as follows:
110.22 Identification of Disconnecting Means.
(A) General. Each disconnecting means shall be legibly marked to indicate its purpose unless located and arranged so the purpose is evident. The marking shall be of sufficient durability to withstand the environment involved.
(B) Engineered Series Combination Systems. Where circuit breakers or fuses are applied in compliance with the series combination ratings selected under engineering supervision and marked on the equipment as directed by the engineer, the equipment enclosure(s) shall be legibly marked in the field to indicate the equipment has been applied with a series combination rating. The marking shall be readily visible and state the following:

CAUTION — ENGINEERED SERIES COMBINATION SYSTEM RATED AMPERES IDENTIFIED REPLACEMENT COMPONENTS REQUIRED.

FPN: See 240.86(A) for Engineered Series Combination systems.

(C) Tested Series Combination Systems. Where circuit breakers or fuses are applied in compliance with the series combination ratings marked on the equipment by the manufacturer, the equipment enclosure(s) shall be legibly marked in the field to indicate the equipment has been applied with a series combination rating. The marking shall be readily visible and state the following:

CAUTION — SERIES COMBINATION SYSTEM RATED _____ AMPERES IDENTIFIED

REPLACEMENT COMPONENTS REQUIRED.

FPN: See 240.86(B) for Tested Series Combination Systems. ~~interrupting rating marking for end-use equipment~~.

Substantiation: This comment was developed by a task group comprised of the following members of CMP-10 James Dollard, Chair; Charles Blizzard; Dennis Darling; Charles Eldridge; Carl Fredericks; Clive Kimblin; John Kovacik; Frank Ladonne; George Ockuly; Gerald Williams; Alan Manche and Vince Saporita.

This proposed revision is modeled after the preliminary work of a CMP-1 Task Group developing a comment on Proposal 1-98.

The intent of the submitter is met in this revision. In order to improve clarity and usability, the proposed revision of the requirements of 110.22 are separated into three first level subdivisions. The existing requirements of 110.22 as seen in the 2005 NEC are editorially separated into two first level subdivisions titled, "(A) General)" and "(C) Tested Series Combination Systems." The proposed additional text accepted in Proposal 1-98 by CMP-1 is editorially placed in first level subdivision titled "(B) Engineered Series Combination Systems." This separation of requirements provides additional clarity, is user friendly, and in compliance with the NEC Manual of Style.

The Fine Print Note referencing 240.86(A) as accepted by CMP-1 in Proposal 1-98 has been modified to provide additional clarity. The revised FPN does not contain a requirement and is in compliance with the NEC Manual of Style. The existing FPN which is editorially moved to a new first level subdivision 110.22(C) has been modified for consistency with the proposed FPN in a new first level subdivision 110.22(B).

Requirements for marking of engineered series rated systems should be found in the same place as those for tested series rated systems. As such, they should be located in 110.22, not Article 240. CMP-10 considers that Proposal 1-98 as modified by this comment meets the intent of Proposal 10-52 relative to specific markings associated with 240.86(A).

This comment was balloted through CMP-10 with the following ballot results:

12 Eligible to Vote

11 Affirmative

1 Not Returned (R. Sobel)

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-71 Log #1672 NEC-P01 **Final Action: Accept in Principle**
(110.25 (New))

TCC Action: The Technical Correlating Committee understands that the panel action deletes the last sentence in the opening paragraph of 110.26 and adds a new 110.26(G).

Submitter: Phil Simmons, Olympia, WA

Comment on Proposal No: 1-100

Recommendation: Delete the last sentence of 110.26 opening paragraph and create a new 110.25 (or other appropriate location) with the concepts included in the existing rule.

110.25 Locked Rooms or Equipment. Rooms ~~or enclosures housing~~ containing overcurrent protective devices or disconnecting means and enclosures for overcurrent protective devices or disconnecting means shall be permitted to be locked provided those to whom access is necessary have a key or other means to open the lock(s) ~~electrical apparatus that are controlled by lock and key shall be considered accessible to qualified persons~~.

Substantiation: As stated in the substantiation for the Proposal, the sentence that is the subject of the Proposal has everything to do with access to equipment or to the room housing the electrical equipment and nothing to do with providing working space about electrical equipment. Working space is a cube-shaped space generally located in front of electrical equipment with a specific width, depth and height. Those working spaces are never locked (unless, of course, the room exactly matches the dimensions of the working space which is unlikely).

To accomplish the relocation needed, this Comment suggests the concepts included in this sentence be relocated to a new section. Section 110.25 is proposed, but another section at the discretion of the Panel is certainly acceptable.

Proposal 4-81 to add the language from 110.26 to 230.92 was rejected by CMP-4 with the thought that language to regulate access to equipment, if applicable to more than one article, should be in Article 110. Locked equipment is presently covered in not less than the following 20 articles: 110, 230, 240, 410, 422, 424, 430, 440, 450, 490, 514, 520, 600, 610, 620, 625, 647, 665, 675, and 695.

Panel member Mr.McMahill states in his negative vote, "The proposal should have been accepted as the submitter's substantiation justifies deletion of the text. I agree with the submitter that this sentence does not belong in this section and removing it will improve usability of the code. The panel statement notes that, "The submitter has not provided adequate technical substantiation that a problem exists." I believe the submitter has provided reasonable substantiation for the change. Section 110.26 addresses "Spaces About Electrical Equipment." A lock and key has nothing to do with these spaces. The sentence more appropriately belongs somewhere else in the code. At the minimum, CMP-1 should have accepted the proposed deletion of the sentence contingent on CMP-4 and 10's positive action on the submitter's companion proposals. CMP-1 should reconsider the action on this proposal." I agree with Panel member Mr.McMahill!

Moving this sentence to a new and appropriate location will not introduce a new concept not covered in the NEC, but will improve the organization and user-friendliness of the Code.

Panel Meeting Action: Accept in Principle

Create new section 110.26 (G) that reads:

110.26 (G) Locked Electrical Equipment Rooms or Enclosures. Electrical equipment rooms or enclosures housing electrical apparatus that are controlled by a lock(s) shall be considered accessible to qualified persons.

Panel Statement: CMP-1 accepts the recommendation to delete the text from Section 110.26 regarding "Enclosures housing electrical apparatus that are controlled by a lock(s)...." and create a new section 110.26(G). CMP-1 has created a new title for 110.26(G) - Locked Electrical Equipment Rooms or Enclosures. The deleted text from Section 110.26(A) has been relocated to this new section and slightly modified for clarity of the intent.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-72 Log #1003 NEC-P01 **Final Action: Reject**
(110.26 (New))

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing

Comment on Proposal No: 1-103

Recommendation: Accept as written.

Substantiation: The CMP's comments appear to overlook a special characteristic of many metering devices. Utility meters most commonly serve as customer demarcation points, remaining under utility control. At least in part because of this, the utility, not the AHJ, approves the location of the meter can. Then electricians-our peers-as well as lineworkers need access after these are energized, for instance when performing service changes.

Panel Meeting Action: Reject

Panel Statement: Working space is required about all electrical equipment. Clearly this includes "metering devices".

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-73 Log #2200 NEC-P01 **Final Action: Reject**
(110.26 (New))

Submitter: Michael A. Anthony, University of Michigan Business & Finance / Rep. Association of Higher Education Facilities Professionals

Comment on Proposal No: 1-101

Recommendation: Accept the Proposal. New Text from ROP is repeated here:

1-101 Log #3082 NEC-P01 **Final Action: Reject**
(110.26)

Submitter: Michael A. Anthony, University of Michigan Business & Finance / Rep. Association of Higher Education Facilities Officers

Recommendation: Add text to read as follows:

11 0.26(D) (NEW) Emergency Illumination. The area around all service panels in non-dwelling unit occupancies 200 amperes and above shall be automatically illuminated upon loss of power. For a period of 90 minute illumination levels shall be

(1) One footcandle (1-fc) along the floor to the established building emergency egress path.

(2) Two footcandles (2-fc) at all vertical surfaces where surface switchgear, permanent service directory, emergency transfer switches, or standby power switches are located.

Substantiation: Proposal 1-101, Log #3801 should be accepted. This proposal aligns with the work of the panel that crafted new Article 585 (Critical Operations Power Systems) because it a necessary part of the foundation we are building for power security. It should be intuitively understood that emergency lighting is needed at the electric service equipment in order for an electrical professional--or non-electrical professional--to at least determine the nature of the outage and take appropriate action.

Some NEC requirements ought to come from gut-level understanding that emergency lighting at the service equipment is important enough that it should not lie in the gap in coverage of the Life Safety Code (typically enforced by the local fire marshal) and the electrical inspector enforcing the National Electric

Code. A great deal of the Life Safety Code covers egress; everything is about getting people out of the building. But during a power outage everybody else may be leaving the building while the electrician or fire fighter is obliged to go in the opposite direction.

In the 2006 Life Safety Code you will get 30 hits on the word "emergency lighting", 10 hits on the word "emergency power", 38 hits on the word "illumination" and 3 hits on the word "ingress". Look at them all carefully in the context of how an Architect constructs an egress path and then tell me that there is not a gap between these two codes that leaves the electrician in the dark.

The following selections from the Life Safety Code may help friends of the NEC who do not have access to the NFPA code subscription service that makes it so easy to compare codes and standards.

7.8 Illumination of Means of Egress.

7.8.1 General.

7.8.1.1* Illumination of means of egress shall be provided in accordance with Section 7.8 for every building and structure where required in Chapter 11 through Chapter 42.

The Life Safety Code is silent over the issue of whether service equipment needs to be on the egress entry, egress path, or egress exit. The Life Safety Code fails to assure that the path to or from the electric service equipment is obvious and direct. (I acknowledge the hidden assumption that transfer equipment is located near the service point) Good engineers and architects can, and should, provide for such illumination in the design stage but a large class of electrical service equipment areas are not guided by designers. Even with good designers on the job the concept of "ingress toward the electric service equipment" doesn't even seem to show up between the lines of the Life Safety Code. The equivalency of ingress (or partial ingress), as the reverse of egress, for example, may not be assured.

7.9.2.3* The emergency lighting system shall be arranged to provide the required illumination automatically in the event of any interruption of normal lighting due to any of the following:

(1) Failure of a public utility or other outside electrical power supply
(2) Opening of a circuit breaker or fuse
(3) Manual act(s), including accidental opening of a switch controlling normal lighting facilities

Note that the only facility classes that explicitly require illumination at anything resembling the service point, are storage and detention facilities.

22.5.1.2 Alarms, emergency communications systems, and the illumination of generator set locations shall be provided with emergency power in accordance with NFPA 70, National Electrical Code.

From this sample of passages it should be plain that, without an explicit requirement for emergency illumination at the service equipment as a Chapter 1 general requirement, we put the Fire Marshall and the Electrical Inspector in a position where each looks to the other as the person responsible for verifying that the installation meets service equipment emergency lighting requirements that do not now exist. Getting this language into the NEC, or a version of it that matches its intent, will change that.

We should take comfort in the fact that mounting a spec grade emergency lighting unit and pointing its beam at the service equipment can cost as little as $100--installed. While it is true that loss data has not been presented to the committee, the lack of hard data accompanying this proposal is not much different than the lack of data presented to the committee governing the controversial selectivity requirements in Articles 700 and 701. A great deal of the NEC has come down to us from uncounted, unclassified experience. We should let common sense be the guide in the acceptance of Proposal 1-101. It's a start.

Panel Meeting Action: Reject

Panel Statement: The Panel reaffirms its statement on Proposal 1-101. The panel recommends that the submitter submit this proposal to the NFPA 101 & 5000 committees. The panel notes that what the submitter is suggesting is not prohibited by the NEC.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

ANTHONY, M.: I appreciate the respectful discussion of this issue by my colleagues on Panel 1 at the December 2006 ROC panel meeting. Perhaps this proposal is one of many that are presented to NEC committees that take a while "getting used to" or may be too far ahead of its time. Nevertheless, I maintain that emergency illumination for service switchgear--especially switchgear that controls emergency power--should be a general requirement for electrical installations; much as working/clearance/dedicated space, and panic hardware is a general requirement. Electrical people should be looking after their own in this regard; not leaving the issue to the architectural trades that dominate the code panels in the Life Safety Code.

1-74 Log #1004 NEC-P01 **Final Action: Reject**
(110.26(A))

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 1-106
Recommendation: Accept, adding: To the extent practicable, in front of Mr. Schwan's proposed new text.
Substantiation: What has been proposed is an important concept, one that often is enforced now, and that should be incorporated into the Code. It addresses issues raised also in Proposals 1-113, 114, and 115, and 10-40-the latter being a case where three CMP members say that the working space in front of panelboards should not require workers to stand on two levels. Equipment on a roof may not have a flat surface in front of it, as the CMP points out, but this is not in conflict: roofs are sloped when, as Mr. Schwan's wording acknowledges, they must be arranged to drain.

Furthermore, if a roof is so steep as to exceed a reasonable slope for drainage, perhaps anyone requiring the installation of electrical equipment requiring testing or service on such as surface ought to supply a working platform in front of it, for worker safety. OSHA statistics on falls by construction workers are well-known. While this is partly due to the nature of the sites-holes, uneven ground, elevations-I believe you will agree that it also is partly due to the distracting nature of the work. When the stumble would cause shock or worse, adding a simple requirement such as Mr. Schwan's is especially worthwhile.

The words I propose adding will make it easier for AHJs to accommodate special cases without having to provide formal written permission per 90.4.

Panel Meeting Action: Reject

Panel Statement: The Panel concludes that the proposed text suggested by the comment does not ameliorate the concerns expressed in the panel statement on Proposal 1-106.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

ANTHONY, M.: I disagree with the panel statement that this language fails to clear up the problem of working spaces on unlevel surfaces. Electrical designers, among others, need to be made to work harder to keep electrical equipment out of stairways and other unlevel surfaces. Very often a stairway is the only egress path and switchgear should not be permitted to be installed in such locations.

MCMAHILL, L.: CMP-1 should have accepted this comment in principle with the following revised wording: "To the extent practicable, the standing surface shall be horizontal, flat, and level, except where necessarily sloped to drain." The revised text would more closely reflect the intent of the original submitter. Using the generic term "standing surface" eliminates the need for a type of surface, such as grade, floor or platform. Use of the term "to the extent practicable" (feasible) is appropriate code language - it meets the NEC Style Manual syntax requirements. The revised text will allow the AHJ flexibility in code enforcement and provide a tool to be used for attaining compliance with this section.

1-75 Log #1005 NEC-P01 **Final Action: Reject**
(110.26(A))

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 1-106
Recommendation: Accept Mr. Schwan's proposed new text.
Substantiation: What has been proposed is an important concept, one that often is enforced now, and that should be incorporated into the Code. It addresses issues raised also in Proposals 1-113, 114, and 115, and 10-40-the latter being a case where three CMP members say that the working space in front of panelboards should not require workers to stand on two levels. Equipment on a roof may not have a flat surface in front of it, as the CMP points out, but this is not in conflict: roofs are sloped when, as Mr. Schwan's wording acknowledges, they must be arranged to drain.

Furthermore, if a roof is so steep as to exceed a reasonable slope for drainage, perhaps anyone requiring the installation of electrical equipment requiring testing or service on such as surface ought to supply a working platform in front of it, for worker safety. OSHA statistics on falls by construction workers are well-known. While this is partly due to the nature of the sites-holes, uneven ground, elevations-I believe you will agree that it also is partly due to the distracting nature of the work. When the stumble would cause shock or worse, adding a simple requirement such as Mr. Schwan's is especially worthwhile.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 1-74.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

ANTHONY, M.: See my explanation of negative on Comment 1-74.

MCMAHILL, L.: See my explanation of negative vote on Comment 1-74.

1-76 Log #837 NEC-P01 **Final Action: Accept**
(110.26(A)(1)(a))

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 1-111
Recommendation: Continue to reject the proposal.
Substantiation: Although this proposal was rejected by a significant margin, the comments on voting deserve some additional explanation. The problem with using the term "de-energized" introduces exactly the issue that existed in the 1999 NEC. You must read the wording carefully because using that term stated "de-energized parts on the back of enclosed equipment". Nobody could explain what a de-energized part would be that is ON the back of a piece of equipment. The panel was correct to change the wording to "non-electrical". A couple of examples of what may be included in this wording are items such as filters for air circulation systems that are part of the equipment or a transformer throat connection that needs some mechanical (not electrical) work.

Furthermore, if the expectation was for de-energized parts then you may still need the normal working space in order to verify that these are "de-energized" (as pointed out by Mr. Barrios). The 30" provision allows for reduced space to allow access and perform work that is not related to the electrical aspects of the equipment.

Mr. Barrios is correct that the way to resolve the inconsistency is to fix 110.34(A) exception to match 110.26.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

MCMAHILL, L.: Code-Making Panel 1 should have reverted back to the original code language to mirror the requirements of 110.34, Exception. The term "de-energized" has been long standing in the code with no reports of problems or concerns. Use of the term "nonelectrical" now requires a judgment call on the part of the AHJ to determine if working space is or is not required for rear access. De-energized terminals on the rear of a switchboard generally do not require examination, adjustment, servicing, or maintenance while energized. Therefore, is working space per 110.26(A) required, or does compliance with 110.26, Spaces About Electrical Equipment, suffice? The term nonelectrical is vague and unenforceable code language. This change now requires a minimum horizontal working space on the back of enclosed equipment for nonelectrical parts, yet requires no minimum working space for electrical parts. It is more appropriate to require a minimum horizontal working space for deenergized electrical parts not likely to require examination, adjustment, servicing, or maintenance while energized, than for nonelectrical parts.

1-77 Log #1796 NEC-P01 **Final Action: Hold**
(110.26(A)(1)(a) and 110.34.(A))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 1-111
Recommendation: Modify 110.34(A)Exception as shown below.
110.34 Work Space and Guarding.

(A) Working Space. Except as elsewhere required or permitted in this Code, the minimum clear working space in the direction of access to live parts of electrical equipment shall not be less than specified in Table 110.34(A). Distances shall be measured from the live parts, if such are exposed, or from the enclosure front or opening if such are enclosed.
Exception: Working space shall not be required in back of equipment such as dead-front switchboards or control assemblies
where there are no renewable or adjustable parts (such as fuses or switches) on the back and where all connections are accessible from locations other than the back. Where rear access is required to work on non-electrical ~~de-energized~~ parts on the back of enclosed equipment, a minimum working space of 750 mm (30 in.) horizontally shall be provided.
Substantiation: The panel action should continue to be Reject on Proposal 1-111 because Condition 1, 2, or 3 working clearances may still be needed on de-energized equipment for tasks such as testing for the absence of voltage as noted in Mr. Barrios' ROP affirmative ballot comment. Also as noted in Mr. Barrios' ballot comment, "de-energized parts" in 110.34(A) Exception should be changed to "non-electrical parts" as shown above so that the requirements in 110.26(A)(1)(a) and 110.34(A) are consistent. Failure to modify 110.34(A) will continue the inconsistency between the low voltage and medium voltage clearance requirements behind dead front equipment for another code cycle. This action should not be considered as new material since the proposed changes in 110.34 (A) Exception appeared in the ROP.
Panel Meeting Action: Hold
Panel Statement: This comment was held because it would introduce a concept that has not had public review by being included in a related proposal as published in the Report on Proposals.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

BARRIOS, L.: The panel should have accepted this comment and not placed it on hold for the 2011 code cycle. Comment 1-77 recommends changing "de-energized parts" to "non-electrical parts" in the 110.34(A) Exception in order to make the requirements the same for LV and MV equipment. I also made this recommendation in my affirmative ballot comment on Proposal 1-111 in the 2008 ROP. Since similar language appears in the ROP, the proposed change has had public review and should not have been considered new material. The submitter of Comment 1-76 acknowledged the proposed change in my ROP comment by stating "Mr. Barrios is correct that the way to resolve the inconsistency is to fix the110.34(A) exception to match 110.26."

HITTINGER, D.: I am voting negative on the panel action to hold Comment 1-77. Our explanation is as follows: "This comment did have public review as noted in Mr. Barrios' ROP ballot comment. The panel should accept this comment that would modify the text to make the requirements in 110.26(A)(1)(a) and 110.34(A) consistent."

1-78 Log #6 NEC-P01 **Final Action: Accept**
(110.26(A)(3))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 1-117
Recommendation: The Technical Correlating Committee directs the panel to reconsider their action relative to the necessity of a soft conversion. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the TCC's direction to reconsider action on Proposal 1-117. As 90.9(D) states that compliance with either SI measurements or inch-pound measurements shall constitute compliance with NEC, and 6 inches is a greater distance than 150 mm, 90.9(C)(4) would not apply. The panel concludes that the use of 150mm is appropriate.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-79 Log #935 NEC-P01 **Final Action: Reject**
(110.26(A)(3))

Submitter: Robert G. Fahey, City of Evansville
Comment on Proposal No: 1-116
Recommendation: I would support the new wording proposed for this section as proposed in NEC Proposal 1-115 (Log #1892).

The new 2nd sentence in (A)(3):

"Stairs or stair treads shall not be permitted as the grade floor or platform as referred to in this section."
Substantiation: I am not aware of any incidents where a worker has been hurt by working on a stairs or uneven floor surfaces. As an electrician and an electrical inspector, it is very apparent to me it would be very easy to loose your balance while working on a panelboard located on a stair tread or uneven surface. I would doubt if any electrician in my area would take the time to build a level platform in order to work on the equipment. Providing a level working area in front of electrical equipment will enhance the safety of the installation, allowing an uneven area created by steps in front of electrical equipment provides an unsafe workplace. As the NEC is presently written, new electrical panelboards are allowed to be installed in these unsafe areas, there would typically be minimal or
no additional cost to install these panelboards in a safe, level work space, this might save an electrician from being injured or shocked sometime in the future. I inspected an installation where the panelboard was installed on a stairway and found it to be unfortunate that the National Electrical Code did not prohibit this type of unsafe installation. I would encourage the Code Panel to look at this additional sentence and embrace this as another step in making it safer for workers who must in some instances (actually many instances) work on this equipment energized. This would, in my mind, be logical move forward in creating a safer work area for all electricians and maintenance personnel.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its statement on Proposal 1-115. The panel understands that this comment is in reference to proposal 1-115 rather than the linked proposal 1-116.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

HICKMAN, P.: We are voting negative to the panel action to reject Comment 1-79. Our explanation is as follows: This comment should have been accepted. We disagree with the panel statement which reaffirms the action and statement on Proposal 1-115. We disagree the proposed recommendation is restrictive and unnecessary. We recognize that there may be many cases where working from an uneven work surface may be unnecessary. However, designing or condoning this type of installation does not seem prudent.

1-80 Log #1404 NEC-P01 **Final Action: Reject**
(110.26(A)(3))

Submitter: Noel Williams, Noel Williams Consulting
Comment on Proposal No: 1-116
Recommendation: Revise text to read as follows:

This proposal should have been accepted. Alternatively the proposal should have been accepted in principal with the wording changed to read "...to the height required by 110.26(E) or to the top of the equipment and not less than 2.0 m (6-1/2 ft) where a minimum height is not specified by 110.26(E)."
Substantiation: According to the panel statement, "the submitter's intent is met by the reference to 110.26(E) height requirement in 110.26(A)." This is false. The submitters intent is not met by the existing language of 110.26(E). It may be true that the panel's intent is met by this reference, however, that would mean that the panel's intent is that there would be no minimum height requirement for equipment such as safety switches, combination motor controllers, control panels, or the like, since 110.26(E) does not provide a height requirement for such equipment. 110.26(A)(3) says the height shall be "...the height required by 110.26(E)." 110.26(E) provides a height requirement only for "service equipment, switchboards, panelboards, or motor control centers," and provides no requirement for other equipment that may require "examination, adjustment, servicing, or maintenance while energized." I doubt very much that that is the panel's intent, but that is what the section says. If the panel intends that a height requirement apply to equipment other than that to which 110.26(E) clearly limits itself, then the proposal should have been accepted. Otherwise other types of equipment will have specified width and depth requirements but no height so the working space for such equipment will have an area, but no volume. A more user-friendly approach would be to state the requirement in 110.26(A)(3) rather than referring to another subsection. If the panel intends that the minimum height requirements be 6-1/2 ft in all cases except for in existing dwelling units, the alternative wording suggested above should be accepted and the original proposal should have been accepted in principal.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its statement on Proposal 1-116. 110.26(A)(3) references the height requirements (dimensions) contained in 110.26(E) for the equipment addressed in 110.26(A). It does not limit the working space height to the specific equipment addressed in 110.26(E).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

HITTINGER, D.: I am voting negative on the panel action to reject Comment 1-80 with the following explanation: The submitter has identified a problem with determining the height of working space and headroom requirements as found in 110.26(A)(3) that references 110.26(E). The list in 110.26(E) only references service equipment switchboards, panelboards and motor control centers so there is no requirement for equipment not mentioned in the list. Inserting the proposed text into 110.26(A)(3), would provide users of the code the necessary language to install and enforce height requirements for all electrical equipment.

MCMAHILL, L.: The submitter's comment that "there would be no minimum height requirement for equipment such as safety switches, combination motor controllers, control panels, or the like" is correct. Section 110.26(E) is specific to "service equipment, switchboards, panelboards, or motor control centers." This is a minor oversight that may need to be clarified during the 2011 NEC cycle by deleting "about service equipment, switchboards, panelboards, or motor control centers" from Section 110.26(E). This would likely meet the intent of the submitter and the code.

1-81 Log #1455 NEC-P01 **Final Action: Reject**
(110.26(A)(3))

Submitter: James O'Driscoll, IBEW Local #98
Comment on Proposal No: 1-113
Recommendation: I agree with the submitter and Mr. P. Hickman.
Substantiation: The submitter's substantiation portrays real-life hazards in the field. As a journeyman electrician, I worked on many installations where panelboards where installed in stairwells. I felt that doing any kind of maintenance or new additions to these panelboards was very hazardous. Especially, with the advent of NFPA 70E, how can the Code permit these types of installations
Panel Meeting Action: Reject
Panel Statement: This public comment does not contain proposed text as required by 4.4.5(c) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-82 Log #1457 NEC-P01 **Final Action: Reject**
(110.26(A)(3))

Submitter: James O'Driscoll, IBEW Local #98
Comment on Proposal No: 1-114
Recommendation: I agree with the submitter and Mr. P. Hickman.
Substantiation: The submitter's substantiation portrays real-life hazards in the field. As a journeyman electrician, I worked on many installations where panelboards were installed in stairwells. I felt that doing any kind of maintenance or new additions to these panelboards was very hazardous. Especially, with the advent of NFPA 70E, how can the Code permit these types of installations
Panel Meeting Action: Reject
Panel Statement: This public comment does not contain proposed text as required by 4.4.5(c) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-83 Log #1468 NEC-P01 **Final Action: Reject**
(110.26(A)(3))

Submitter: James O'Driscoll, IBEW Local #98
Comment on Proposal No: 1-115
Recommendation: I agree with the submitter and Mr. P. Hickman.
Substantiation: The submitter's substantiation portrays real-life hazards in the field. As a journeyman electrician, I worked on many installations where panelboards were installed in stairwells. I felt that doing any kind of maintenance or new additions to these panelboards was very hazardous. Especially, with the advent of NFPA 70E, How can the Code permit these types of installations.
Panel Meeting Action: Reject
Panel Statement: This public comment does not contain proposed text as required by 4.4.5(c) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-84 Log #389 NEC-P01 **Final Action: Accept**
(110.26(C))

TCC Action: The Technical Correlating Committee understands that the panel action is further modified by the addition of the text "and over 1.8 m (6 ft) wide" in accordance with the panel actions on Comment 1-86 and Proposal 1-127.
Submitter: James K. Lathrop, Koffel Assoc., Inc.
Comment on Proposal No: 1-119
Recommendation: Further revise the text of 110.26(C) from that made at the ROP stage as follows:
(C) Entrance to and Egress fromWorking Space.

(1) Minimum Required. At least one entrance of sufficient area shall be provided to give access to and egress from working space about electrical equipment.
(2) Large Equipment. For equipment rated 1200 amperes or more that contains overcurrent devices, switching devices, or control devices, there shall be one entrance to and egress from the required working space not less than 610 mm (24 in.) wide and 2.0 m (6½ ft) high at each end of the working space. Where the entrance has a personnel door(s), the door(s) shall open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure.

A single entrance to and egress from the required working space shall be permitted where either of the conditions in 110.26(C)(2)(a) or (C)(2)(b) is met.

(a) Unobstructed Egress ~~Exit~~. Where the location permits a continuous and unobstructed way of egress ~~exit~~ travel, a single entrance to the working space shall be permitted.

(b) Extra Working Space. Where the depth of the working space is twice that required by 110.26(A)(1), a single entrance shall be permitted. It shall be located so that the distance from the equipment to the nearest edge of the entrance is not less than the minimum clear distance specified in Table 110.26(A)(1) for equipment operating at that voltage and in that condition.
Substantiation: I serve as chairman of the NFPA 101 and NFPA 5000 Means of Egress Technical Committee (MEA). NFPA 101 and NFPA 5000 are in the June 2008 revision cycle. The MEA committee developed committee proposals to reference NFPA 70 110.33(A). Users of NFPA 101/5000 have followed the criteria of those codes only to find that the design was deficient from the requirements of NFPA 70. By referencing NFPA 70 110.33(A), the user of NFPA 101/5000 will be warned that the related provisions from NFPA 70 apply. However, some of the terminology used in 110.26(C) is inconsistent with that in NFPA 101/5000.

(1) With respect to the addition of the words "and egress from" in (C)(2), this is a correction to what was reported in the ROP. It appears the submitter of the proposal included the addition of those words, but they were not underscored and went unnoticed. Thus, the committee action on NEC Proposal 1-119 should have read: "The panel accepts only the submitter's recommendation to insert 'and egress from' in four ~~three~~ places."

(2) With respect to the replacement of the word "exit" with the word "egress" in two places in (C)(2)(a), the word "exit" has a special meaning in NFPA 101/5000 which can be generalized to mean the final door reached to the outside. Other travel across floors and through doors encountered along the egress path is part of the exit access. So in describing the route to the exit, the term "egress" is more correct.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-85 Log #652 NEC-P01 **Final Action: Reject**
(110.26(C)(2))

Submitter: Michael Cole, MRC Electric
Comment on Proposal No: 1-127
Recommendation: Change the first paragraph of 110.26(C)(2) as follows, which is slightly different than the original proposal by Alan Manche. This proposal needs to be Accepted in Part, but modified in part.

(2) Large Equipment. For equipment rated 1200 amperes or more or over 1.8 m (6 ft) overall width that contains overcurrent devices, switching devices, or control devices, there shall be one entrance to the required working space not less than 610 mm (24 in.) wide and 2.0 m (6 1/2 ft) high at each end of the working space. In new installations where equipment can be installed on both sides of the working space condition 3 in Table 110.26(A)(1) shall be applied with a reasonable depth allowance for future equipment.

Add fine print note:

FPN: A double width working space minimizes installation and maintenance labor and allows workers to more readily and safely work when there are ladders, wire reels, and so forth in the working space. A working space with both double space and double exits provides both superior safety and greatly reduces labor for installation and maintenance.

Substantiation: a. Equipment that is over 6 ft wide regardless of ampere capacity presents several headaches with respect to safety, installation, and maintenance. A single width double exit working space no longer has 2 exits when somebody is working on a ladder. Also, for equipment that is over 6 ft wide there needs to be extra room and/or exits such that 2 or more people can work in there. One such instance is when OSHA or insurance regulations require that there be 2 people working together in the room.

b. Another instance where double space and/or exits is needed is that having 2 or more electrical workers in the room minimizes installation time and optimizes installation labor. The less frustrated people are the more likely that they will work safely and efficiently. Also, the most efficient way to pull multiple general purpose branch circuits into raceways is to put the wire reels in the electrical closet and pull all of the home runs from there to the first box.

Allocating a double width working space is NOT a waste of resources - it can actually save money as well as enhancing safety. For that matter, it PAYS to use 2.5 in. schedule 80 PVC conduit for a 200 amp residential underground electrical service because of the savings on wire pulling labor. If you have a 4 person crew and no place to hook up a wire pulling winch or a forklift truck, the wire pull needs to be really easy. See Chapter 9, Fine Print Note No. 2 for jamming criteria when pulling wires around a conduit bend.

c. Oftentimes, equipment that is over 6 ft wide requires double width working space an/or double exits just to be able to get the equipment into the electrical room.

d. Not being able to install equipment on both sides of an electrical closet is a constraint that nobody likes to see.

Panel Meeting Action: Reject
Panel Statement: As stated in 90.1(C), the Code is not a design specification or a manual for untrained persons. The submitter's recommendation contains language that is vague and unenforceable.

The substantiation does not supply technical justification to require two means of access/egress or double the working space where equipment of any rating exceeds 6 ft.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-86 Log #892 NEC-P01 **Final Action: Reject**
(110.26(C)(2))

Submitter: Michael P. O'Quinn, MOGO Enterprises, Inc.
Comment on Proposal No: 1-127
Recommendation: Reject this proposal. Restore wording to 2005 NEC language.
Substantiation: The proposal appears to use the logic that providing 2 methods of egress for electrical equipment with "increased hazard" is too difficult or confusing. If this is the case, this is not a good reason for a change in the wording of this section.

As both Mr. Hickman and Mr. McMahill pointed out in their Explanation of Negative, the two means of egress about this equipment is for worker safety. Modern electrical equipment, especially at the 480-volt nominal range, can provide tremendous levels of arc flash and blast. The size of modern equipment is getting smaller with increasing levels of electrical energy, and also being placed more often in rooms to prevent the unqualified from exposure. Without adequate egress from this level of danger, extra exposure time to the arc flash increases the level of danger to the worker, even with proper PPE protection.

As the proposal's submitter states: "The arc blast or incident energy at a location is based on the voltage, available short circuit current, separation between the electrodes (phases), the distance a worker's body parts are from the arcing fault, and the duration of the fault."

Panel Meeting Action: Reject
Panel Statement: The Comment does not provide any new information and the Panel reaffirms its action based on the substantiation contained in Proposal 1-127.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

HICKMAN, P.: We are voting negative to the panel action to reject Comment 1-86. Our explanation is as follows: This comment should have been accepted to maintain the direction the panel took on this issue last cycle. Clearly, equipment much smaller than 6 ft can be extremely dangerous and would warrant the protection afforded by the requirements of 110.26(C)(2). As we stated in our comment to the negative during the ROP, we point to the substantiation provided by Mr. Ray Jones, current chairman of the NFPA 70E Technical Committee. The submitted IEEE paper entitled Staged Tests Increase Awareness of Arc-flash Hazards in Electrical Equipment (Paper no. PCIC 97-34, which was published in the IEEE Transactions on Industry Applications in 1998 we point to Test #4 of Table 1 on page 3. This test shows a Size 1 combination starter with a 30 ampere fused switch and protected by a 640 ampere power circuit breaker that did not open when a line side phase-to-ground fault was created. Clearly, a Size 1 combination starter is smaller than 6 ft, however, the ensuing arc-fault and blast was quite substantial with 22,000 amps available on a 640 ampere device.

HITTINGER, D.: I am voting negative on the panel action to reject Comment 1-86 with the following explanation: The panel action during the ROP Proposal 1-127(Log #3487), was to put the 6 foot requirement back in the code. However, there are several reasons that were considered by the panel when we removed this requirement that involves worker safety. It is essential to provide sufficient work space for a field worker when considering potential arc-flash hazards. The physical size of equipment enclosure has been reduced, but the hazards still exist. Removal of the 6 foot requirement made interpreting and enforcement easier when considering how to apply the rule to individual sections of gear or to a complete assembly. Installers could easily avoid the rule by placing individual sections and place them end to end that would exceed the 6 foot rule. I believe Panel 1 did the correct thing when we removed this requirement and should maintain their original action.

MCMAHILL, L.: CMP-1 should have maintained the language from the '05 NEC as requested by several comments submitted. By adding "and over 1.8 m (6 ft) wide" to the equipment requirement simply adds confusion. For example, does the requirement apply to the individual pieces of equipment or to an assembly only? Is the hazard less where a 4 ft wide 3000A switchboard is installed compared to an 8 ft wide 1200A switchboard? The change to the '05 NEC was to eliminate this confusion and to clarify the intent. In addition, the width of the equipment should have no bearing on the hazard. If anything, the rating of the equipment is of greater importance.

Comment on Affirmative:

BARRIOS, L.: CMP 1 did the right thing to reinstate the 6 foot wide requirement for requiring multiple means of egress. Physical size of the equipment should continue to be a criteria used to determine the amount of entrances needed for safe egress from an electrical equipment room or building. It is the physical size and placement of the equipment inside a room which creates barriers and obstructions for safe egress, not the equipment's continuous current rating alone. This is not solely an arc blast issue. The issue is providing an unobstructed path for persons to exit the area not only under equipment fault conditions, but also including fire and other events requiring emergency egress. The 6 foot wide equipment criteria has been in the NEC since 1978 (increased from 4-foot prior to that). Providing unobstructed paths is based on the physical size and location of the equipment and the size of the area in which the equipment is installed. It should not be based solely on the continuous current rating of the equipment.

LABRAKE, JR., N.: EEI agrees with the Panel's action on this Comment and Proposal 1-127, which restores the 6 ft. requirement. EEI further agrees with the Panel's statement on Proposal 1-125, which states "The panel rejects the concept of basing exiting requirements on incident energy levels. This section primarily deals with working space for large equipment rather than arc flash boundaries."

1-87 Log #986 NEC-P01 **Final Action: Accept in Principle**
(110.26(C)(2))

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 1-127
Recommendation: This proposal should be Accepted in Principle as follows:
110.26 Spaces About Electrical Equipment
(C) Entrance to Working Space
(1) Minimum Required. At least one entrance of sufficient area shall be provided to give access to working space about electrical equipment.
(2) Large Equipment.
(a) Entrance and Egress. For equipment rated 1200 amperes or more and over 1.8 m (6 ft) wide that contains overcurrent devices, switching devices, or control devices, there shall be one entrance to the required working space not less than 610 mm (24 in.) wide and 2.0 m (6 1/ 2 ft) high at each end of the working space. A single entrance to and egress from the required working space shall be permitted where either of the conditions in 110.26(C)(2)(a)(1) or (C)(2)(a)(2) is met.
(1) Unobstructed Exit. Where the location permits a continuous and unobstructed way of exit travel, a single entrance to the working space shall be permitted.
(2) Extra Working Space. Where the depth of the working space is twice that required by 110.26(A)(1), a single entrance shall be permitted. It shall be located so that the distance from the equipment to the nearest edge of the entrance is not less than the minimum clear distance specified in Table 110.26(A)(1) for equipment operating at that voltage and in that condition.
(b) Personnel Doors. Where the entrance to equipment rated 1200 amperes or more has a personnel door(s) that is less than 15 m (50 ft) from the working space, the door(s) shall open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure.
~~A single entrance to the required working space shall be permitted where either of the conditions in 110.26(C)(2)(a) or (C)(2)(b) is met.~~
~~(a) Unobstructed Exit. Where the location permits a continuous and unobstructed way of exit travel, a single entrance to the working space shall be permitted.~~
~~(b) Extra Working Space. Where the depth of the working space is twice that required by 110.26(A)(1), a single entrance shall be permitted. It shall be located so that the distance from the equipment to the nearest edge of the entrance is not less than the minimum clear distance specified in Table 110.26(A)(1) for equipment operating at that voltage and in that condition.~~
Substantiation: The intent of this comment is to preserve the requirement for doors to swing in the direction of egress with panic hardware when required. The action in the proposal stage to replace the six foot dimension for equipment achieves the intent of the submitter, but inadvertently eliminates doors in the direction of egress, and panic hardware where equipment is rated 1200 amps or more but is less than six feet in width. The width of the equipment does not affect in any way, the incident energy created in an arc flash/blast. Retaining this requirement is essential for the safety of all installers and maintainers of electrical equipment.
The revision is editorial in nature. Rearranging the requirements of 110.26(C)(2) in two new third level subdivisions, (a) Entrance and Egress and (b) Personnel Doors, is user friendly as it separates the two requirements for clarity. This separation of requirements allows for the six foot dimension which is reinstated, to apply only to the requirements addressing two doors and not the requirement for door swing and panic hardware.
Other changes accepted by CMP-1 are included in this text for clarity. The distance of six feet accepted in proposal 1-123 is revised to 15 m (50 ft) to coordinate with a sister comment to modify 1-123.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel actions and statements on Comments 1-86 and 1-92. The panel concludes that 25 ft is an adequate distance. The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
LABRAKE, JR., N.: This comment should be rejected and accept Proposal 1-127. The Panel reversed its position from their statement on Proposal 1-125, whereby the Panel rejected the concept of basing exiting requirements on incident energy levels. This section primarily deals with working space for large equipment rather than arc flash boundaries. A requirement for "panic hardware" and outward exit swing for all doors within 25 feet of the workspace for equipment rated 1200 amperes or more is considered excessive and unjustified. The Comment offers no fact finding report in the technical substantiation that the work space shall be larger, but has based the change on work rules found typically in NFPA 70E, which is outside of the scope of this installation Code.
Although EEI strongly supports safe installations for the use of electricity, strong evidence from a fact finding report is needed to establish changes to the distance to doors requiring panic hardware. The door criterion of 6 ft. in Proposal 1-123 was primarily to prevent a door swing interfering with the work space.
MCMAHILL, L.: Increasing the personnel door(s) distance from 6 ft to 25 ft is over restrictive. The 6 ft determination was based on double the minimum working space requirement. This was a reasonable distance and was intended to clarify the requirement for the personnel door(s). Some were enforcing the requirement where the doors were a considerable distance from the working space. Since the requirement is specific to personnel door(s), the 25 ft distance in essence penalizes a designer that wishes to place the electrical equipment in a room instead of a space. CMP-1 should keep in mind that where the electrical equipment is installed on a mezzanine, in an underground vault, or on a rooftop there may not be a personnel door. In these instances access may be via a hatch and ladder that is less than 25 ft from the working space.
Comment on Affirmative:
ANTHONY, M.: It is refreshing to consider a proposal that is data driven. We agree that this is a good start at securing space for an area of refuge and/or to stage an electrician recovery effort. But working space is an issue that involves owners and other trades and we should not be surprised that the practical implementation of this requirement in existing buildings will complicate architectural issues with respect to panic hardware on doors, openings, enclosures, intervening or absence of walls.

1-88 Log #987 NEC-P01 **Final Action: Accept in Principle**
(110.26(C)(2))

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 1-127
Recommendation: This proposal should be ACCEPTED IN PRINCIPAL as follows:
Where the entrance has a personnel door(s) that is less than 15 m (50 ft) from the working space, the door(s) shall open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure.
Substantiation: The substantiation provided states that a six foot distance is "reasonable" and provides for "safe egress" from the area. Six feet is not reasonable, six feet does not provide for safe egress in the event of an arcing fault, the distance must be significantly increased to allow safe egress for electrical workers in the event of an arcing fault.
The submitter is correct in his attempt to provide clarity to this requirement; however the distance must be significantly increased. As pointed out in a white paper presented by Dennis K. Neitzel at the 2006 IEEE IAS Electrical Safety Workshop, there are multiple different issues to be considered in an arcing fault, all of which require panic hardware and doors which swing in the direction of egress. There is no limit to the amount of studies and technical papers written to substantiate that a distance of six feet is not adequate. The white paper referenced above is included as additional information, thousands of additional pages of studies and technical papers to support significantly larger distances are available.
Allowing the immediate exit of persons from the room is imperative. This distance should be increased to fifty feet. This dimension does not represent a burden to building owners. It is beneficial to building owners, as it will allow their own employees to egress the room in the event of an arc fault. Doors will be put on these rooms and the door swing does not impact cost. The cost of the panic hardware is insignificant when one considers that standard hardware would be required in any situation.
The arc temperature, incident energy and pressure developed in an arcing fault present serious safety hazards. The temperature of the arc is recognized to be up to 35,000º F with some studies reporting temperatures over 60,000º F. An exposure of 203 º F for one tenth of a second (6 cycles) creates an incurable third degree burn. Non fire-rated clothing is ignited and burns fiercely. Copper expands by a factor of 67,000 times when it vaporizes. Together with superheated air from the arc itself a tremendous blast is created. One square inch of copper, when vaporized, becomes almost 1 ½ square yards of conductive plasma fireball. The toxic gases created will fill the room. Vision is compromised due to the arc flash and the fact that the room is filled with toxic gases.
We need to provide persons working in these equipment rooms with a means of immediate egress. Placing a 50-foot dimension is necessary for the safety of all persons.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 1-92. The panel concludes that 25 ft is an adequate distance. The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
LABRAKE, JR., N.: This comment should be rejected and accept Proposal 1-127. Refer to my negative ballot statement on Comment 1-87.
MCMAHILL, L.: See my explanation of negative vote on Comments 1-86 and 1-87.
Comment on Affirmative:
ANTHONY, M.: See my explanation of affirmative vote on Comment 1-87.

1-89 Log #1333 NEC-P01 **Final Action: Accept in Principle**
(110.26(C)(2))

Submitter: Ken Borgwald, Cooper Bussman
Comment on Proposal No: 1-123
Recommendation: This proposal should be accepted in principle as follows:
Where the entrance has a personnel door(s) that is less than 22.5 m (75 ft) from the working space, the door(s) shall open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure.
Substantiation: This requirement for doors to open in the direction of egress and panic hardware is designed to provide electrical workers with the ability to quickly exit a room after and perhaps during an arcing fault event. I manage the Gubany Center in St. Louis, MO. It is a high current testing facility where we create short circuits on purpose, every day. Most testing is set up for bolted short circuits, but the last decade or so we have been setting up tests that involve arcing faults. These arcing faults are hard to imagine-the sheer power, deafening explosion, huge fireball, molten metal and huge clouds of thick acrid smoke are something to behold for all of the senses. Standing 75 feet away, behind protective bulletproof glass, you can feel the concussion. If it were not for huge purge fans our entire facility would be filled with smoke. I cannot imagine what it would be like to be in a small equipment room when an arcing fault occurs. An individual would be immediately in a state of shock from the deafening explosion. It would be like standing next to a hand grenade. The smoke could easily block the worker's vision for over 75 feet. An individual burned in the event would suffer even more trauma. The first instinct would be to exit the room. The smoke alone would not permit you to see the door and the eyes may be blinded from the flash. Anyone in the room will most likely be unable to exit without doors that open in the direction of egress and panic hardware. Because I have seen the results of the smoke at 75 feet, I am recommending that the distance be at least 75 feet. There could be a need for an even greater distance. I am just not familiar with distances beyond 75 feet.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 1-92. The panel concludes that 25 ft is an adequate distance. The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
LABRAKE, JR., N.: This comment should be rejected and accept Proposal 1-127. Refer to my negative ballot statement on Comment 1-87.
MCMAHILL, L.: See my explanation of negative vote on Comments 1-86 and 1-87.
Comment on Affirmative:
ANTHONY, M.: See my explanation of affirmative vote on Comment 1-87.

1-90 Log #2085 NEC-P01 **Final Action: Reject**
(110.26(C)(2))

Submitter: Patrick McMullen, McMullen Inspecting, Inc.
Comment on Proposal No: 1-127
Recommendation: I would like to see this proposal voted down and left as it is in the 2005 NEC.
Substantiation: We will have 1600-amp and 2000-amp gear that is 5 ft 11 3/4 in. again for the little bit that panic hardware cost. I think we'd be better served by leaving this section as it was written in the 2005 NEC.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 1-86.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
HICKMAN, P.: See our explanation of negative vote on Comment 1-86.
MCMAHILL, L.: See my explanation of negative vote on Comments 1-86.

1-91 Log #2244 NEC-P01 **Final Action: Reject**
(110.26(C)(2))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 1-127
Recommendation: This proposal should be rejected.
Substantiation: The ability of the person to exit the area under emergency conditions is not as closely related to the physical size of the equipment as it is to the electrical rating of the equipment. It is the electrical energy, not the physical size, that causes the safety hazard.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 1-86.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
HICKMAN, P.: See our explanation of negative vote on Comment 1-86.
MCMAHILL, L.: See my explanation of negative vote on Comment 1-86.

1-92 Log #2330 NEC-P01 **Final Action: Accept in Principle in Part**
(110.26(C)(2) and (3))

TCC Action: It is the understanding of the Technical Correlating Committee that the panel action is to delete the last sentence in 110.26(C)(2), and add a new item 110.26(C)(3) as shown in the panel action.
Submitter: Alan Manche, Square D Company
Comment on Proposal No: 1-127
Recommendation: Delete the following text from 110.26(C)(2):
~~Where the entrance has a personnel door(s) that is less than 1.8 m (6 ft) from the working space, the door(s) shall open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure.~~
And add a new item (3) to 110.26(C) that reads as follows:
(3) Personnel Doors. Where equipment rated 1200A or more is installed ~~the entrance has~~ and there is a personnel door(s) that is less than ~~1.8~~ 7.6 m (~~6~~ 25 ft) from the nearest edge of the working space, the door(s) shall open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure.
Substantiation: This proposal is to accomplish three objectives:
1) The addition of the "over 6 ft" language back into 110.26(C)(2) was the proper action for the panel. However, since the panel has now added a dimension of measurement to apply to the door(s) to the room, the paragraph needs to be broken into two parts. This comment moves the text associated with the door and creates a new item (3) where the text can stand on its own. This makes the requirement much easier to apply.
2) The driver language for the door requirement in the new (3) is proposed to be based only on the "rated 1200A or more" without the 6 ft being a part of that requirement. This is logical since the need to have the panic hardware on the door is independent of the two exits from the working space.
3) The comment also adds text to make it clear that the 6 ft measurement for the personnel door is measured from the nearest edge of the working space. The language is also revised to remove the text "the entrance has" and replace it with "and there is". This is to avoid the confusion of the use of the term "entrance". In (C)(2), the use of the term "entrance" is to describe entering the working space and not necessarily the room. Using the term again to describe the personnel door implies that the door is truly the entrance to the working space, when in fact it may be located up beyond the working space.
We also recognize the 6 ft distance between the working space and the personnel door was a value proposed by the panel looking for further feedback. Based on our discussion with others in the industry it is evident there is support for a distance much larger than 6 ft based on the idea that if someone is injured it doesn't matter if the equipment is in a small room or large room, that person will needs to exit the room in order to remove himself from further danger to the environment within the room where the equipment is installed. Based on the environmental conditions witnessed in our large testing labs after an arc-flash demonstration, it would be prudent to consider extending the 6 ft distance to at least 25 ft in order to include appropriate hardware on exits doors for the room in which the equipment is located.
Panel Meeting Action: Accept in Principle in Part
The panel does not accept the deletion of the struck-through text of the first paragraph of the recommended wording, and concludes that it will be relocated into a new second level subdivision (3).
And add a new item (3) to 110.26(C) that reads as follows:
"(3) Personnel Doors. Where equipment rated 1200A or more that contains overcurrent devices, switching devices, or control devices is installed and there is a personnel door(s) intended for entrance to and egress from the working space less than 7.6 m (25 ft) from the nearest edge of the working space, the door(s) shall open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure."
Panel Statement: The panel does not accept the deletion of the struck-through text of the first paragraph of the recommended wording, and concludes that it will be relocated into a new second level subdivision (3).
The phrase "that is" was removed to editorially simplify the statement.
The phrase "intended for entrance to and egress from the working space" was added to clarify the personnel doors intended to be covered by this requirement.
The panel does not necessarily agree with all of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
LABRAKE, JR., N.: This comment should be rejected and accept Proposal 1-127. Refer to my negative ballot statement on Comment 1-87.
MCMAHILL, L.: See my explanation of negative vote on Comments 1-86 and 1-87.

Comment on Affirmative:
ANTHONY, M.: See my explanation of affirmative vote on Comment 1-87.

1-93 Log #523 NEC-P01 **Final Action: Reject**
(110.26(D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 1-129
Recommendation: Accept the proposal.
Substantiation: 90.1(A) and (B) indicates the NEC is a safety code. It is difficult to discern why outdoor equipment does not merit an illumination requirement. 110.34(D) requires illumination for over 600 volt equipment indoors or outdoors. While the potential hazard may be greater, there is also a potential hazard from 600 volt and less equipment. The term "equipment" in 110.34(D) as defined in Article 100 includes material, fittings and the like (such as raceways) which literally require provision for illumination.
Panel Meeting Action: Reject
Panel Statement: The comment does not provide any new information, and the panel reaffirms its action and statement on Proposal 1-129.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
HICKMAN, P.: We agree the submitter does not provide any new information or technical substantiation. However, as we stated in our comment during the ROP, we join the submitter in wondering why illumination is not required for outdoor installations but only when installed indoors.

1-94 Log #305 NEC-P01 **Final Action: Hold**
(110.26(F))

TCC Action:The Technical Correlating Committee directs that this comment and Proposal 1-135 be reported as "Hold" in accordance with 4.4.6.2.2 of the Regulations Governing Committee Projects because it involves something that could not be properly handled within the time frame for processing the report, and directs that this comment be referred **to Code-Making Panel 9 for action during the 2011 revision cycle.**
Submitter: Code-Making Panel 19,
Comment on Proposal No: 1-135
Recommendation: The following is the final action of a task group appointed to review Proposal 1-135. CMP-19 recommends accepting this proposal.
Substantiation: CMP-19 agrees that the NEC does not define distribution board and that a distribution board is considered a type of panelboard. Removing the words "distribution boards" from 110.26(F) may alleviate the submitter's concern, while maintaining the requirement for dedicated equipment space for all types of panelboards. This change will not impact the articles under the purview of CMP-19.
This comment was balloted through CMP-19 with the following results:
14 Eligible to Vote
12 Affirmative
2 Not Returned (W. Bowman and R. Carlson)
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 1-95.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-95 Log #310 NEC-P01 **Final Action: Hold**
(110.26(F))

TCC Action: The Technical Correlating Committee directs that this comment and Proposal 1-135 be reported as "Hold" in accordance with 4.4.6.2.2 of the Regulations Governing Committee Projects because it involves something that could not be properly handled within the time frame for processing the report, and directs that this comment be referred to Code-Making Panel 9 for action during the 2011 revision cycle.
Submitter: Code-Making Panel 9,
Comment on Proposal No: 1-135
Recommendation: Recommend the proposal be held for study.
Substantiation: CMP-9 believes the proposal has merit, however, it needs to be correlated with Article 408, which uses the phrase "switchboards, panelboards, and distribution boards" units scope. The current text in 110.26(F) simply repeats that scope information so as not to inadvertently change the application of 110.26(F), which originated within what is now Article 408 in the 1981 cycle and remained there for almost twenty years. CMP-9 will review the scope statement in 408.1 during the 2011 code cycle, and the text of 408.1 and 110.26(F) can be correlated during that cycle. CMP-9 understands that scope statements are under the purview of the Technical Correlating Committee.
This comment has been balloted through CMP-9 with the following balloting results.
11 Eligible to Vote
10 Affirmative
1 Not Returned (H. deVega)
Panel Meeting Action: Accept
Panel Statement: The panel understands that the action on this comment "holds" this comment and Proposal 1-135 for action by Code-Making Panel 9 in the 2011 Code revision cycle.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-96 Log #1483 NEC-P01 **Final Action: Hold**
(110.26(F)(3))

Submitter: Charles Ball, S & C Electric Company
Comment on Proposal No: 1-135
Recommendation: Add a new section to 110.26(F)(3):
110.26(F)(3): Arc-Resistant Switchgear. Provide clear space in accordance with the manufacturer's recommendations. No obstructions such as foreign systems, suspended ceilings, piping, dusts or structures shall be located within the required clear space for indoor or outdoor installations. Exceptions listed in 110.26(F)(1) and 110.26(F)(2) are not allowed when the switchgear is arc resistant.
Substantiation: Arc-resistant switchgear is often designed to direct the exhaust from an internal fault away from areas where personnel could be standing. Unobstructed space is required for the equipment to vent properly. Obstructions could impede or prevent proper venting and result in hot gasses being released toward personnel. The NEC should not allow exceptions such as suspended ceilings, that conflict with the requirements of this type of switchgear and cause an unexpected hazard.
Panel Meeting Action: Hold
Panel Statement: The comment offers new material that has not had public review and is to be held for the next revision cycle in accordance with 4.4.6.2.2(a) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
MINICK, J.: Comment 1-96 listed Proposal 1-135 as the proposal being commented on of which Proposal 1-135 addressed only the deletion of the term "distribution boards" from 110.26(F). The subject matter submitted in Comment 1-96 is to provide a new subsection 110.26(F)(3) regarding arc-resistant switchgear. The subject of Comment 1-96 has nothing to do with Section 110.26(F), which is the NEC section addressed by Proposal 1-135. This comment is in violation of 4.4.5, item (b) of the Regulations Governing Committee Projects which states: " "Each comment shall include the following:..Identification of the document, proposal number to which the comment is directed, and the paragraph of the document to which the comment is directed." The comment is indeed new material but it is more importantly trying to create a new subsection part to subsection 110.26(F) through the backdoor using Proposal 1-135 as its catalyst. This comment should have been rejected.

1-97 Log #1799 NEC-P01 **Final Action: Reject**
(110.27)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 1-139
Recommendation: The panel action should have been "accept in principle" rather than "reject". The ACC provides optional language to the original proposal that meets the submitter's intent and addresses the ballot comments.
110.27 Guarding of Live Parts.
(A) Live Parts Guarded Against Accidental Contact.
Except as elsewhere required or permitted by this Code,live parts of electrical equipment operating at 50 volts or more shall be guarded against accidental contact by ~~approved enclosures or by~~ any of the following means:
(1) By approved enclosures.
(~~1~~2) By location in a room, vault, or similar enclosure that is accessible only to qualified persons.
(~~2~~3) By suitable permanent, substantial partitions or screens arranged so that only qualified persons have access to the space within reach of the live parts. Any openings in such partitions or screens shall be sized and located so that persons are not likely to come into accidental contact with the live parts or to bring conducting objects into contact with them.
(~~3~~4) By location on a suitable balcony, gallery, or platform elevated and arranged so as to exclude unqualified persons.
(~~4~~5) By elevation of 2.5 m (8 ft) or more above the floor or other working surface.
(6) By suitable barriers within enclosures containing live parts requiring examination, adjustment, servicing or maintenance while energized.
(7) By limiting the size of openings to live parts within enclosures requiring examination, adjustment, servicing or maintenance while energized that will not permit the entry of a 12.5 mm (0.5 in.) diameter rod.
Substantiation: The submitter does not agree with the panel statement, "The current NEC language provides sufficient guarding of
live parts from accidental contact regardless of the qualification status of the person." Each of the provisions in 110.27 address enclosing, locating, partitioning, screening and elevating live parts to keep them away from unqualified persons. 110.27 does not address the potential exposure electricians face every day when examining, adjusting, servicing or troubleshooting live parts within enclosures. The submitter also does not agree with the panel statement, "Given the type of work that occurs inside of a piece of equipment,

the definition of what constitutes 'accidental contact' is extremely broad and unclear." The phrase "accidental contact" is already used in the existing 110.27 three times, including the title. The use of the phrase is already broad and unclear. And while the submitter concurs with the panel that "the only positive way to ensure that accidental contact with live parts does not occur is to deenergize the equipment prior to working on it", equipment designs today continue to require examination and troubleshooting while energized. Also, the act of establishing an electrically safe working condition, which includes verifying a de-energized state using test equipment, requires a qualified person to assume the equipment is energized.

The separate sections for "qualified" and "unqualified" persons were removed from the original proposal in order to satisfy the panel statement. "Approved enclosures" was relocated to the first option in the listing and does not change the original intent of the section. The originally proposed Part B in proposal 1-139 was re-written and added as options 6 and 7 as suggested by Mr. Floyd's affirmative ballot comment.

Panel Meeting Action: Reject

Panel Statement: The panel concludes that new Items (6)and (7) suggested in the comment relate to live parts within approved enclosures and are not alternatives to Items (1) through (5) as would be implied by the text of 110.27(A).

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

BARRIOS, L.: In its Proposal 1-139 and subsequent Comment 1-97, the ACC was attempting to provide protection to qualified persons who may be exposed to live parts when working inside enclosures. The ACC concludes that 110.27(A), Live Parts Guarded Against Accidental Contact,still does not address these hazards.

FLOYD, H.: CMP 1 should have accepted this comment. Touch safe shrouded terminals provide an inherently safer design that reduces the risk of inadvertent contact having the risk of electric shock or initiation of an arc flash. The NEC should acknowledge that the application of touch safe shrouded terminals provide a safer work environment for both qualified as well as unqualified personnel. These types of designs are widely used outside of the US and significantly reduce the risk of inadvertent personnel contact in industrial control panels and other equipment. The requirement for touch safe shrouded terminals designs has proven both acceptable and reasonable in installations outside the US. I would encourage the submitter to resubmit the proposal for the 2011 NEC.

1-98 Log #7 NEC-P01 **Final Action: Accept**
(110.32)

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 1-146

Recommendation: The Technical Correlating Committee directs the panel to reconsider their action relative to the necessity of a soft conversion. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the direction of the Technical Correlating Committee.

Panel Statement: The panel continues to accept the recommendation as submitted in Proposal 1-146 for working space about equipment; safety is a prime consideration, and 90.9(C)(4) applies.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-99 Log #2332 NEC-P01 **Final Action: Accept in Principle in Part**
(110.33(A))

TCC Action: It is the understanding of the Technical Correlating Committee that the panel action is to delete the last sentence in 110.33(A)(2) and adds a new item 110.33(A)(3) as shown in the panel action.

Submitter: Alan Manche, Square D Company

Comment on Proposal No: 1-148

Recommendation: Delete the following text from 110.33(A):

~~Where the entrance has a personnel door(s) that is less than 3.7 m (12 ft) from the working space, the door(s) shall open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure.~~

Add a new 110.33(A)(3) to read:

(3) Personnel Doors. Where there is ~~the entrance has~~ a personnel door(s) that is ~~that is~~ less than ~~3.7~~ 7.6 m (~~12~~ 25 ft) from the nearest edge of the working space, the door(s) shall open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure.

Substantiation: The text associated with personnel doors needs to be relocated to its own subsection. The problem with the current ROP language is that the location creates confusion about applying the door requirements because of the way the term "entrance" is used in 110.33(A). It's assumed that the panel intends to apply the requirements for the door to any door that is located within 12 ft of the working space. As arranged in the ROP, one could easily interpret that a door added under the provisions of 110.33(A)(1) would not need to comply with the requirement to open outward and have panic hardware.

This comment relocates the door requirement to its own subsection (3) and makes it clear that any door located within 12 feet of the working space must comply. Text is also added to make it clear that the measurement of the 12 feet is to the nearest edge of the working space.

We also recognize the 12 ft distance between the working space and the personnel door was a value proposed by the panel looking for further feedback. Based on our discussion with others in the industry it is evident there is support for a distance much larger than 12 ft based on the idea that if someone is injured it doesn't matter if the equipment is in a small room or large room, that person will needs to exit the room in order to remove himself from further danger to the environment within the room where the equipment is installed. Based on the environmental conditions witnessed in our large testing labs after an arc-flash demonstration, it would be prudent to consider extending the 12 ft distance to at least 25 ft in order to include appropriate hardware on exits doors for the room in which the equipment is located.

Panel Meeting Action: Accept in Principle in Part

The panel does not accept the deletion of the struck-through text of the first paragraph of the recommended wording, and concludes that it will be relocated into a new second level subdivision (3).

The panel revises the recommended wording of (3) to read as follows:

(3) Personnel Doors. Where there is a personnel door(s) intended for entrance to and egress from the working space less than 7.6 m (25 ft) from the nearest edge of the working space, the door(s) shall open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched, but open under simple pressure.

Panel Statement: The panel does not accept the deletion of the struck-through text of the first paragraph of the recommended wording, and concludes that it will be relocated into a new second level subdivision (3).

The phrase "that is" was removed to editorially simplify the statement.

The phrase "intended for entrance to and egress from the working space" was added to clarify the personnel doors intended to be covered by this requirement.

The panel does not necessarily agree with all of the submitter's substantiation.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

LABRAKE, JR., N.: This comment should be rejected and accept Proposal 1-148. The Panel reversed its position from their statement on Proposal 1-125, whereby the Panel rejected the concept of basing exiting requirements on incident energy levels. This section primarily deals with working space for large equipment rather than arc flash boundaries. A requirement for "panic hardware" and outward exit swing for all doors within 25 feet of the workspace for equipment rated above 600 volts is considered excessive and unjustified. The Comment offers no fact finding report in the technical substantiation that the work space shall be larger, but has based the change on work rules found typically in NFPA 70E, which is outside of the scope of this installation Code.

Although EEI strongly supports safe installations for the use of electricity, strong evidence from a fact finding report is needed to establish changes to the distance to doors requiring panic hardware. The door criterion of 12 ft. in Proposal 1-148 was primarily to prevent a door swing interfering with the work space.

MCMAHILL, L.: See my explanation of negative vote on Comments 1-86 and 1-87. They are applicable here too.

1-100 Log #390 NEC-P01 **Final Action: Reject**
(110.33(A) and (B))

Submitter: James K. Lathrop, Koffel Assoc., Inc.

Comment on Proposal No: 1-147

Recommendation: Further revise the text of 110.33(A) and (B) from that made at the ROP stage as follows:

110.33 Entrance to <u>and Egress from</u> Enclosures and Access to Working Space.

(A) Entrance. At least one entrance to enclosures for electrical installations as described in 110.31 not less than 610 mm (24 in.) wide and 2.0 m (6½ ft) high shall be provided to give access to <u>and egress from</u> the working space about electric equipment. Where the entrance has a personnel door(s), the door(s) shall open in the direction of egress and be equipped with panic bars, pressure plates, or other devices that are normally latched but open under simple pressure.

(1) Large Equipment. On switchboard and control panels exceeding 1.8 m (6 ft) in width, there shall be one entrance at each end of the equipment. A single entrance to <u>and egress from</u> the required working space shall be permitted where either of the conditions in 110.33(A)(1)(a) or (A)(1)(b) is met.

(a) Unobstructed Egress ~~Exit~~. Where the location permits a continuous and unobstructed way of egress ~~exit~~ travel, a single entrance to the working space shall be permitted.

(b) Extra Working Space. Where the depth of the working space is twice that required by 110.34(A), a single entrance shall be permitted. It shall be located so that the distance from the equipment to the nearest edge of the entrance is not less than the minimum clear distance specified in Table 110.34(A) for equipment operating at that voltage and in that condition.

(2) Guarding. Where bare energized parts at any voltage or insulated energized parts above 600 volts, nominal, to ground are located adjacent to such entrance, they shall be suitably guarded.

(B) Access. Permanent ladders or stairways shall be provided to give safe access to and egress from the working space around electric equipment installed on platforms, balconies, or mezzanine floors or in attic or roof rooms or spaces.

Substantiation: I serve as chairman of the NFPA 101 and NFPA 5000 Means of Egress Technical Committee (MEA). NFPA 101 and NFPA 5000 are in the June 2008 revision cycle. The MEA committee developed committee proposals to reference NFPA 70 110.33(A). Users of NFPA 101/5000 have followed the criteria of those codes only to find that the design was deficient from the requirements of NFPA 70. By referencing NFPA 70 110.33(A), the user of NFPA 101/5000 will be warned that the related provisions from NFPA 70 apply. However, some of the terminology used in 110.33(A) is inconsistent with that in NFPA 101/5000.

(1) With respect to the addition of the words “and egress from” in 110.33 title, 110.33(A), 110.33(A)(1), and 110.33(B), these changes are for consistency with the action taken in NEC Proposal 1-119 on 110.26(C). The subjects of 110.26(C) and 110.33(A) and (B) are related, and should be handled consistently.

(2) With respect to the replacement of the word “exit” with the word “egress” in two places in (A)(1)(a), the word “exit” has a special meaning in NFPA 101/5000 which can be generalized to mean the final door reached to the outside. Other travel across floors and through doors encountered along the egress path is part of the exit access. So, in describing the route to the exit, the term “egress” is more correct.

Panel Meeting Action: Reject

Panel Statement: The content of the comment does not address the subject matter of Proposal 1-147.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-101 Log #8 NEC-P01 **Final Action: Accept**
(110.34(A))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 1-151
Recommendation: The Technical Correlating Committee directs the panel to reconsider their action relative to the necessity of a soft conversion. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The panel accepts the direction of the Technical Correlating Committee.

Panel Statement: The panel continues to accept the recommendation as submitted in Proposal 1-151 for working space about equipment; safety is a prime consideration, and 90.9(C)(4) applies.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-102 Log #816 NEC-P01 **Final Action: Reject**
(110.81)

Submitter: John Whitney, Newtown Square, PA
Comment on Proposal No: 1-160 Log
Recommendation: Revise text:

Unused openings shall be effectively closed.

Substantiation: Unused openings in underground enclosures permit ingress of ground water which carries soils into the enclosure. Over time, the accumulation of soils will completely engulf the electrical facilities within the enclosure. Accumulation of soils concealing electrical cables and equipment within the space introduces additional hazards into the already hazardous environment of the space. Soils can conceal damaged cables or equipment and clearing the soils from concealed cables and equipment requires extreme care not to damage the facilities. Underground enclosures by their location are expected to be subject to ground water ingress, however, the simple requirement to effectively close unused openings will limit or eliminate soils accumulation within underground enclosures resulting in safer installation and maintenance of the electrical facilities therein.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms their panel action and panel statement on Proposal 1-160.

In addition, the submitter has not provided any specific instances where this situation has been shown to be a problem.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-103 Log #822 NEC-P01 **Final Action: Reject**
(110.82 (New))

Submitter: John Whitney, Newtown Square, PA
Comment on Proposal No: 1-161
Recommendation: Add a new section:

Protection Against Corrosion and Deterioration. Equipment, cable racks, cable rack arms, other appurtenances and all supporting hardware shall be corrosion resistant and of materials suitable for the environment in which they are to be installed.

Substantiation: The NEC recognizes the detrimental effects of corrosion on electrical facilities in many
more than 100 instances throughout the code and prescribes constraints on materials and methods to assure safe and reliable electrical facilities. In the preponderance of code articles addressing corrosion, the mere suggestion of no more than dampness instantly constrains materials to a corrosion resistance requirement. Manholes and underground enclosures intended for personnel entry are quite possibly one of the most corrosive environments where electrical facilities are intended to be installed. Underground enclosures are expected to be a wet environment and are in fact often flooded continuously with water. When non-corrosion resistant materials such as cable racks, hardware, ladders, pulling irons, etc. are applied in underground enclosures, the materials soon corrode and fail to provide their intended function in support of the facilities installed within the space. Cable racks and hardware supporting the racks which corrode will fail to support the cables and can actually cause damage to cables when the racks break free due to failure of the anchoring system and the weight of the racks is imposed on the cables. Failure of a fixed ladder or the ladder support and anchoring system introduces the obvious hazard to entrants as well. In fact, NEC Article 110.79 requires corrosion resistance for fixed ladders installed in vaults and tunnels. To assure safe and reliable operation and maintenance of electrical facilities installed in manholes and other underground enclosures intended for personnel entry, all materials applied within the space shall be suitable for continuous submersion in water. The simple extension of the many more than 100 commonsense materials corrosion resistance requirements throughout the National Electrical Code to include the damp and wet spaces within Manholes and Other Electric Enclosures Intended for Personnel Entry will reduce equipment failures due to collapsed support structures and eliminate the hazards introduced by such structural failures.
Panel Meeting Action: Reject
Panel Statement: The panel concludes that this material is already covered in the 110.11 FPN that refers the reader to 300.6.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-104 Log #823 NEC-P01 **Final Action: Reject**
(110.83 (New))

Submitter: John Whitney, Newtown Square, PA
Comment on Proposal No: 1-162
Recommendation: Add a new section:

Cable Seals. All cables and conductors entering underground enclosures shall be effectively sealed.

Substantiation: Underground conduit systems are commonly subject to settlement, subsidence, and undermining as well as other unintended compromises due to careless excavation and inadequate repairs. Damage to underground conduits connected to underground enclosures permits ingress of ground water which carries soils into the enclosure. Over time, the accumulation of soils will completely engulf the electrical facilities within the enclosure. Accumulation of soils concealing electrical cables and equipment within the space introduces additional hazards into the already hazardous environment of the space. Soils can conceal damaged cables or equipment and often render the equipment inoperable. Clearing soils from concealed electrical cables and equipment is a hazardous activity and requires extreme care not to damage the facilities. Underground enclosures by their location are expected to be subject to ground water ingress, however, the simple requirement to effectively close occupied conduits with cable seals will limit or eliminate soils accumulation within underground enclosures resulting in safer installation and maintenance of the electrical facilities therein.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action and statement on Proposal 1-162.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-105 Log #815 NEC-P01 **Final Action: Reject**
(110.84 (New))

Submitter: John Whitney, Newtown Square, PA
Comment on Proposal No: 1-163
Recommendation: Add a new section:

Non-Electrical Facilities. Non electric conduits, pipes, hoses, etc. transmitting or containing fluids or gases shall not be installed within or through electric duct banks, manholes and other electric enclosures intended for personnel entry.

Substantiation: Regarding my recommendation 1-163 Log #2356 NEC-P01 (110.84 (New)) for a new section titled Non-Electrical Facilities. - Non electric conduits, pipes, hoses, etc. transmitting or containing fluids or gases shall not be installed within or through electric duct banks, manholes and other electric enclosures intended for personnel entry. I respectfully request that the panel review the following comments and consider accepting my recommendation:

NEC Article 110 part V is titled "Manholes and Other Electric Enclosures Intended for Personnel Entry, All Voltages". The title designates these enclosures as electric enclosures, therefore, it would be unreasonable to expect foreign equipment placed within these enclosures.

Electrical enclosures intended for personnel entry expose entrants to complex electrical and confined space hazards, the intentional introduction of additional hazards associated with non-electrical facilities increases the complexity of hazard mitigation and will impact the reliability of both systems. Article 110.75(E) recognizes these additional hazards by requiring marking to prominently indicate the function of manholes. This requirement clearly exhibits the intention to isolate foreign systems from electrical facilities within manholes and other electric enclosures intended for personnel entry.

In addition to the hazards non-electrical facilities pose to personnel within the space, introduction of non-electrical facilities into electrical enclosures will result in unintended exposure of electrical facilities within those enclosures to fluids/gases that have not been assessed as to compatibility with conductor insulation and jacket materials. This unintended exposure will most likely result in deterioration of materials and the eventual failure of the electrical facilities. Materials intended for application to electrical facilities are evaluated to assess their compatibility with those facilities. Refer to article 110-11 regarding conductor exposure to deteriorating agents.

Non electrical facilities at pressure have the potential to instantly flood the electrical enclosure with fluids/gases thereby engulfing entrants. Personnel and electrical facilities within the enclosure exposed to fluids/gases at elevated pressure and/or elevated temperatures would be injured or damaged by unintended/accidental release.

Fixed facilities for ventilation and de-watering the enclosure shall be permitted.

Article 300.8 prohibits raceways and cable trays from containing any service other than electrical, why would we accept anything less for enclosures intended for personnel entry?

Panel Meeting Action: Reject
Panel Statement: The text recommended by the comment would preclude the installation of a sump pump and associated piping for draining the manhole. The substantiation submitted is insufficient to justify this restrictive requirement.

The panel reaffirms its statement on Proposal 1-163.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-106 Log #824 NEC-P01 **Final Action: Reject**
(110.85 (New))

Submitter: John Whitney, Newtown Square, PA
Comment on Proposal No: 1-164
Recommendation: Add a new section:

Identification of Cables and Conductors. Cables and conductors within enclosures intended for personnel entry shall be permanently and legibly tagged or labeled to indicate the owner, application, and the line or circuit number such as "METRO Electric Co. Circuit #123 15KV". Tags, labels and their attachments shall be durable and of materials suitable to withstand the environment in which they are installed.

Substantiation: This proposal should be accepted. Identifying cables and conductors at the time of installation is relatively inexpensive and simple to achieve and could hardly be considered restrictive. Cost relative to benefit analysis of applying identification to cables and conductors will prove this proposal to be one of the most cost effective methods to significantly increase the level of safety for personnel required to enter manholes and other electric enclosures intended for personnel entry. One incident of unintended interruption of service, damage to electrical facilities, or injury to personnel would immediately demonstrate how insignificant the cost or difficulty of identifying cables and conductors is when compared to costs associated with the unintended event. Certainly anyone experiencing such an event would testify that given the opportunity they would have marked the cables and conductors to prevent the incident.

Although there are certainly other opportunities for cable identification in other sections of the NEC, this proposal specifically addresses a need to mitigate electrical hazard exposure to personnel working within enclosures intended for personnel entry and as such, belongs in Article 110, paragraph V.

Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action and statement on Proposal 1-164.

The proposed text is overly restrictive in that it would require identification of all cables in all manholes, even though the cables may all be power circuits under the ownership and control of a single entity.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

ANTHONY, M.: Our interest group is interested in the outcome of Proposal 1-164 because many colleges and universities have power plants and utility distribution systems that operate much like utilities. Some have power distribution networks that share poles with telecommunication cabling and municipal signaling systems.

Further discussion within our interest group indicates that this is a reasonable proposal that should have been accepted at the proposal stage. We agree with Mr. Hickman and Mr. Hittenger's substantiation negative votes in the proposal stage (Log #2357). I would like to add that OSHA looks to the NEC for safety rules and identification of a hazard is one of the most basic. OSHA's general purpose clauses, as well as the specific ones regarding enclosed spaces and locking ought to be supplemented with specific NEC language that this proposal provides.

HICKMAN, P.: We are voting negative to the panel action to reject Comment 1-106. Our explanation is as follows: This comment should have been accepted. We reaffirm our position from the ROP which states the submitter has identified and provided a solution to a serious safety issue. As Mr. Hittinger stated in his explanation of negative in the ROP: "Identification of cables and conductors within enclosures would benefit personnel that must perform maintenance duties within the enclosure". The marking of cables within enclosures would be a step in the right direction for safety of personnel and property due to misidentification of cables being cut by mistake.

HITTINGER, D.: I am voting negative on the panel action to reject Comment 1-106 with the following explanation: We reaffirm our position from the ROP stating the submitter has identified and provided a solution to serious safety issue. A properly labeled system would be a benefit to the owner and provide the necessary information to a field worker. There are similar requirements in 408.4: Circuit Directory or Circuit Identification. Every circuit and circuit modification shall be legibly identified as to its clear, evident and specific purpose or use. The identification shall include sufficient detail to allow each circuit to be distinguished from all others. The identification shall be included in a circuit directory that is located on the face or inside of the panel door in the case of a panelboard, and located at each switch on a switchboard.

This requirement has worked well for years and is helpful to owners and workers and does provide a level of safety.

The proposed new section 110.85 would benefit worker safety when asked to enter enclosures to work on these systems.

ARTICLE 200 — USE AND IDENTIFICATION OF GROUNDED CONDUCTORS

5-19 Log #271 NEC-P05 **Final Action: Reject**
(200.6(A) and 200.6 (B))

Submitter: Dennis Downer, Morrisville, VT
Comment on Proposal No: 5-44
Recommendation: Revise text to read as follows:

200.6 Means of Identifying Grounded Conductors.

(A) ~~Sizes 6 AWG or Smaller.~~ An insulated grounded conductor ~~of 6 AWG or smaller~~ shall be identified by a continuous white or gray outer finish or by three continuous white stripes on other than green insulation along its entire length. Wires that have their outer covering finished to show a white or gray color but have colored tracer threads in the braid identifying the source of manufacture shall be considered as meeting the provisions of this section. Insulated grounded conductors shall also be permitted to be identified as follows:

(1) The grounded conductor of a mineral-insulated, metal-sheathed cable shall be identified at the time of installation by distinctive marking at its terminations.

(2) A single-conductor, sunlight-resistant, outdoor-rated cable used as a grounded conductor in photovoltaic power systems as permitted by 690.31 shall be identified at the time of installation by distinctive white marking at all terminations.

(3) Fixture wire shall comply with the requirements for grounded conductor identification as specified in 402.8.

(4) For aerial cable, the identification shall be as above, or by means of a ridge located on the exterior of the cable so as to identify it.

Change the title of 200.6(B) and text to the following:

200.6(B) Sizes larger than ~~6 AWG~~ Conductors 4 AWG or Larger. An insulated grounded conductor 4 AWG or larger ~~than 6 AWG~~ shall be identified by one of the following means:

Substantiation: This will make the language the same as 250.119. As an electrical inspector, I cannot remember the number of times I have written this up because people can not read. I think that changing the language from Sizes Larger than 6 AWG to Sizes 4 AWG or Larger will leave no room for misreading the title, is 6 AWG included or is it larger than 6?

Panel Meeting Action: Reject

Panel Statement: The proposed change would create a violation of the NEC Style Manual as it deletes the boldfaced title of the section. The present Code language is precise in covering the conductors 6 AWG and smaller as well as conductors larger than 6 AWG.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-20 Log #272 NEC-P05 **Final Action: Reject**
(200.6(B))

Submitter: Dennis Downer, Morrisville, VT

Comment on Proposal No: 5-45

Recommendation: Change the title of 200.6(B) and language to the following:

200.6(B) ~~Sizes Larger than 6 AWG~~ Sizes 4 AWG or Larger. An insulated grounded conductor 4 AWG or larger ~~than 6 AWG~~ shall be identified by one of the following means:

Substantiation: As an electrical inspector, I cannot remember the number of times I have written this up because people cannot read. I think that changing the language from Sizes Larger than 6 AWG to Sizes 4 AWG or Larger will leave no room for misreading the title is 6 AWG included or is it larger than 6. It will also now be the same format as 200.6(A) Sizes 6 AWG or smaller.

Panel Meeting Action: Reject

Panel Statement: The present Code language is precise in covering the conductors 6 AWG and smaller as well as conductors larger than 6 AWG.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-21 Log #825 NEC-P05 **Final Action: Accept**
(200.6(B))

Submitter: Tom Studer, Electric Inspection agency

Comment on Proposal No: 5-45

Recommendation: Reject proposal.

Substantiation: This proposal should have been rejected. The proposer referenced 250.119(A)(1), where the rule requires marking of a grounding conductor at each end and at every point where the conductor is accessible. 200.6(B)(3) simply requires the conductor to be marked at its terminations. No where in this rule is there a requirement to mark the grounded conductor where the conductor is accessible, such as conduit bodies or pull boxes. Since there is no requirement to mark a grounded conductor in conduit bodies where the grounded conductor is not terminated, adding an exception to specifically permit a grounded conductor to not be marked where that conductor is not terminated serves no purpose other than to add confusion. i.e. This is an exception to a rule where the rule does not exist.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-22 Log #507 NEC-P05 **Final Action: Reject**
(200.11)

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 5-47

Recommendation: Accept the proposal.

Substantiation: Since the polarity of ac circuits regularly reverse there is no designated “polarity” for a grounded conductor terminal or lead. The proposal has nothing to do with limiting “polarity” to only dc circuits.

Panel Meeting Action: Reject

Panel Statement: “Polarity” in general means the relationship between two opposite attributes. Looking at other NEC uses of this word, that is the idea that applies. The submitter has provided no technical substantiation to support narrowing the view of this term to apply only to dc.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

2-6 Log #1344 NEC-P02 **Final Action: Accept**
(210.4)

Submitter: Donald M. King, Wilmington, DE

Comment on Proposal No: 2-10

Recommendation: Continue to accept this proposal in principle.

Substantiation: Panel 2 has reviewed, over several code cycles, numerous proposals that substantiate the hazards that exist for qualified persons working on multiwire branch circuits. This change will aid in the positive identification of multiwire branch circuits and ensure that all ungrounded conductors of the circuit is de-energized before work begins. This change will greatly increase the level of safety for qualified persons working multiwire branch circuits.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-7 Log #1855 NEC-P02 **Final Action: Reject**
(210.4)

Submitter: Mike Holt, Mike Holt Enterprises, Inc.

Comment on Proposal No: 2-10

Recommendation: Continue to Accept in Principle, but delete Exception No. 2.

Substantiation: Exception No. 2 becomes unnecessary with the new code language.

Panel Meeting Action: Reject

Panel Statement: Exception No. 2 to 210.4(C) continues to be necessary. The exception allows a multiwire branch circuit to supply multiple line-to-line connected utilization equipment, provided the overcurrent device will open all ungrounded conductors. This exception is specific to the overcurrent device, not the disconnecting means. If the exception is deleted, multiwire branch circuits would be limited to line-to-neutral connected loads only or to single utilization equipment.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-8 Log #1996 NEC-P02 **Final Action: Accept**
(210.4(A), FPN)

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)

Comment on Proposal No: 2-11

Recommendation: Revise as follows:

FPN: A 3-phase, 4-wire, wye connected power system used to supply power to nonlinear loads may necessitate that the power system design allow for the possibility of high harmonic currents on the neutral-conductor ~~currents~~.

Substantiation: To reflect the correct use of terms related to this situation.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-9 Log #2160 NEC-P02 **Final Action: Reject**
(210.4(D) (New))

Submitter: Michael L. Last, Na’alehu, HI

Comment on Proposal No: 2-16

Recommendation: Add new text to read as follows:

At all locations where it is possible to interrupt the integrity of the grounded (neutral) conductor of a multiwire branch circuit, means shall be made to identify said grounded conductor with its associated ungrounded conductors.

Substantiation: When the integrity of the grounded (neutral) conductor is compromised, a serious voltage imbalance can occur. A similar condition exists and is addressed in 300.13(B) wherein identical hazards and concerns are lessened. This proposal would promote consistency among various articles.

Panel Meeting Action: Reject

Panel Statement: Section 300.13 already addresses the issue of interruption of the grounded conductor by removal of devices. The submitter’s suggestion that the grounded conductor be identified at every point where it could be interrrupted is too broad, given that the conductor could be cut or spliced at any point.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:
KING, D.: This Comment should have been accepted. The panel reference to the requirements found in section 300.13 do not fully address the Submitter's concerns. There are many instances where grounded conductor splices can be disconnected, that are not associated with the removal of a device. Proper identification of the grounded conductor at a junction or outlet box will aid the qualified person in determining if the grounded conductor is part of a multiwire branch circuit thus avoiding the hazard of electrical shock and damage to the equipment.

2-10 Log #641 NEC-P02 **Final Action: Accept**
(210.4(E) (New))

Submitter: Mark Shapiro, Farmington Hills, MI
Comment on Proposal No: 2-16
Recommendation: Reject the proposed new subsection.
Substantiation: This is one of three proposals that have been accepted to modify this section, to help identify the conductors in multiwire branch-circuits. With the acceptance of either of the other 2, this one is unnecessary.
Some form of flagging out multiwire branch-circuits is good. In addition to the reasons given in the ROP, my own experience is that there are too many multiwire branch-circuits that are not properly balanced or "phased out" in electrical panels. Requiring grouping or identifying will make it easier to keep track of them.
But, assuming the passage of the latest proposals, we're already identifying conductors by voltage system, and soon by phase [210.5(C)]. We're remarking the white conductor in switch legs [200.(C)] Assuming the passage of either of the other proposals in 210.4 we've done enough.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: This comment should have been rejected. Accurate identification of the grounded conductor that is associated with a multiwire branch circuit will prevent the unintentional removal of a multiwire branch circuit grounded conductor when service work is being performed in an electrical panel. Grounded conductor terminal strips are commonly located in the branch-circuit panel board away from the ungrounded circuit conductor termination points. In many cases it is very difficult if not impossible to trace the grounded conductor of a multiwire branch circuit, once it is separated from its associated ungrounded conductors, to its final termination point. Identification of Ungrounded and Associated Grounded Conductors at the branch circuit panelboard will aid the qualified person servicing multiwire branch circuits.

2-11 Log #653 NEC-P02 **Final Action: Reject**
(210.4(E) (New))

Submitter: Michael Cole, MRC Electric
Comment on Proposal No: 2-16
Recommendation: Add to the new text that Mr. Michael L. Last proposed:
(E) Anonymous shared conductor circuits also known as haywire circuits. A load shall not be supplied by tapping one or more conductors of 1 2-wire or multiwire branch circuit and 1 or more conductors of another 2-wire or multiwire branch circuit. Such circuits create disconnection problems and are a potential source of electrical injury to people or equipment and create nuisance tripping of AFCI and GFCI devices.
Substantiation: a. In Summit County, Ohio, residential electricians are still using the old knob-and-tube practice (but with nonmetallic sheathed cable and boxes) of tapping any hot wire on the first floor and then tapping any neutral on the second floor to supply 3-way switches for a stairway. This is also sometimes done with ceiling lights in bedrooms where a receptacle hot lead on the first floor and a neutral on the second floor is used to supply a ceiling light. In one such instance the installation used more wire and more labor than doing things by the book.
This creates a number of problems in addition to nuisance tripping of AFCI and GFCI circuit breakers necessitating some rewiring, when a neutral of an allegedly deenergized 2-wire circuit is interrupted, the neutral sometimes becomes hot. Tracking down which additional circuit breaker(s) to achieve full disconnection is a pain. In some instances, the open neutral does not become hot until a table lamp or some other load is turned on. Also, splices do not last forever and I know someone who needs to have copper oxide removed from the wire splices in a 20 year old house. I should NOT need to use hot line gloves to do that.
The claim is that it is more efficient to use 2-wire with ground cable instead of using 3-wire or 4-wire with ground cable. It is also more efficient to do splices outside of boxes like in knob-and-tube days or to let drywallers bury junction boxes or to otherwise not do things the right way. Why not do things the right way?
b. In a commercial installation in Cleveland, Ohio, I installed some hot and neutral pigtails in a ceiling junction box for future addition of some ceiling lights on the same circuit as some wall lights and a future receptacle for a garage door operator on a different circuit. The 2 lighting circuits share 1 neutral and the 2 receptacle circuits share a different neutral. The 2 neutrals are colored white for neutral 1 and gray aka slate for neutral 2. I taped together the neutral and hot pigtails for the future ceiling receptacle and separately taped together the hot and neutral pigtails for the future lighting. Nevertheless, a garage door technician hooked up a new receptacle to the WRONG neutral. Now, when I go to work on this installation, I have to turn off 4 circuit breakers instead of 2 which makes temporary lighting a bit difficult to hook up.
c. Some explanatory text that this hazard exits and why haywiring MUST NOT be done does not hurt.
Panel Meeting Action: Reject
Panel Statement: The text of 210.4 deals with multiwire branch circuits, and as such, the submitter's recommendations regarding two 2-wire circuits are not relevant. In addition, for multiwire branch circuits, the current text of the NEC already prohibits the connections described in the submitter's substantiation [see 300.3 and 210.4(B)].
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-12 Log #839 NEC-P02 **Final Action: Accept**
(210.4(E) (New))

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 2-16
Recommendation: The Panel should reconsider and reject the proposal.
Substantiation: It would appear that the panel has implemented redundant provisions for the multi-wire branch circuits. With the addition of the grouping requirement in 210.4(D), the identification requirement in (E) would seem to be redundant. The grouping aspect will make it obvious as to which ungrounded conductors a particular grounded conductor is associated with. There is no need to also have to tag or mark the conductors since the provision written by the panel only applies to the marking or tagging at the panelboard only.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: See my explanation of negative on Comment 2-10.

2-13 Log #1345 NEC-P02 **Final Action: Reject**
(210.4(E) (New))

Submitter: Donald M. King, Wilmington, DE
Comment on Proposal No: 2-16
Recommendation: Continue to accept this proposal in principle in part.
Substantiation: Positive identification of the grounded conductor of a multiwire branch circuit at the branch circuit panel board will reduce the hazard of electrical shock and electrocution. It will be also reduce the potential of damage to equipment due to the misidentification and disconnecting of grounded conductors while the associated ungrounded conductors remain energized and supply equipment.
Panel Meeting Action: Reject
Panel Statement: The requirements for common disconnect and grouping of conductors are adequate to address the issues raised for multiwire branch circuits. The requirement to also identify each grounded conductor is redundant to the requirement for grouping in 210.4(D).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: See my explanation of negative on Comment 2-10.

2-14 Log #695 NEC-P02 **Final Action: Reject**
(210.5 (New))

Submitter: Jamie McNamara, Hastings, MN
Comment on Proposal No: 6-33
Recommendation: Panel 2 should consider this proposal and accept it as a FPN to 210.5.
Substantiation: This was originally proposed to Panel 6 as a FPN to 310.5 and was referred to Panel 2 by the TCC (Technical Correlating Committee).
See the original Proposal 6-33.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree with the addition of the FPN for the same reasons that a specific color coding is not specified in the NEC. The color code is not consistently applied (particularly where the color gray is used), and the FPN can be misleading because the systems are identified in this manner.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: This Comment should be given further consideration. The submitter has presented Panel 2 with a standard color code that is commonly used for electrical systems in commercial applications today. The inclusion of this color coding system in the Code in the form of a FPN will aid in providing a consistent identification of 277/480 and 208/120 volt systems, without initiating language into the main text that may be too restrictive for certain applications. I disagree with the Panel statement that the proposed FPN can be misleading. FPN's are only intended to inform the code user of a practical and commonly used means to meet the requirements of a particular section. The benefit of moving to a more consistent identification of conductors for a widely used voltage system in future installations warrants further consideration of this Comment by Panel 2.

2-15 Log #9 NEC-P02 **Final Action: Accept**
(210.5(C))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 2-23
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting related to the use of possibly unenforceable and vague terms.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel accepts the Technical Correlating Committee direction to reconsider the proposal and the terminology used. The panel continues to Accept the text as stated in its panel action in the ROP.
Panel Statement: The term "readily available" is neither vague nor unenforceable. For very large and complex systems, the ability to have the conductor ID scheme outlined in system diagrams and documentation is critical. In these systems, it is likely that this information will be kept more up-to-date than some type of legend located at each panelboard.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-16 Log #511 NEC-P02 **Final Action: Reject**
(210.5(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-24
Recommendation: Reject.
Substantiation: Phase ID is not practical; phase meters would be required to reliably ensure proper ID. More importantly there is no requirement to maintain the same type of ID throughout the entire premises wiring system, which would result in confusion where the system is very extended such as a high-rise or large industrial plant. Red could be a color code for Phase A of one system but is not prohibited from being any phase of another system if tagging or tape is used. Tagging and tape are not as reliable as color for ID. Posting of various means of ID at panelboards would be confusing. If phase ID is for safety, should not DC systems be included? The substantiation is not adequate to justify phase ID. This requirement also applies to control and signal circuits which may be wholly installed in the same raceway, cable, or enclosure with power or lighting circuits. Wiring for fire alarm and emergency systems already have ID requirements. It is impractical to identify conductors in lighting, trolley, and power busways which are continuously or frequently accessible. "Where accessible" in effect limits ID to color coding for messenger supported wiring, open wiring on insulators, outside open conductors of Article 225 (which in effect prohibits bare conductors permitted by 225.4), Type FC cable, Type FCC cable.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree that phase ID is not practical. It was previously required when the text applied to multiwire branch circuits. Removing the requirement to ID the phase would allow the same ID to be used for all three phases of one system, which has the potential to introduce greater confusion.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-17 Log #1343 NEC-P02 **Final Action: Reject**
(210.5(C))

Submitter: Janet D. Skipper, Ocoee, FL
Comment on Proposal No: 2-23
Recommendation: Continue to delete the last sentence that was proposed by the submitter. In addition, delete the proposed text: "The means of identification shall be documented in a manner that is readily available or." The revised section should read as follows:
210.5 Identification for branch Circuits
(C) Ungrounded Conductors. Where the premises wiring system has branch circuits supplied from more than one nominal voltage system, each ungrounded conductor of a branch circuit, ~~where accessible,~~ shall be identified by system at all termination, connection and splice points. This means of identification shall be permitted to be by separate color coding, marking tape, tagging, or other approved means~~. The means of identification shall be documented to a manner that is readily available or~~ and shall be permanently posted at each branch-circuit panelboard or similar branch-circuit distribution equipment. ~~In industrial occupancies, where conditions of maintenance and supervision ensure that only qualified persons service the installation, a cable and conductor numbering system shall be permitted to meet this requirement.~~
Substantiation: I concur with the negative explanation that Mr. Weber has submitted. 210.23 applies generally to all types of occupancies, therefore, there is assurance that a qualified person will update or maintain files or be available at the time when the documents will need to be accessible to the Authority Having Jurisdiction or qualified person servicing the equipment. I also agree with the negative explanation submitted by Mr. King. The proposed text is vague and unenforceable and does not include prescriptive language that would ensure that the intent of this section would be satisfied.
Panel Meeting Action: Reject
Panel Statement: The term "readily available" is neither vague nor unenforceable. For very large and complex systems, the ability to have the conductor ID scheme outlined in system diagrams and documentation is critical. In these systems, it is likely that this information will be kept more up-to-date than some type of legend located at each panelboard.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: The use of the term "readily available" allows for a broad interpretation of the location where the documentation for system identification is to be kept. There are no requirements in the proposed text to ensure that these documents will be properly updated and maintained by a qualified person. As building ownership changes much of this important documentation can be lost. Requiring system identification to be at the Panelboard location gives prescriptive requirements that can be more easily enforced by the authority having jurisdiction and is always available to those servicing the electrical equipment.

2-18 Log #1897 NEC-P02 **Final Action: Accept in Principle**
(210.5(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-24
Recommendation: I. Rephrase the additional text as "phase or line and".
II. Split the second sentence into two sentences, revised to read as follows:
The means of identification shall be permitted to be by separate color coding, marking tape, tagging, or other approved means. The method utilized for conductors originating within each branch-circuit panelboard or similar branch-circuit distribution equipment shall be permanently posted on the equipment.
Substantiation: I. The rule will also apply to single-phase distributions, where both ungrounded conductors are of the same phase but with a potential difference between them. The panel action incorrectly implies that these conductors are of differing phases, which is not the case. This wording makes the rule technically correct.
II. At every seminar I give on the 2005 NEC, someone and usually more than one, asks whether the panelboard labeling rule covers the conductors originating at that panel, or whether the rule is a reciprocal rule requiring every panel to list every identification scheme for every system in the building. The words in the NEC will support both interpretations. When I raised this at the Eastern Section IAEI meeting, the speakers had no idea either, and suggested I address it with a comment. This wording supposes the intent is the former; if I guessed wrong, then please put contrary wording in the book. It does seem that when you get a number of systems you would need a huge amount of real estate to list all the options, so I hope I guessed correctly.

Panel Meeting Action: Accept in Principle

The panel accepts the submitter's revision to change "phase and" to "phase or line and."

Revise the last sentence of 210.5(C) of the ROP text to read as follows:

"The method utilized for conductors originating within each branch-circuit panelboard or similar branch-circuit distribution equipment shall be documented in a manner that is readily available or shall be permanently posted at each branch-circuit panelboard or similar branch-circuit distribution equipment."

Panel Statement: The panel has accepted the addition of the words to apply to phase or line conductors. The panel agrees with the intent of the submitter that the identification is required to identify the conductors that originate at that panelboard. To accomplish that intent, the panel has revised the words from the ROP to state the identification (whether documentation or posting) before the conductors at that panelboard.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-19 Log #522 NEC-P02 **Final Action: Reject**

(210.5(C) and Exceptions)

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 2-27

Recommendation: Accept the proposal as revised:

Where the wiring system has branch circuits supplied from more than one ~~nominal voltage~~ system with different characteristics such as voltage frequency, phases, ac or dc, or supplied from different services, or separately derived systems, shall be identified by system at all terminations, connections, and supply points. The means of identification shall be posted where the branch circuit receives its supply.

Exception No. 1: Conductors for fire alarm circuits.

Exception No. 2: Conductors for emergency systems.

Exception No. 3: The enclosures for busway conductors shall be identified in an approved manner.

Exception No. 4: Flat Cable Assemblies Type FC shall only be required to be identified at the point of supply and in junction boxes.

Exception No. 5: Flat Conductor Cable Type FCC shall only be required to be identified at the point of supply.

Exception No. 6: Control and signal circuit conductors installed in the same raceway, cable or enclosure with power or lighting circuits.

Exception No. 7: Where the authority having jurisdiction determines that a system is sufficiently limited or separated from other systems identification shall not be required.

Substantiation: This section only applies to different voltage systems. Interconnection or misconnection of conductors with different characteristics other than voltage, such as ac and dc, grounded and ungrounded, different services, or separately derived can also be hazardous; currents may be improperly divided; backfeed to disconnected circuits may occur. Wiring for fire alarm and emergency systems are required to be identified in their respective articles. It is impractical to identify conductors in power, lighting, and trolley busway, Type FC and FCC cableseat all connections and supply points of devices. Present text can require Class 1 circuits installed with power supply circuits to be identified. A limited system which is separated from other systems such as a service supplying only a fire pump room does not warrant identification.

Panel Meeting Action: Reject

Panel Statement: The submitter has not provided substantiation that the requirement should be extended beyond identification of different voltage systems. The original substantiation dealt with the need being associated with voltage systems. The exceptions are unnecessary for the following reasons:

(1) Fire alarm circuits are not covered by Article 210. The branch circuit supplying the fire alarm equipment is covered, but the fire alarm circuits themselves are not.

(2) Emergency systems - the emergency system should be identified in compliance with 210.5 in order to identify which system it is supplied from.

(3) Busway - It is unnecessary to add an exception for busways since the identification means is typically already in place.

(4) FC and FCC Cable - There is no basis to not ID FC cable at its accessible points. For FCC cable, 324.120(B) already requires compliance with 310.12 which requires compliance with 210.5(C).

(5) Control and signal conductors are not always Article 210 Branch Circuits. In cases where they are, they should comply with 210.5(C), in other instances the ID requirements would not apply.

(6) A specific exception for the AHJ to omit the ID requirement is not needed since the current text of 210.5(C) allows "other approved means" and since 90.4 would allow the AHJ to permit different methods.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-20 Log #2126 NEC-P02 **Final Action: Accept in Part**

(210.6(D))

Submitter: Robert H. Wills, Intergrid, LLC

Comment on Proposal No: 2-32

Recommendation: I request that the panel reconsider it's reject vote with the following language substituted for that of the original proposal:

Add a Part (3) and Exception (3) to 210.6(D) Branch-Circuit Voltage Limitations, 600 Volts Between Conductors so that the complete section reads as follows:

(D) 600 Volts Between Conductors. Circuits exceeding 277 volts, nominal, to ground and not exceeding 600 volts, nominal, between conductors shall be permitted to supply the following:

(1) The auxiliary equipment of electric-discharge lamps mounted in permanently installed luminaires (fixtures) where the luminaires (fixtures) are mounted in accordance with one of the following:

a. Not less than a height of 6.7 m (22 ft) on poles or similar structures for the illumination of outdoor areas such as highways, roads, bridges, athletic fields, or parking lots

b. Not less than a height of 5.5 m (18 ft) on other structures such as tunnels

(2) Cord-and-plug-connected or permanently connected utilization equipment other than luminaires (fixtures)

(3) Luminaires powered from direct current systems where the luminaire contains a listed, dc-rated ballast that provides isolation between the dc power source and the lamp circuit and protection from electric shock when changing lamps.

FPN: See 410.78 for auxiliary equipment limitations.

Exception No. 1 to (B), (C), and (D): For lampholders of infrared industrial heating appliances as provided in 422.14.

Exception No. 2 to (B), (C), and (D): For railway properties as described in 110.19.

Exception No. 3 to (D): Luminaires in installations where conditions of maintenance and supervision ensure that only qualified persons service the installation.

Substantiation: A. The panel rejected previous submissions on this topic due to the following:

The recommendation proposed would allow a luminaire with up to 430 V to be installed in a location where it could be easily accessed for changing lamps, etc. This defeats the intent of the requirement which is to require luminaires with voltage supplies higher than 277 V to be limited to very specific installation as described in 210.6(D)(1). There is no substantiation to allow luminaires supplied from PV systems to be treated any differently than luminaires power by AC line power.

1. The requirements of 210.6(D) are intended to protect non-qualified persons from the risk of electric shock while changing lamps, etc.

2. The use of listed electronic light ballasts that provide isolation between the ac or dc power source and the lamp circuit, and protection against electric shock are an alternate means of achieving this intent.

3. The proposed new language for 210.6(D)(3) would allow connection of listed, dc-rated ballasts to dc circuits operating between 277 and 600 V. Fluorescent lamp ballasts are listed under UL 935 which tests for and protects against the potential for electric shock when changing lamps. UL 935 applies to both ac and dc powered ballasts. UL 1029 applies to high intensity discharge ballasts and has similar provisions for the prevention of electric shock.

4. Most electronic ballasts can operate on both ac and dc as the internal electronics converts incoming power to dc before inverting to lamp voltage. Many are listed for both ac and dc use. A ballast connected to a 277 V ac nominal circuit will be subject to 392 V peak and 431 V peak at (+10%) ac high line. The internal DC bus of the ballast will be charged to the same (392 V dc) level whether the ballast is connected to 277 V ac or 392 V dc. The lamp is then supplied via an isolated high-frequency inverter circuit. The voltages available in the ballast and the risk of electric shock when changing bulbs are identical.

5. The potential risk to a person changing a ballast is a separate issue which is addressed by the new requirements of 410.73(G) requiring a ballast disconnect switch: "The luminaire will contain a disconnect means internal or external to itself or the luminaire will be cord and plug wired with UL rated hardware". Ballast replacement is also an activity normally performed by qualified personnel.

6. Comments from luminaire manufacturers (in the 2005 ROP) in response to the changes in the 2005 code that excluded luminaires from operating at over 277 V stated that this change was occurring without justification - no problems or cases of electric shock had been reported for lighting systems operating at over 277 V.

B. The new Exception (3) to 210.6(D) provides consistency between under 600 V and over 600 V requirements:

210.6(E) (Over 600 Volts Between Conductors) states: "Circuits exceeding 600 volts, nominal, between conductors shall be permitted to supply utilization equipment in installations where conditions of maintenance and supervision ensure that only qualified persons service the installation."

This provision for over 600 V between conductors is also appropriate for the voltage range 277 to 600 V where the general use of luminaires was prohibited in the 2005 code. This exception would allow the use of luminaires operating above 277 V ac and dc where conditions of maintenance and supervision ensure that only qualified persons service the installation.

C. Industry and Societal Impact. DC assisted lighting systems work by supplying rectified ac power to new and existing lighting installations, with additional power provided (directly via diode coupling) from dc sources such as photovoltaics, fuel cells and wind-generators.

DC lighting systems of this type have been researched and operating reliably for more than 20 years. The first such system (a photovoltaic-assisted lighting system in a department store in Massachusetts) was installed by UMass Lowell and is still operating.

The change to the 2005 NEC to 210.6(D)(2) that excluded luminaires from supply voltages above 277 V has (perhaps inadvertently) made DC assisted lighting systems illegal, but DC assisted lighting systems for commercial and industrial buildings have the potential to significantly reduce US energy consumption.

There are more than 100 billion square feet of commercial and industrial space in the USA that is lit with fluorescent and HID lighting. Typical lighting density is 2 W/square foot (a total electric demand of about 200 GW - about 20% of the total generating capacity).

The advantage of these systems are:

1. Efficiency - energy from the dc power source is used directly without conversion to ac and back to dc again

2. Cost - the cost of inverters is eliminated

3. Interconnection barriers - there is no possibility of back-feeding the electric grid, and so there are no interconnection issues.

The inclusion of this proposal, or equivalent language, is important for the preservation of an existing, growing segment of the renewable-energy industry that can provide significant reductions in US energy demand. It is important for the future of our country.

Panel Meeting Action: Accept in Part

The panel accepts the submitter's recommendation to add item (3) to 210.6(D).

The panel rejects the submitter's recommendation to add a new Exception No. 3.

Panel Statement: The panel agrees with the specific language to allow the DC rated luminaire with the limitations as stated in the submitter's recommendation.

The panel does not agree with adding a general exception that would allow luminaires to generally be applied above 277V. The limitations in 210.6(E) for qualified persons are specific to the limited application of the over 600 volt systems in branch-circuit applications. Applying this broadly to allow higher voltage luminaires in under 600V systems is not justified.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-21 Log #1044 NEC-P02 **Final Action: Reject**
(210.8(A))

Submitter: Gilbert L. Thompson, MEIA Codes and Standards

Comment on Proposal No: 2-40

Recommendation: The Panel should reconsider their action and reject not accept this proposal.

The exemptions that now appear in the 2005 NEC should remain and the new wording proposed by the panel added. However, an "s" should be inserted after the word exception in that new wording proposed by the panel.

Substantiation: Our inspectors associations agree with the negative comments of Mr. Brown and Mr. Purvis that the proposal should be rejected. We also agree that sufficient substantiation was not provided to expand the requirements for this section and are also concerned just the same as Mr. Brown regarding the problems that could be generated by nuisance tripping. We feel there could also be enforcement headaches created as to the dates that would be certifying when GFCI protection was installed or have circuits and receptacles been changed because they would not function properly.

Panel Meeting Action: Reject

The submitter has not provided any additional substantiation that the claims regarding nuisance tripping are associated with the GFCIs and appliances that have been in production over the past decade. The product standards include specific requirements for limitations on appliance leakage current (not more than 0.75#ma for a fixed cord and plug connected appliance) and the GFCIs have a minimum trip level of 4/mA. In addition, the removal of the exceptions avoids a potential conflict when the receptacles are located within 6ft of a utility sink that is in a garage.

Panel Statement: The submitter has not provided any additional substantiation that the claims regarding nuisance tripping are associated with the GFCIs and appliances that have been in production over the past decade. The product standards include specific requirements for limitations on appliance leakage current (not more than 0.75ma for a fixed cord and plug connected appliance), and the GFCIs have a minimum trip level of 4mA. In addition, the removal of the exceptions avoids a potential conflict when the receptacles are located within 6 ft of a utility sink that is in a garage.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-22 Log #1144 NEC-P02 **Final Action: Reject**
(210.8(A))

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group

Comment on Proposal No: 2-40

Recommendation: Reject Proposal 2-40 in its entirety.

Substantiation: Proposal 2-40 should be rejected due to the incorrect assumption that all refrigerators and freezers will operate on GFCI protected circuits/receptacles. Potential loss of food in refrigerators and freezers is still a major problem. Also, some refrigerators are still being sold with a warning label to not install the refrigerator on a GFCI protected circuit. See copy of a label below from a Frigidaire Upright Freezer tag.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The product standard for refrigerators and freezers (UL 250) includes specific requirements for leakage current tests and limits the leakage current to.75mA. If there are situations where the appliance is leaking more than 5 times its permitted current to trip a GFCI, the condition with the appliance should be corrected. Relative to the "tags" mentioned in the substantiation, there is no evidence that these types of markings are not related to the historical issues associated with higher leakage currents and lower GFCI trip thresholds.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

PURVIS, R.: Comment 2-22 should be accepted. Neither the submitter of Proposal 2-40, nor the members of CMP 2 submitted sufficient substantiation for the need to require GFCI protection for dedicated appliances in garages and basements. However, various comments submitted pointed out potential problems with nuisance trips due to lightning, leakage or whatever for refrigerators and freezers that could result in food loss. If these exceptions are eliminated, there is a real possibility that electrical contractors will later remove the GFCI (after inspection) or somehow make doubly sure that refrigerators and freezers are not on a GFCI protected circuit or receptacle.

2-23 Log #1346 NEC-P02 **Final Action: Reject**
(210.8(A)(B))

Submitter: Donald M. King, Wilmington, DE

Comment on Proposal No: 2-42

Recommendation: This proposal should have been accepted.

Substantiation: The hazards associated with the use of electricity in close proximity of a sink have been adequately substantiated by numerous proposals that have been submitted to Panel 2 in past Code cycles. Panel 2 has recognized these hazards in this code cycle with the panel action on Proposal 2-81. Proposal 2-81 revises 210.8(B)(5) to require GFCI protection for all receptacles installed within 6 feet of a sink in other than dwelling units. The same level of protection should be required for similar installations in dwelling units. The same electrical hazards exist where electricity is used in close proximity of a sink regardless of the type of occupancy.

Panel Meeting Action: Reject

Panel Statement: The revision to 210.8(A)(7) and 210.8(B)(5) cover the situation related to receptacles installed within 6 ft of sinks. The wording in the proposal relative to "tubs" is already covered through the bathroom requirement for GFCI protection. The wording "other body of water" in the proposal is too broad.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

KING, D.: The Panel action and statement does not satisfy the submitter's concerns. With the present Code language in 210.8(A)(6) and 210.8(A)(7) it is possible in a dwelling unit to have a receptacle installed in a peninsular wall located more than 12 inches below the countertop surface and not have that receptacle be required to be GFCI protected. If a sink were installed in the countertop surface above the receptacle it is likely that the receptacle would be within 6 ft of the sink and the receptacle under the present code text would still not require GFCI protection. In the above scenario it is possible to utilize the receptacle for cord and plug connected equipment to be placed on the

countertop adjacent to the sink creating an unsafe condition for anyone using the electrical equipment. Accepting in Part the submitter's original Proposal to require GFCI protection within 6 ft of any sink would have required GFCI protection for the installation above and satisfied the submitter's concerns. I agree with the Panel that the wording in the Proposal "other body of water" is too broad but maintain my position that GFCI protection should be provided for all receptacles installed within 6 ft of any sink in a dwelling unit.

2-24 Log #1406 NEC-P02 **Final Action: Reject**
(210.8(A) Exception No. 2 to (2) and Exception No.2 to (5).)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 2-40
Recommendation: Revise text to read as follows:
These proposals should have been rejected. The exceptions should remain for existing older appliances.
Substantiation: Nuisance tripping of the GFCI is not the only real issue here. The proposals also refer to leakage current in the appliances and state that appliances should not have this much leakage current. However, earlier NEMA guides stated that some appliances do have higher leakage currents and should not be used with GFCIs. Although the product standards have since changed and do not permit the higher leakage currents, many of the appliances listed under previous products standards are still in use and have not been shown by any substantiation to present a significant shock hazard to their users. The acceptance of this proposal seems to be based on the assumption that all appliances used in newer homes are listed under the newer standards. This is highly presumptuous. In effect, the acceptance of this rule says to all buyers of homes built after 2008 that they must replace their older appliances without regard to their ability to pay or the continued usability of those appliances. The author of this comment agrees that "readily accessible" is vague and no longer a valid reason for an exception, but the consumers should be able to continue to use major appliances until the useful life of the appliance is over.
Panel Meeting Action: Reject
Panel Statement: The requirements for limited leakage current are not a recent change and have been in the appliance standards for a number of years. The submitter also overlooks the fact that if the appliance has significant leakage current, it is a hazard and should be replaced.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-25 Log #1006 NEC-P02 **Final Action: Reject**
(210.8(A)(1))

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 2-45
Recommendation: Revise text to read as follows:
(1) Bathrooms. The ground fault circuit interrupter receptacle or device, protecting a bathroom shall be located in the bathroom being protected or in a panelboard.
Substantiation: Mr. Jones' and others' argument that there is a problem with multiple bathrooms being served by one GFCI is born out of experience. I have seen homeowners bring in extension cords to serve a bathroom because it didn't contain the GFCI serving it and they didn't know where to go to restore power. Trusting in the power of the market to convince builders eventually to provide adequate circuiting and location is a crapshoot. The proposed modification to the wording of Mr. Dewey's proposal is a compromise. It also avoids summarily overruling those designers and installers who believe they have good reason to prefer circuit breaker-type GFCIs over unit devices.
Panel Meeting Action: Reject
Panel Statement: A GFCI located in one bathroom and protecting receptacles in another bathroom is a proper application and will provide the needed GFCI protection. The convenience concerns associated with the location of the GFCI can be addressed by good design practices.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-26 Log #1675 NEC-P02 **Final Action: Reject**
(210.8(A)(1))

Submitter: Joseph Linteau, Greg Brooks Electric
Comment on Proposal No: 2-46
Recommendation: Add new text:
All general-purpose receptacles shall be GFCI protected in bathrooms. This does not include laundry equipment such as washers and dryers.
Substantiation: Presently, there is relief for basements and garages, I believe this relief should apply to bathrooms. This change would also prevent nuisance tripping.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree that the appliances located in a bathroom should be exempt from GFCI protection. These appliances are compatible with GFCI, and if they are tripping the GFCI, they have leakage current that is in excess of acceptable levels. The submitter has not substantiated his statement regarding nuisance tripping.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-27 Log #1052 NEC-P02 **Final Action: Reject**
(210.8(A)(2))

Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 2-41
Recommendation: The Panel should reconsider their action to accept this proposal.
Substantiation: The statement that "readily accessible is too vague" is bogus, and has the panel considered that the garage door operation is essential to many disabled persons as well as a vital part of home security and a ready and easy fire exit. These openers are listed and are equipped with 3-wire attachment caps. I thought it was necessary to provide substantiation for a NEC change. I see none. In addition, the exception that permits fire and burglar alarm systems to be supplied from a non-GFCI circuit remains, Why? The only reason would be "nuisance tripping" which is a concern for the garage door opener.
Panel Meeting Action: Rej
ect
Panel Statement: The panel does not agree with exempting receptacles at elevated locations from GFCI protection. In many cases, these receptacles supply equipment that is located in a readily accessible location of a garage that should require GFCI protection. There is no incompatability between garage door openers and GFCIs.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
PURVIS, R.: Comment 2-27 should be accepted. Neither the submitter of Proposal 2-41, nor the members of CMP 2 submitted sufficient substantiation for the need to require GFCI protection for receptacles that are not accessible (garage door opener for example). However, the comment submitted pointed out valid potential life safety problems with requiring GFCI protection due to nuisance trips.

2-28 Log #2031 NEC-P02 **Final Action: Accept**
(210.8(A)(2) Exception No. 1)

Submitter: Donald Cook, Shelby County Building Inspections
Comment on Proposal No: 2-50
Recommendation: I support the panel action on this proposal.
Substantiation: A circuit with potentially lethal leakage current capable of opening a GFCI protective device, should not be considered a "nuisance trip" by the electrical industry.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
PURVIS, R.: Comment 2-28 should be rejected. Neither the submitter of Proposal 2-50, nor the members of CMP 2 submitted sufficient substantiation for the need to require GFCI protection for receptacles that are not accessible (garage door opener for example). However, Comment 2-27 pointed out valid potential life safety problems with requiring GFCI protection due to nuisance trips.

2-29 Log #896 NEC-P02 **Final Action: Reject**
(210.8(A)(2) Exception No. 1 and 210.8(A)(5) Exception No. 1)

Submitter: Michael P. O'Quinn, MOGO Enterprises, Inc.
Comment on Proposal No: 2-41
Recommendation: Reject this proposal: restore wording to 2005 NEC language.
Substantiation: The proposal submitter states that "readily accessible" can mean different things based upon the height of the person. But the wording of 210.8(A)(2) Exception No. 1 and 210.8(A)(5) Exception No. 1 is referring to not readily accessible, which is something quite different.
"Readily accessible" refers to the ability of anyone, regardless of height or mobility, to access the equipment or device in question. This term needs to be vague to allow or require items to be at the height of the user. This is why the definition of readily accessible in Article 100 has remained unchanged during several Code cycles.

The intent of the phrase "not readily accessible" was to prevent anyone from reaching equipment or a device without resorting to ladders to achieve the height. It, therefore, is directed at the nominal height of a person, and in several locations such as 240.24(A) has been placed at no less than 6 ft 7 in. above the floor. This was thought to be a practical height to require those to who ready access is required to resort to ladders to achieve this height, even though persons of greater height could reach it without aid.

See 210.8(A)(3) Exception, which permits the elimination of GFCI protection for receptacles feeding electric snow-melting equipment. In order to follow 426.28, ground-fault protection devices (not GFCI) would trip at about 30 ma, providing shock hazard to anyone coming in contact with the receptacle, but providing proper protection for the snow-melting system. The intent of this "not readily accessible" requirement though no height is mentioned, expects this to be at the roof line where the average person would not be exposed to possible deadly current.

In 110.34(E) we use specific heights based upon the voltage level to prevent access by unqualified persons from unguarded voltages above 600V. There is no adjustment in these distances based upon the height of the person because of this non readily accessible height should provide "...practical safeguarding from the hazards arising from the use of electricity" [90.1(A)].

Panel Meeting Action: Reject
Panel Statement: See action and statement on Comment 2-27.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

PURVIS, R.: Comment 2-29 on Proposal 2-41 should be accepted for the same reason that Comment 2-27 should have been accepted.

2-30 Log #2132 NEC-P02 **Final Action: Reject**
(210.8(A)(2) Exception No. 1 and No. 2)

Submitter: Michael R. Fisher, Bluhm Electric Inc.
Comment on Proposal No: 2-50
Recommendation: Exception No. 1 to (2) Receptacles that are not readily accessible.
Substantiation: As the proposer talks about leakage current for appliances. But does not address the issue of lightning. In Colorado, we are second in lightning strikes which will trip AFCI receptacles. Do we want to be responsible for the loss of food in freezers or refrigerators in garages. Also new spec's on refrigerator recommend that these appliances not be put on AFCI receptacles.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-27. GFCIs produced in recent years under the revised standards are much more resistant to lightning as a cause for unwanted tripping. In addition, there are actions such as freezer temperature alarms and similar devices that could be used to warn of a power outage for any reason (not just a GFCI opening).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

PURVIS, R.: Comment 2-30 should be accepted which would reject Proposal 2-50. The need for GFCI protection was not substantiated. Many new homeowners would not be aware that they might have to purchase some type of warning device for power loss due to false trips from lightning etc. if GFCI protection is required on these circuits.

2-31 Log #2030 NEC-P02 **Final Action: Accept**
(210.8(A)(2) Exception No. 2)

Submitter: Donald Cook, Shelby County Building Inspections
Comment on Proposal No: 2-51
Recommendation: I support the panel action on this proposal.
Substantiation: A circuit with potentially lethal leakage current capable of opening a GFCI protective device, should not be considered a "nuisance trip" by the electrical industry.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

PURVIS, R.: Comment 2-31 on Proposal 2-51 should be rejected. Neither the submitter of the proposal, nor the members of CMP 2 submitted sufficient substantiation for the need to require GFCI protection for dedicated appliances in garages. However, various comments submitted pointed out potential problems with nuisance trips due to lightning, leakage or whatever for refrigerators and freezers that could result in food loss. If these exceptions are eliminated, there is a real possibility that electrical contractors will later remove the GFCI (after inspection) or somehow make doubly sure that refrigerators and freezers are not on a GFCI protected circuit or receptacle.

2-32 Log #2029 NEC-P02 **Final Action: Accept**
(210.8(A)(5) Exception No. 1 to (5))

Submitter: Donald Cook, Shelby County Building Inspections
Comment on Proposal No: 2-58
Recommendation: I support the panel action on this proposal.
Substantiation: A circuit with potentially lethal leakage current capable of opening a GFCI protective device, should not be considered a "nuisance trip" by the electrical industry.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-33 Log #2028 NEC-P02 **Final Action: Accept**
(210.8(A)(5) Exception No. 2 to (5))

Submitter: Donald Cook, Shelby County Building Inspections
Comment on Proposal No: 2-57
Recommendation: I support the panel action on this proposal.
Substantiation: A circuit with potentially lethal leakage current capable of opening a GFCI protective device, should not be considered a "nuisance trip" by the electrical industry.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

PURVIS, R.: Comment 2-33 on Proposal 2-57 should be rejected. Neither the submitter of the proposal, nor the members of CMP 2 submitted sufficient substantiation for the need to require GFCI protection for dedicated appliances in basements. However, various comments submitted pointed out potential problems with nuisance trips due to lightning, leakage, or whatever for refrigerators and freezers that could result in food loss. If these exceptions are eliminated, there is a real possibility that electrical contractors will later remove the GFCI (after inspection) or somehow make doubly sure that refrigerators and freezers are not on a GFCI protected circuit or receptacle.

2-34 Log #1997 NEC-P02 **Final Action: Accept in Principle**
(210.8(A)(5) Exception No. 3)

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-58
Recommendation: Accept the proposed change.
Substantiation: It may be advisable to include this cross-reference FPN in Chapter 2 as most electricians who wire one- and two-family dwellings and low-rise multifamily buildings very rarely use the provisions of Chapter 7. In addition, NAHB would like to make sure this important information is included in the electrical provisions of the ICC International Residential Code (IRC).
Panel Meeting Action: Accept in Principle

Add an FPN to 210.8(A)(5) following the exception that reads:

"FPN: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems."

Panel Statement: The panel accepts the recommendation to add the FPN and has reworded the FPN to reference the correct sections and make the FPN generic relative to power supply requirements.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-35 Log #809 NEC-P02 **Final Action: Hold**
(210.8(A)(7))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Hold" since the revision to 210.8(A)(7) is new material that has not had adequate public review and the Technical Correlating Committee directs that only Comment 2-35 be held.
Submitter: Joseph A. Hertel, Safety and Buildings
Comment on Proposal No: 2-40
Recommendation: Revise text to read:

(7) Laundry, utility, bedroom and wet bar sinks, where the receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink.

Substantiation: Bedroom sinks are quite common in current construction where a vanity with sink is installed in addition to a bathroom for a master bedroom. It can be argued that the sink is in the bathroom area or can be used as a wet bar but the addition of the word bedroom would eliminate the question.
Panel Meeting Action: Accept in Principle

Reword 210.8(A)(7) from the ROP text to read as follows:

"(7) Laundry, utility, wet bar and similar sinks -- where the receptacles are installed within 1.8 m (6 ft) of the outside edge of the sink."

Panel Statement: The panel has revised the language to include "similar sinks" to address the submitter's concern. The proposed text of "bedroom sink" is not a common term. The language in the panel action text will make the requirement inclusive of all sinks other than those covered by the bathroom and kitchen provisions of 210.8(2) and (A)(6).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-36 Log #11 NEC-P02 **Final Action: Accept**
(210.8(A)(7) Exception)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 2-66
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered since the acceptance of two other proposals is not a technical reason for rejecting this proposal in accordance with the 4.3.5.1 of the NFPA Regulations Governing Committee Projects.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the Technical Correlating Committee direction to reconsider the proposal. The panel continues to reject the proposal. The panel does not agree that the exceptions should be added for equipment located in the areas covered by the requirements. The panel notes that the submitter's original substantiation was simply that the exception exists in other 210.8 locations and should be added here. This substantiation is insufficient to expand the use of the exceptions.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-37 Log #12 NEC-P02 **Final Action: Accept**
(210.8(A)(7) Exception)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 2-67
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered since the acceptance of two other proposals is not a technical reason for rejecting this proposal in accordance with the 4.3.5.1 of the NFPA Regulations Governing Committee Projects.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the Technical Correlating Committee direction to reconsider the proposal. The panel continues to reject the proposal. The panel does not agree the exceptions should be added for equipment located in the areas covered by the requirements. There is no basis to exclude the equipment that is supplied for receptacles within the 6 ft space. The panel notes that the original need for the substantiation was based on higher leakage currents in appliances and lower trip thresholds for GFCIs. For a number of years, the equipment leakage provisions and the minimum trip levels of the GFCI have been well coordinated, and as such expansion of the use of the exceptions is not warranted.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-38 Log #10 NEC-P02 **Final Action: Accept**
(210.8(A)(7) Exception No. 1 and No. 2 (New))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 2-65
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered since the acceptance of two other proposals is not a technical reason for rejecting this proposal in accordance with the 4.3.5.1 of the NFPA Regulations Governing Committee Projects.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the Technical Correlating Committee direction to reconsider the proposal. The panel continues to reject the proposal. The panel does not agree that the exceptions should be added for equipment located in the areas covered by the requirements. The panel notes that the submitter's original substantiation was simply that the exception exists in other 210.8 locations and should be added here. This substantiation is insufficient to expand the use of the exceptions.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-39 Log #13 NEC-P02 **Final Action: Accept**
(210.8(B))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 2-70
Recommendation: The Technical Correlating Committee understands that the Panel Action on this Proposal retained "(3) Rooftops"; revised (4) to read "(4) Outdoors", deleted the existing text in (4), changed the existing "Exception to (3) and (4)" to "Exception No. 1 to (3) and (4)", and added the proposed "Exception to (3)" as "Exception No. 2 to (4)"; and deleted (5).
The Technical Correlating Committee directs that the Action on this Proposal be rewritten to comply with 4.1.1 of the NEC Style Manual. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel accepts the direction of the Technical Correlating Committee as follows:
Revise Exception No.1 to (3) and (4) to read as follows: "Exception No. 1 to (3) and (4): Receptacles that are not readily accessible and are supplied from a dedicated branch circuit for electric snow-melting or deicing equipment shall be permitted to be installed without GFCI protection."
Panel Statement: The panel agrees that the recommendation properly expresses the arrangement of the exceptions. To address the issue of the reference to the entire article, the panel deleted the reference since all electric snow--melting or deicing equipment must be installed according to the NEC requirements and more specifically Article 426.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-40 Log #1347 NEC-P02 **Final Action: Accept in Principle in Part**
(210.8(B))

Submitter: Donald M. King, Wilmington, DE
Comment on Proposal No: 2-70
Recommendation: Delete the proposed industrial exception as recommended by Panel 2, add specific section references to the exception to (3) to satisfy the TCC action and revise the submitter's recommended text to read as follows:
(B) Other Than Dwelling Units. All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in (1) though (5) shall have ground-fault circuit-interrupter protection for personnel:
(1) Bathrooms
(2) Commercial and institutional kitchens for the purposes of this section, a kitchen is an area with a sink and permanent facilities for food preparation and cooking.
(3) Rooftops
~~(4) Outdoors in public spaces for the purposes of this section a public space is defined as any space that is for use by, or is accessible to, the public~~
~~Exception to (3) and (4): Receptacle that are not readily accessible and are supplied from a dedicated branch circuit for electric snow melting or deicing equipment shall be permitted to be installed in accordance with the applicable provisions of Article 426.~~
~~(5) Outdoors where installed to comply with 210.63~~
(4) Outdoors.
Exception to (3) and (4) Receptacles that are not readily accessible and are supplied from a dedicated branch circuit for electric snow-melting or deicing equipment shall be permitted to be installed in accordance with the applicable provisions of Part I of Article 426.
Substantiation: The addition of an industrial exception by Panel 2 that allows an assured equipment grounding program to be used in lieu of GFCI protection was done without reviewing any technical data that would indicate that an assured equipment grounding program would provide the same level of shock protection as GFCI protection. Industrial establishments present some of the most adverse conditions and environments for persons who are required to operate cord and plug connected equipment. Oftentimes, workers are required to work outside in inclement weather for extended periods of time while utilizing portable cord and plug connected electrical equipment, exposing them to the hazard of electric shock or electrocution. There are also many situations that require workers at industrial facilities to work in areas that are below grade, such as manholes and cable vaults, further subjecting them to risk of electrical shock or electrocutions. The use of GFCI protected devices would greatly reduce the hazard of electrical shock or electrocution in these areas. GFCI protected devices have a proven history of saving lives and should be required for all 125 volt 15 and 20 ampere receptacle outlets installed outdoors including those installed in Industrial establishments.

Panel Meeting Action: Accept in Principle in Part

The panel rejects the recommendation to delete Exception No. 2 to 210.8(B)(4) of the ROP text.

The panel accepts in principle the recommendation to reword Exception No. 1 to (3) and (4) of 210.8(B)(4) of the ROP text to not reference the entire article. The panel action on Comment 2-39 accomplishes this objective.

Panel Statement: The panel does not agree with the deletion of Exception No. 2 from the ROP text. The assured equipment grounding conductor program is recognized by OSHA as well as the NEC in Article 590. See the panel action on Comment 2-41 that futher limits the exception to the text used in 590.6(A) Exception.

See panel action and statement on Comment 2-39 for the revision of Exception No. 1. The panel has removed the entire reference to Article 426, since the article would apply to the equipment regardless of the reference.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

NENNINGER, B.: In keeping an industrial exception for outdoor receptacles, Panel 2 has appropriately recognized specific industrial situations exist in which a "greater hazard" could result from the loss of power. Examples of such situations include: receptacles for equipment supplying breathing air during confined space entry, air evacuation/supply where gases may be present, and equipment held in place using electro-magnetic technology such as magnetic drills.

2-41 Log #1358 NEC-P02 **Final Action: Accept in Principle in Part (210.8(B))**

TCC Action: The Technical Correlating Committee understands that the panel action did not Accept the deletion of "Exception No. 1 to (3) and (4)".

Submitter: Michael P. O'Quinn, MOGO Enterprises, Inc.

Comment on Proposal No: 2-70

Recommendation: Revise text to read as follows:

(B) Other Than Dwelling Units. All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in (1) through (5) shall have ground-fault circuit-interrupter protection for personnel:

(1) Bathrooms

(2) Commercial and institutional kitchens—for the purposes of this section, a kitchen is an area with a sink and permanent facilities for food preparation and cooking

~~(3) Rooftops~~

~~(4) Outdoors in Public Spaces. For the purpose of this section a public space is defined as any space that is for use by, or is accessible to, the public~~

~~Exception to (3) and (4): Receptacles that are not readily accessible and are supplied from a dedicated branch circuit for electric snow melting or dicing equipment shall be permitted to be installed in accordance with the applicable provisions of Article 426.~~

~~(5)~~ (3) Outdoors, ~~where~~ including receptacles installed to comply with 210.63

Exception to (3): Receptacles that are not readily accessible and are supplied from a dedicated branch circuit for electric snow-melting or deicing equipment shall be permitted to be installed in accordance with the applicable provisions of Article 426.

[Panel Action] Exception No. 2 to (4): In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified personnel are involved, GFCI protection shall not be required on receptacles that are limited in use to those receptacles listed in 590.6(A) Exception ~~equipment qualified under an assured equipment grounding conductor program as specified in 590.6(B)(2)~~.

Substantiation: I agree with the inclusion of all 125-volt, 15- and 20-ampere receptacles installed outdoors with GFCI protection. I do not agree that "rooftops" is not "outdoors", but the added wording "including receptacles installed to comply with 210.63" should cover the problem addressed in the panel statement.

The panel action that added 210.8(B)(4) Exception No. 2 should refer to 590.6(A) Exception. 590.6(A) Exception allows an assured equipment grounding conductor program only if the receptacle is 125-volt, 15-, 20-, or 30-ampere that "...would create a greater hazard if power was interrupted or having a design that is not compatible with GFCI protection". This follows the intent of 590.6(A) Exception in that it protects persons using electricity with almost all temporary wiring. 590.6(B) gives an option for receptacles other than 125-volt, 15-, 20-, or 30-ampere to use either GFCI protection or an assured equipment grounding conductor program.

590.6(A) Exception refers to 590.6(B)(2) for the requirements of the assured equipment grounding conductor program, not which receptacles would be covered.

There does not appear to be a substantiation for exempting all 125-volt, 15- and 20-ampere receptacles in industrial establishments from GFCI protection by merely using an assured equipment grounding conductor program.

Panel Meeting Action: Accept in Principle in Part

The panel accepts in principle the revision to Exception No. 2 by rewording as follows: "Exception No. 2 to (4): In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment grounding conductor program as specified in 590.6(B)(2) shall be permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power is interrupted or having a design that is not compatible with GFCI protection."

The panel rejects the recommendation to delete rooftops.

The panel rejects the recommendation to include the reference to 210.63 in the outdoor requirement.

Panel Statement: The panel has revised Exception No. 2 to mirror the language used in 590.6(A) Exception. This will accomplish the objective of the submitter to make the use of the assured equipment grounding conductor program consistent.

The panel does not accept the deletion of rooftops because there may be receptacles installed on a rooftop (such as those in a penthouse) that are rooftop receptacles but are not located outdoors. In addition, those receptacles may not be for compliance of 210.63, so the use of that reference may again leave gaps in the intended protection.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-42 Log #1801 NEC-P02 **Final Action: Accept in Principle (210.8(B))**

Submitter: Michael Walls, American Chemistry Council

Comment on Proposal No: 2-71

Recommendation: The panel should amend its action and reject the expansion of GFCI's to sinks in "industrial laboratories" by adding an exception to the newly accepted text, "(5) Sinks – where receptacles are installed within 1.8 m (6 ft) of the outside edge of sink" as follows: Exception: Receptacles in industrial laboratories.

It should be noted the new text was offered by panel 2 in proposal 2-81 and referenced by the panel to address in principal in part the submitters request in proposal 2-71.

Substantiation: The blanket reference to all sinks including industrial laboratory facilities is of concern due to a potential loss of power to critical lab equipment used to control (cool, heat, stir/agitate) process reactions and evacuate process gases. Loss of power to such equipment either from a nuisance or intentional GFCI trip may result in significant run-away reaction hazards depending on the process characteristics and/or gases produced. These hazards include fire for those hood installations classified as division 2. In addition, leaving the text "industrial laboratories" out does not preclude the use of GFCI in such locations where they do not contribute to the hazards referenced above.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 2-44.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

KING, D.: See my explanation of negative on Comment 2-44.

Comment on Affirmative:

NENNINGER, B.: By accepting an exception covering sinks in industrial laboratories, Panel 2 has appropriately recognized situations where "greater hazards" exist in the event power is lost to critical lab equipment used in proximity to sinks. Examples of such equipment include devices designed to control process reactions and evacuate process gases. In these cases, a GFCI trip (nuisance or intentional) could result in significant run-away reaction hazards depending on the process characteristics and/or gases produced.

2-43 Log #1849 NEC-P02 **Final Action: Reject (210.8(B))**

Submitter: Mike Holt, Mike Holt Enterprises, Inc.

Comment on Proposal No: 2-70

Recommendation: Accept the Proposal as originally submitted.

Substantiation: I agree with Mr. Weber's comment. Industrial workers are often exposed to the same hazards as non-industrial workers. Considering the fact that the performance requirements of the assured program are seldom adhered to, we are putting our industrial workforce in an unnecessary danger by accepting the Panel's proposed exception.

Panel Meeting Action: Reject

Panel Statement: The panel does not agree that the permission to use the assured equipment grounding conductor program should be removed. This program is still recognized by OSHA as acceptable if properly applied. The panel has revised the exception to be consistent with the wording of 590.6(A) Exception, which further limits the use of the exception. See the panel action and statement on Comment 2-41.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:
KING, D.: I agree with the submitter's substantiation. The level of safety afforded by the use of GFCI protection far exceeds that provided by an assured equipment grounding program. Protection of persons from electrical shock and electrocution should be of the highest priority for Panel 2 when permitting exceptions for GFCI protection. The Panel should reconsider whether this exception is warranted.

2-44 Log #571 NEC-P02 **Final Action: Accept in Principle**
(210.8(B) Exception (New))

TCC Action: The Technical Correlating Committee directs that the new Exception added in the panel action be identified as "Exception No. 1 to (5)" to correlate with the Technical Correlating Committee action on Comment 2-57.

The Technical Correlating Committee understands that the panel action on Comment 2-57 modifies this panel action.

Submitter: William M. Lewis, Martinsville, IN
Comment on Proposal No: 2-71
Recommendation: The additional requirement for GFCI protection should be accompanied by the following exception:

Exception: Where loss of power could lead to more serious consequences than electrical shock, such as runaway reactions endangering multiple personnel or buildings, GFCI protection shall not be required.

Substantiation: Reasoning for this exception is obvious. It has long been the standard of the company from which I retired, to install GFCIs where employees request them, but not routinely in lab hoods or near lab sinks. Sometimes reliability and safety for the masses, outweighs individual safety.
Panel Meeting Action: Accept in Principle

Add a new exception to 210.8(B)(5) of the ROP text to read as follows:

"In industrial laboratories, receptacles used to supply equipment where removal of power would introduce a greater hazard shall be permitted to be installed without GFCI protection."

Panel Statement: The panel has added wording that is more consistent with code language and meets the intent of the submitter.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: The hazards which are described in the submitter's substantiation would require back up power sources to prevent "a dangerous runaway reaction" regardless of whether GFCI Protection is used or not. The submitter has not substantiated that there is a compatibility issue with electrical equipment used in labs and listed GFCI devices. Panel 2 should have requested to see more technical data before adding this exception.
Comment on Affirmative:
NENNINGER, B.: See my explanation given in Comment 2-42.

2-45 Log #1765 NEC-P02 **Final Action: Reject**
(210.8(B) Exception and 210.8(C) Exception (New))

Submitter: Michael Cole, MRC Electric
Comment on Proposal No: 2-70
Recommendation: Add an Exception to read as follows:

Exception e to 210.8(B) and 210.8(C): For loads that are incompatible with GFCI protection for people such as truck engine block heaters, older refrigerators, older vending machines, older boat hoists, large boat hoists, and similar loads a combination ground fault/ground check relay of the type that is used for protection of cords and machines in mines shall be permitted. The ground fault trip of such a device shall be permitted to be adjustable from 0.1 amperes to 10 amperes and shall be adjusted to the lowest level that tolerates normal leakage current of the appliance or machine. The ground check circuit shall be able to detect both an open equipment grounding conductor and ground fault of the ground check conductor.

For cords that do not lie on the floor or when bridge crane runway conductors or festoon cords are used to supply an appliance or machine, the power circuit shall be solidly grounded or resistance grounded and the cord shall be permitted to be unshielded for voltages of 600 volts or less. If the power circuit is solidly grounded, the ground check relay shall be protected from the voltage drop in the equipment grounding conductor that occurs during a ground fault by means of a fused communications protector block. This method of protection shall also be permitted for cords that lie on indoor floors that are not subject to flooding, washdown while the cord is in use, or presence of sharp objects. This method shall also be permitted for outdoor cords that do not lie on the floor and supply an appliance or machine that is stationary when in use. Where a cord lies on the floor and is subject to flooding, washdown, or sharp objects the cord power and ground check conductors shall be shielded regardless of voltage and the power source shall be resistance grounded regardless of voltage or number of phases.

Substantiation: a. One of the problems with the engine block heaters in diesel trucks is that at 55 miles per hour salt water will force its way into the wiring causing a leakage current that will trip a ground fault circuit interrupter for people protection. This is no more of a hazard than how if you do not ground a 15 horsepower hoist motor the hoist ropes will have a nasty tingle voltage regardless of how good the insulation is.

b. The method that is used in surface mines and underground mines for voltages up to 13,800 volts resistance grounded is to use continuous monitoring of the equipment ground which allows ground fault protection to be set to trip at much higher levels than 6 milliamperes.

The combination of resistance grounding and shielding of cord conductors protects against cord cuts and broken wire strands working their way through insulation to the surface (causing and electrocution) or to the other conductor (causing a fire). Resistance grounding makes the ground fault almost totally nonincendive and allows the ground fault relays and electricians to locate and clear a ground fault. This cause of electrocutions and fires was determined by the British National Coal Board among other regulatory agencies. The British have not had an electrocution in their underground coal mines since 1964 and they have 1,100 volt and 3,300 volt extension cords so they must be doing something right. The only electrical fires that they have had since then have been due to an operator of a machine running over the machine's supply cord.

Resistance ground also provides substantially reduced arc flash hazard. There still is a way to have a phase to phase arcing ground fault but such a fault almost always branches to ground which would trip ground fault protection that is set for 10 amperes or less.

A company in Pennsylvania named Bender does this technology up to 4,160 volts resistance grounded. Bender has been advertising in the online e-mail newsletter from Electrical Construction and Maintenance magazine. A company in West Virginia named Service Machine Corporation does this technology up to 13,800 volts resistance grounded. There really is such a thing as a 400 ampere 13,800 volt extension cord that is electrocution proof and fire proof and as safe as breakfast food as long as nobody runs over it with a mining machine. But then, you could choke on your breakfast food.

c. The present generation of ground fault/ground check relays are not listed for use on solidly grounded electrical systems but that problem can be fudged using a fused communication protector block. This gives a way to do a simpler power system for machines in areas where cords are not abused or subject to moisture that could lead to electrocution.

Panel Meeting Action: Reject
Panel Statement: The submitter's concept that an adjustable relay of 0.1 to 10 amperes be used as a substitute for GFCI protection at 120 V is technically flawed. The research associated with protection from electrocution is well established, and the panel notes that ground fault currents above 10 mA are above the let-go threshold and currents up to 50 mA induce ventricular fibrillation. Equipment that is leaking current in the ranges stated by the submitter can pose a significant hazard to persons.

In addition, the main requirement is to provide GFCI protection of the 15 and 20 ampere receptacles. The submitter's concept is dependent upon special cord sets (many of which would not be cord and plug connected to a 15 or 20/A receptacle), and there is no way to limit the receptacle to those applications.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-46 Log #940 NEC-P02 **Final Action: Reject**
(210.8(B) Exception No. 2)

Submitter: Robert G. Fahey, City of Evansville
Comment on Proposal No: 2-70
Recommendation: Delete the following text:

~~Exception No. 2: In industrial establishments only, where the conditions of maintenance and supervision ensure that only qualified personnel are involved, GFCI protection shall not be required on receptacles that are limited to use with equipment qualified under an assured equipment grounding conductor program as specified in 590.6(B)(2).~~

Substantiation: I believe the proposed new Exception No. 2 should be omitted from the 2008 NEC. I have inspected industrial plants where the maintenance is, in fact, done by qualified people, but I have not noticed the assured equipment grounding program utilized, most cords used do not have the color coded tape as required by OSHA. I believe the GFCI protection is a better, more assured method of protecting the workers in all facilities, therefore, I believe the qualified personnel in the industrial establishments deserve the same protection as every other person. Leave the safety in the NEC and industrial facilities and take Exception No. 2 to 210.8(B) out of the NEC.
Panel Meeting Action: Reject
Panel Statement: See panel actions and statements on Comments 2-41 and 2-43.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: See my explanation of negative on Comment 2-43.

2-47 Log #1307 NEC-P02 **Final Action: Reject**
(210.8(B) Exception No. 2)

Submitter: Joseph A. Hertel, Safety and Buildings
Comment on Proposal No: 2-70
Recommendation: Delete proposed Exception No. 2.
Substantiation: The Code Panel has done a commendable job in revising this section. Inclusion of the proposed Exception can negate any gains. GFCI technology has proven its worth and to allow other than a protected circuit based on a qualified person or assured grounding program defeats the purpose.

Panel Meeting Action: Reject
Panel Statement: See panel actions and statements on Comments 2-41 and 2-43.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: See my explanation of negative on Comment 2-43.

2-48 Log #14 NEC-P02 **Final Action: Accept**
(210.8(B)(2))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 2-72
Recommendation: The Technical Correlating Committee directs that the Panel reconsider the proposal and correlate with the Panel Action on Proposal 1-36.
This action will be considered by the Panel as a Public Comment.
The Technical Correlating Committee understands that the Panel Action on Proposal 2-73 modifies the Panel Action on this Proposal.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the Technical Correlating Committee to reconsider the proposal and correlate with the action on Proposal 1-36. The panel action on Comment 2-5 accepts Proposal 1-36 and deletes the text of the definition from 210.8(B)(2). See also the panel action on Comment 2-50 that further revises the text of 210.8(B)(2).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-49 Log #15 NEC-P02 **Final Action: Accept**
(210.8(B)(2))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 2-73
Recommendation: The Technical Correlating Committee directs that the Panel reconsider the proposal and correlate with the Panel Action on Proposal 1-36.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the Technical Correlating Committee to reconsider the proposal and correlate with the action on Proposal 1-36. The panel action on Comment 2-5 accepts Proposal 1-36 and deletes the text of the definition from 210.8(B)(2). See also the panel action on Comment 2-50 that further revises the text of 210.8(B)(2).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-50 Log #1357 NEC-P02 **Final Action: Accept in Principle**
(210.8(B)(2))

Submitter: Michael P. O'Quinn, MOGO Enterprises, Inc.
Comment on Proposal No: 2-72
Recommendation: Revise text to read as follows:
(B) Other Than Dwelling Units. All 125-volt, single-phase, 15- and 20-ampere receptacles installed in the locations specified in (1) through (5) shall have ground-fault circuit-interrupter protection for personnel:
(1) Bathrooms
(2) ~~Commercial and institutional k~~Kitchens~~—for the purposes of this section, a kitchen is an area with a sink and permanent facilities for food preparation and cooking~~
Substantiation: With the addition of the term kitchen in Article 100: "An area with a sink and permanent facilities for food preparation and cooking" [ROP 1-36], the reminder of the text in 210.8(B)(2) is redundant.
Panel Meeting Action: Accept in Principle
Revise the ROP text of 210.8(B)(2) from "Commercial, institutional, and other nonresidential kitchens" to "Kitchens".
Panel Statement: The panel agrees with utilizing "Kitchens" as the descriptive term. The submitter did not use the text from the ROP revision in the recommendation. The deletion of the specific types of kitchens is appropriate due to the ROP action on Proposal 2-73.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-51 Log #811 NEC-P02 **Final Action: Reject**
(210.8(B)(3))

Submitter: Ray C. Mullin, Ray C. Mullin Books
Comment on Proposal No: 2-70
Recommendation: This is an editorial comment.
Delete: ~~(3) Rooftops~~
Move present (4) to become (3).
Substantiation: We continue to try to make the NEC more "user friendly".
I propose to delete (3) since to my knowledge, all rooftops are located outdoors, (3) Rooftops is redundant.
Panel Meeting Action: Reject
Panel Statement: The panel does not accept the deletion of "rooftops" since there may be receptacles serving the rooftop but the receptacle itself is not located outdoors.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-52 Log #16 NEC-P02 **Final Action: Accept**
(210.8(B)(4))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 2-79
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered since the acceptance of two other proposals is not a technical reason for rejecting this proposal in accordance with the 4.3.5.1 of the NFPA Regulations Governing Committee Projects.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the Technical Correlating Committee to reconsider the proposal. The panel rejects the proposal. The provision for GFCI protection has been extended to all outdoor receptacles through the action on Proposal 2-70. The submitter has not substantiated exempting receptacles in spaces over the 10 ft particularly since those receptacles could still be supplying equipment that is accessible to the public.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-53 Log #17 NEC-P02 **Final Action: Accept**
(210.8(B)(4))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 2-80
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered since the acceptance of two other proposals is not a technical reason for rejecting this proposal in accordance with the 4.3.5.1 of the NFPA Regulations Governing Committee Projects.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the Technical Correlating Committee to reconsider the proposal. The panel continues to reject the proposal. The panel has expanded the requirement for GFCI protection to all outdoor receptacles. With this expansion, the concern of the submitter, related to clarifying public access, is addressed.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-54 Log #1032 NEC-P02 **Final Action: Accept in Principle**
(210.8(B)(5) (New))

Submitter: Philip Kercher, Sacred Heart Medical Center
Comment on Proposal No: 2-81
Recommendation: I am opposed to this proposed new text which would require GFCI outlets within 6 ft of sinks. As a Healthcare Facility Manager for 24 years, my experience indicates increasing the distance is unnecessary.
Substantiation: Strongly opposed to the proposal.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 2-57.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-55 Log #2102 NEC-P02 **Final Action: Accept in Principle**
(210.8(B)(5) (New))

Submitter: Stephen J. Grose, The Washington State Society for Healthcare Engineering
Comment on Proposal No: 2-81
Recommendation: Add an Exception to proposed (5) to read:
In patient care areas of health care facilities. (See Article 517 for the definition).
Substantiation: Best practices for healthcare infection control and current code requires hand washing sinks be located in the patient room. The closer to the point of use the more frequently the sink will be used. This requirement would cause healthcare organizations to place GFCI's on their emergency outlets. Placing an electromechanical device in-line with emergency power prior to the point of equipment use only compounds the probability of device failure and adds one more successive check in and emergency. If the healthcare organization was to design the room with the hand sink out of the way then the staff would be less likely to utilize the sink as frequently. I would challenge the NFPA to review the relative risk from patient room water hazard and compare the data to GFCI failure ratios and the spread of hospital acquired infection due to poor hand hygiene standards. The results will become self evident. This exception applies to new item (5) only and would not apply to patient bathrooms.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 2-57.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-56 Log #2114 NEC-P02 **Final Action: Reject**
(210.8(B)(5) (New))

Submitter: Nate Schoff, York, ME
Comment on Proposal No: 2-81
Recommendation: Add:
(5) Laundry, utility, and wet bar sinks - where the receptacles are installed with 6 ft of the outside edge of the sink.
Substantiation: Number 6 should be added because the risk of electrical shock around water still exits in this situation regardless of if it is in or outside of a dwelling unit.
Panel Meeting Action: Reject
Panel Statement: The submitter's recommendation is unclear. The recommended language is from the ROP text, but the substantiation indicates that a "Number 6" should be added.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-57 Log #796 NEC-P02 **Final Action: Accept in Principle**
(210.8(B)(5) Exception (New))

TCC Action: The Technical Correlating Committee directs that the new Exception added in the panel action be identified as "Exception No. 2 to (5)" to correlate with the Technical Correlating Committee action on Comment 2-44.
Submitter: Douglas S. Erickson, American Society for Healthcare Engineering (ASHE)
Comment on Proposal No: 2-81
Recommendation: Add an exception to proposed (5). In patient care areas of health care facilities. (See Article 517 for definition).
Substantiation: Handwashing sinks are typically located within 6 ft of the patient bed, exam table, gurney location, or treatment facility and this new language would require receptacles serving patient care life support, monitoring, and other portable patient care equipment to be on GFCI. The risk to a patient's life and/or the treatment being rendered could be severely jeopardized by having an interruption of electrical power.
Sinks for clinical staff handwashing are required in all patient rooms, treatment rooms and areas, and exam facilities by federal, state and local standards.
This exception applies to new item (5) only and would not apply to patient bathrooms.
Panel Meeting Action: Accept in Principle
Add a new Exception No. 2 to 210.8(B)(5) of the ROP text to read:
"Exception: For receptacles located in patient care areas of health care facilities, other than those covered under 210.8(B)(1), GFCI protection shall not be required."
Panel Statement: The panel has added an exception for receptacles in patient care areas of health care facilities, but has provided wording that receptacles considered to be part of the bathroom area under 210.8(B)(1) are still required to be GFCI protected. This exception addresses the submitter's concern that receptacles at the bedside that may be supplying critical equipment not be included in the requirement for GFCI protection within 6 ft of the sink.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-58 Log #1475 NEC-P02 **Final Action: Accept in Principle**
(210.8(B)(5) Exception (New))

Submitter: Chad E. Beebe, Washington State Department of Health / Rep. NFPA HCS Codes & Standards Review Committee
Comment on Proposal No: 2-81
Recommendation: Add an exception to (5) - In patient care areas of health care facilities. (See Article 517 for definition).
Substantiation: Handwashng sinks are typically located within 6 feet of the patient bed, exam table, gurney location, or treatment facility and this new language would require receptacles serving patient care life support, monitoring, and other portable patient care equipment to be on GFCI. The risk to a patient's life and/or the treatment being rendered could be severely jeopardized by having an interruption of electrical power. Sinks for clinical staff handwashing are required in all patient rooms, treatment rooms and areas, and exam facilities by federal, state and local standards. This exception applies to new item (5) only and would not apply to patient bathrooms.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 2-57.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-59 Log #2146 NEC-P02 **Final Action: Accept in Principle**
(210.8(B)(5) Exception (New))

Submitter: Matthew Campbell, Washington State Department of Health: Construction Review Services
Comment on Proposal No: 2-81
Recommendation: Add an Exception proposed (5) to read:
In patient care areas of health care facilities. (See Article 517 for the definition).
Substantiation: Handwashing sinks are typically located within 6 ft of the patient bed, exam table, gurney location, or treatment facility and this new language would require receptacles serving patient care life support, monitoring, and other portable patient care equipment to be on GFCI. The risk to a patient's life and/or the treatment being rendered could be severely jeopardized by having an interruption of electrical power. Sinks for clinical staff handwashing are required in all patient rooms, treatment rooms and areas, and exam facilities by federal, state and local standards.
This Exception applies to new item (5) only and would not apply to patient bathrooms.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 2-57.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-60 Log #2164 NEC-P02 **Final Action: Accept in Principle**
(210.8(B)(5) Exception (New))

Submitter: Susan B. McLaughlin, SBM Consulting, Ltd. / Rep. NFPA Health Care Section Executive Board
Comment on Proposal No: 2-81
Recommendation: Add an Exception to proposed (5) to read as follows:
In patient care areas of health care facilities. (See Article 517 for the definition.)
Substantiation: Handwashing sinks are typically located within 6 ft of the patient bed, exam table, gurney location, or treatment facility and this new language would require receptacles serving patient care life support, monitoring, and other portable patient care equipment to be on GFCI. The risk to a patient's life and/or the treatment being rendered could be severely jeopardized by having an interruption of electrical power.
Sinks for clinical staff handwashing are required in all patient rooms, treatment rooms and areas, and exam facilities by federal, state and local standards.
This exception applies to new item (5) only and would not apply to patient bathrooms.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 2-57.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-61 Log #2134 NEC-P02 **Final Action: Reject**
(210.8(B)(6))

Submitter: Geoffrey Wood, Hampton, NH
Comment on Proposal No: 2-81
Recommendation: Add new text to read as follows:
Janitorial, Services and Utility Closets. For the purpose of this section a janitorial service or utility closet, is a closet which contains a floor level mop basin (slop sink) wall mounted mop basin or any other basin.
Substantiation: I think you should have to put a GFCI in janitorial closets or utility closets. The potential for electrical shock is the same as if you were in a kitchen or bathroom, etc. They should be treated the same.
Panel Meeting Action: Reject
Panel Statement: The provisions described by the submitter are already covered in the requirement for 210.8(B)(5) that receptacles within 6 ft. of a sink be GFCI protected. This would include sinks in janitorial closets.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-62 Log #1887 NEC-P02 **Final Action: Reject**
(210.8(D) (New))

Submitter: Paul S. Hamer, Richmond, CA
Comment on Proposal No: 2-88
Recommendation: This proposal (and its companion Proposals 2-6, 2-285, 11-48 and 11-49 - Comments submitted separately) should be accepted. Add to the end of the proposed wording: This requirement shall become effective January 1, 2011. This aligns with Mr. Weber's Explanation of Negative for Proposal 2-88 regarding the development of new, life-saving concepts. Adding the delayed effective date would provide the incentive and the necessary time for the Three-Phase Ground-Fault Circuit-Interrupter System (GFCIS-3Ph) to be further developed and commercialized.
Substantiation: The Panel Statement includes "...The submitter's substantiation notes that the hazard is when unqualified persons work on equipment without taking the appropriate precautions to deenergize the circuit and verify that circuit is disconnected...". There are numerous instances where unqualified persons were electrocuted by faulty or defective equipment (see the supporting material submitted with the proposals), and these people may have been protected from electrocution by the proposed GFCIS-3Ph. See also the Explanation of Negatives of Mr. King and Mr. Weber for this Proposal. The patent applications are pending for the GFCIS-3Ph as of this date, but further field measurements made since the Proposal submittal date indicate that the distributed phase capacitances on an actual installed three-phase 480 volt power system are balanced enough to permit the sensitivity described in the proposals.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees that there is sufficient substantiation for supporting a mandatory requirement for GFCI protection of 277V lighting systems. The submitter's substantiation pointed to the material submitted with the original proposal. In reviewing the data, it is evident that well over 90% of the instances cited are related to improper work practice and work on energized equipment. In a significant number of those instances, the revision to the NEC for a disconnect on each luminaire [as required by 410.73(G)] will resolve the issue. There are also a number of instances cited that do not necessarily fit the submitter's claim relative to 277 V lighting. These include ungrounded 480V luminaires and circuits that may not even be lighting related. The panel also expresses concern that the submitter's approach to the code language is focused on a proprietary system, which may not be the only solution to the problem if one is substantiated.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: The life saving benefits of this new technology warrants further review by panel 2. Although the Panel assessment of the submitter's data may be that over 90% of the instances were related to improper work practices, the Panel needs to recognize that the implementation of this technology would have prevented many of the incidences sited. There are many factors which contribute to the alarming statistics of electric shocks and electrocutions involving 277/480 volt systems. Some electric shocks are a result of human error but the fact remains that these incidences occur at a rate that is unacceptable. The ability to significantly reduce the number of electrical shocks on 277/480 volt systems should be the focus of Panel 2. Panel support for the advancement of this technology would be a positive step to providing a much safer working environment for all who work in the electrical industry.

2-63 Log #1899 NEC-P02 **Final Action: Accept**
(210.9 Exception No. 2)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-89
Recommendation: Continue to reject the proposal.
Substantiation: As the submitter of the series of proposals and comments over several cycles that finally inserted this exception into the NEC, I thought some historical background was in order. I did a great deal of my initial trade work in a number of heavy industrial occupancies, all of whom were running at 600V ungrounded. It was common practice to bring in machinery rated for 480 volts, and I would be assigned the task of wiring it. I quickly discovered that there were no 600V/480V two-winding transformers commercially available. However, a 480V/120V two-winding transformer connected as an autotransformer worked very well, and saved the enormous expense and labor involved in the only alternative, two sets of two-winding transformers. Since the potential hazard in this situation consists of the equipment running at some voltage to ground greater than 480V but in this case not much more, not over 600V, and since that is well within the equipment parameters, the code making panel made a reasonable assessment and allowed it to go forward. It should continue until and unless the industry is willing to make two-winding transformers available for this duty.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: Section 210.9 Exception No. 2 allows for an installation practice at a reduced level of safety than what the general rule permits. The submitter of the original proposal is concerned with the absence of prescriptive requirements that ensure that a qualified person will always be present where this exception is applied. The submitter of this comment has not addressed that concern. Nor has he substantiated that an equivalent level of safety is afforded with the implementation of this exception. Panel 2 should require clear and complete prescriptive requirements for the authority having jurisdiction to follow when allowing an exception of this type to be applied.

2-64 Log #2105 NEC-P02 **Final Action: Reject**
(210.9 Exception No. 2)

Submitter: Charles M. Trout, Maron Electric Co. Inc.
Comment on Proposal No: 2-90
Recommendation: This Proposal should be Accepted.
Substantiation: This exception is a performance requirement. The NEC is a prescriptive document. The panel statement leaves the prescriptive requirements up to the authority having jurisdiction. The requirements of the Code should be expressly defined and not left up to the discretion of the AHJ.
Panel Meeting Action: Reject
Panel Statement: The exception language is specific to allow a particular arrangmenent under specified conditions of maintenance and supervision. The panel reiterates its statement that the authority having jurisdiction has the responsibility to evaluate whether persons responsible for the supervision and maintenance are qualified before permitting such installations. This is no different from determining whether the applicability of other provisions of the code use similar limitations.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: This Comment should have been accepted. See my explanation of negative on Comment 2-63.
Comment on Affirmative:
BROWN, L.: 1: The device installed in dwelling units to announce the presence of smoke and a possible fire situation is called a "smoke alarm". They can be ei
ther the single-station or multi-station type.
2: NEC Code Making Panel 2, nor any Panel of the NEC (NFPA 70), has jurisdiction over the installation of fire notification equipment in any occupancy of a standard developed by NFPA. That is the responsibility of the occupancy Technical Committees of NFPA 101, Life Safety Code. A proposed change of this type should be submitted to the Technical Committee on Residential Occupancies.

2-65 Log #509 NEC-P02 **Final Action: Reject**
(210.11(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-93
Recommendation: Accept the proposal revised:

Where the load is calculated on a volt/ampere per square meter or square ft basis, the wiring system up to and including the branch circuit ~~panelboard~~ overcurrent device(s) shall be provided to serve not less than the calculated load. The load shall be evenly proportioned ~~among multioutlet branch circuits in the panelboard~~ as much as practical between the ungrounded feeder and service conductors where the feeder or service conductors consist of two or more ungrounded conductors. ~~Branch circuit overcurrent devices and circuits shall only be required to serve the connected load.~~

Substantiation: Panel statement that "panelboard" is correct infers that a single individual fused switch or circuit breaker cannot supply a branch circuit. Reference to feeder and service conductors is not inappropriate since the first sentence "The wiring system up to and including the branch circuit panelboard" certainly includes any feeder or service conductors. "Connected" load is not defined; the first sentence indicates the system (including overcurrent devices) shall serve the calculated load; the last sentence only requires overcurrent devices and circuits for a connected load which infers a difference. This is a superfluous requirement since if there is a connected or calculated load to be supplied it inherently requires overcurrent devices and circuits. Requiring the load (sq ft area) to be evenly apportioned among multioutlet circuits precludes installation of a 20-ampere circuit to serve an 800 sq. ft area (2400 va) and a 15-ampere circuit from serving a 600 sq. ft area (1500 va) since the calculated load is not evenly proportioned. It also precludes a circuit supplying two or more outlets in close proximity for a limited area at a computer desk or entertainment center unless all other circuits supply an equal area (load). I don't believe the Code elsewhere requires balanced loads between branch circuits; what purpose does it serve? Balanced loads on branch circuits are not relevant. Each circuit may serve a maximum sq. ft area or less than the maximum sq ft area. Present wording requires each circuit to serve an equally proportioned load (sq ft area) which requires equal circuit ratings. Balanced loads of branch circuits are relevant to feeder and service conductors that consist of more than two conductors but not when the feeder or service is two-wire.
Panel Meeting Action: Reject
Panel Statement: The submitter is attempting to change the entire intent of the section. The objective of 210.11(B) is to make sure that the load that is calculated on a VA/sq ft basis is evenly proportioned among the branch circuits used to supply that load. The submitter is attempting to change the provision to a requirement to simply "balance the load" among the phase or line conductors. The purpose is to balance the load among the multi-outlet branch circuits that supply the VA/sq ft load.

The term "branch circuit panelboard" was included in the 1981 NEC. In the context of applying the requirement among multioutlet branch circuits, the reference to a panelboard is correct.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-66 Log #441 NEC-P02 **Final Action: Reject**
(210.11(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-101
Recommendation: Accept proposal.
Substantiation: The panel cited several code sections which are exactly the basis for the proposal. Many hair blow dryers and portable electric heaters have current (wattage) ratings that exceed 80 percent of a 15 ampere rated multiple receptacle, but are factory equipped with a 15 ampere plug and listed. Apparently, testing agencies conclude a 15 ampere receptacle is rated to carry 15 amperes.
Panel Meeting Action: Reject
Panel Statement: The panel has been clear in its statements regarding load limitations on cord caps and multioutlet branch circuits. The panel has no control over a testing agency's "conclusions." There are far more appliances in compliance with the limitations that are used in bathrooms and as such the provision to have a 15 or 20 A receptacle is acceptable.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-67 Log #1117 NEC-P02 **Final Action: Reject**
(210.11(C)(2))

Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 2-96
Recommendation: Reconsider and accept the proposal.
Substantiation: More and more we are seeing laundry SPACES, not laundry ROOMS, these spaces are often just alcoves along a wall and the laundry appliances occupy the entire space. There is no reason torequire a 120V laundry circuit for this SPACE. If it was a ROOM as indicated on the plans the receptacle would continue to make sense.

For example, if an electric range is installed there is no NEC requirement that a 120V receptacle to be provided in the range space for a FUTURE gas range, so if the laundry equipment is the 240V type, why must we have a different rule? Let's be consistent.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees with the submitter that the rules are inconsistent. There is no limitation in the proposal that only a stacked washer/dryer would be used. As the occupant of the premises changes, it is common to move the laundry equipment and as such the requirement for the laundry circuit is appropriate. The comparison to a range is incorrect since the range is generally not moved from one location to another.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-68 Log #1687 NEC-P02 **Final Action: Reject**
(210.11(C)(3))

Submitter: Christopher Couillard, Rochester, NH
Comment on Proposal No: 2-102
Recommendation: Revise as follows:

Such circuits shall supply no more than two bathrooms and shall have no other outlets.

Substantiation: The comment of affirmative written by Brown, L. states that if there is a problem with overcurrent devices tripping, then the builders shall address the situation. Why do we have codes such as 230.79(C)? If this code was left up to the home builders, they could take the cheap way out and put in smaller services that would just meet requirements. With the high potential of overloading the bathroom circuit, it should not be left up to the home builder.
Panel Meeting Action: Reject
Panel Statement: The current language reflects the minimum intended requirement. The submitter expresses a concern with loading, but even two bathrooms would result in the same concern if multiple pieces of equipment were used at once. The current rules provide a balance that accomplishes the objective of reasonable capacity under the majority of circumstances.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

KING, D.: I disagree with the Panel that "the current rules provide a balance that accomplishes the objective of reasonable capacity under the majority of circumstances." Discussion held during the ROC meeting determined that the Panel has recognized that there is a problem with circuit loading in dwelling unit bathrooms. The Panel has acted to address this problem with the addition of subdivision (3) in the 1999 code to require a 20 ampere circuit for bathrooms. A better balance as is desired by the panel would be achieved by accepting this comment.

2-69 Log #804 NEC-P02 **Final Action: Reject**
(210.11(C)(4))

Submitter: John Kincaid, Systimax Solutions
Comment on Proposal No: 2-104
Recommendation: Accept this proposal in principle in part by accepting the following text:

210.11(C)(4). Communications Branch Circuits. In newly constructed one-family dwellings, other than a home covered by Article 550, with over 3000 square feet of habitable living space, at least one 15-ampere branch circuit shall be provided to supply power for communications circuits. An outlet shall be provided within 6 feet of the point of entrance or anticipated point of entrance of the optical fiber cable (Article 770) or communications cable (Article 800) cable or CATV coaxial cable (Article 820).

FPN No. 1: See 770.2 for the definition of point of entrance of optical fiber cable.

FPN No. 2: See 800.2 for the definition of point of entrance of communications cable.

FPN No. 3: See 820.2 for the definition of point of entrance of CATV coaxial cable.

Substantiation: We agree with the panel statement concerning all dwelling units. While traditional telephone services have been network-powered, many new homes are "wired" with optical fiber cable which has no provision for powering. This new service is primarily offered in new subdivisions of upscale housing.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree with adding a communications circuit that will, in the majority of cases, not be applicable. If the home is being wired with optical fiber, it is up to the communications installer to ensure that appropriate power is available for the installed system.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: This Comment should be given further consideration by Panel 2. At a minimum the Panel should require a 15 ampere communication branch circuit to be installed within 6 feet of the entrance to a dwelling where non-network powered communication systems are installed regardless of the square footage of the structure. This could have been accomplished by accepting this Comment in Principal in Part and revising the first sentence to read as follows: 210.11(C)(4) Communications Branch Circuits. In newly constructed one-family dwellings, at least one 15-ampere branch circuit shall be provided to supply power for non-network powered communications circuits.
This minimum requirement would eliminate the use of extension cords to supply power for non-network powered Communications systems.

2-70 Log #1770 NEC-P02 **Final Action: Reject**
(210.11(C)(4))

Submitter: Robert W. Jensen, dbi
Comment on Proposal No: 2-104
Recommendation: Accept this proposal in principle in part by accepting the following text:

210.11(C)(4). Communications Branch Circuits. In newly constructed one-family dwellings, other than a home covered by Article 550, an indoor receptacle(s) on a 15-ampere dedicated branch circuit shall be provided within 6 feet of the communications point of entrance or anticipated point of entrance.

FPN No. 1: See 770.2 for the definition of point of entrance of optical fiber cable.
FPN No. 2: See 800.2 for the definition of point of entrance of communications cable.
FPN No. 3: See 820.2 for the definition of point of entrance of CATV coaxial cable.

Substantiation: This comment only affects newly constructed one-family dwelling units. Telephone systems are used for emergency services such as a call for police, fire or rescue squad. Traditional telephone services are networked powered. Today, telephone services are also delivered via coaxial systems and optical fiber systems which require local power.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Proposal 2-69. In addition, the submitter's substantiation that the systems are used for emergency services is not relevant, because the installation of the circuit does not change whether or not the system is used. If the system is going to be installed at time of construction, a circuit can be installed to power the system. If the system is installed after the home is constructed, the circuit would be installed as required at that time.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: See explanation of negative on Comment 2-69.

2-71 Log #330 NEC-P02 **Final Action: Reject**
(210.12)

Submitter: Joe Tedesco, Boston, MA
Comment on Proposal No: 2-119
Recommendation: Continue to accept the following Proposals 2-119, 105, 142, 111, 118a, 143, 147, and 137.
Substantiation: Consumer Product Safety Commission
Preventing Home Fires: Arc Fault Circuit Interrupters (AFCIs)
Problems in home wiring, like arcing and sparking, are associated with more than 40,000 home fires each year. These fires claim over 350 lives and injure 1,400 victims annually.
A new electrical safety device for homes, called an arc fault circuit interrupter or AFCI, is expected to provide enhanced protection from fires resulting from these unsafe home wiring conditions.
Typical household fuses and circuit breakers do not respond to early arcing and sparking conditions in home wiring. By the time a fuse or circuit breaker opens a circuit to defuse these conditions, a fire may already have begun.
Several years ago, a CPSC study identified arc fault detection as a promising new technology. Since then, CPSC electrical engineers have tested the new AFCIs on the market and found these products to be effective.
Requiring AFCIs
AFCIs are already recognized for their effectiveness in preventing fires. The most recent edition of the National Electrical Code, the widely-adopted model code for electrical wiring, will require AFCIs for bedroom circuits in new residential construction, effective January 2002.
Future editions of the code, which is updated every three years, could expand coverage.
AFCIs vs. GFCIs
AFCIs should not be confused with ground fault circuit interrupters or GFCIs. The popular GFCI devices are designed to provide protection from the serious consequences of electric shock.
While both AFCIs and GFCIs are important safety devices, they have different functions. AFCIs are intended to address fire hazards; GFCIs address shock hazards. Combination devices that include both AFCI and GFCI protection in one unit will become available soon.
AFCIs can be installed in any 15 or 20-ampere branch circuit in homes today and are currently available as circuit breakers with built-in AFCI features. In the near future, other types of devices with AFCI protection will be available.
Should You Install AFCIs?
You may want to consider adding AFCI protection for both new and existing homes. Older homes with ordinary circuit breakers especially may benefit from the added protection against the arcing faults that can occur in aging wiring systems.
For more information about AFCIs, contact an electrical supply store, an electrician, or the manufacturer of the circuit breakers already installed in your home. Sometimes these components can be replaced with AFCIs in the existing electrical panel box.
Be sure to have a qualified electrician install AFCIs; do not attempt this work yourself. The installation involves working within electrical panel boxes that are usually electrically live, even with the main circuit breakers turned off.
This document is in the public domain. It may be reproduced without change in part or whole by an individual or organization without permission. If it is reproduced, however, the Commission would appreciate knowing how it is used. Write the U.S. Consumer Product Safety Commission, Office of Information and Public Affairs, 4330 East West Highway, Bethesda, MD 20814 or send an e-mail to info@cpsc.gov.
The U.S. Consumer Product Safety Commission is charged with protecting the public from unreasonable risks of serious injury or death from more than 15,000 types of consumer products under the agency's jurisdiction. Deaths, injuries and property damage from consumer product incidents cost the nation more than $700 billion annually. The CPSC is committed to protecting consumers and families from products that pose a fire, electrical, chemical, or mechanical hazard or can injure children. The CPSC's work to ensure the safety of consumer products - such as toys, cribs, power tools, cigarette lighters, and household chemicals - contributed significantly to the 30 percent decline in the rate of deaths and injuries associated with consumer products over the past 30 years.
CPSC Web site: www.cpsc.gov.
Panel Meeting Action: Reject
Panel Statement: The submitter's recommendation does not relate to specific proposals referenced by the submitter in this comment and violates Section 4.4.5(c) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-72 Log #705 NEC-P02 **Final Action: Reject**
(210.12)

Submitter: Steve Campolo, Leviton Manufacturing Co., Inc.
Comment on Proposal No: 2-105
Recommendation: Panel should reject original proposal as suggested by Mr. Nenninger or set an effective date one full code cycle after commercial availability of combination type AFCI's and hold off expansion.
Substantiation: Mr. Nenninger pointed out that as of 2006, combination devices were not available. Even at this date (10/06) they are not available. The manufacturer indicated that they would be available for widespread use and evaluation long ago; yet they are not. The Panel jumped the gun on combustion AFCIs and AFCI expansion. Give the technology a chance to develop and become acceptable in the field.
Panel Meeting Action: Reject
Panel Statement: The panel action on the original proposal was based on the commercial availability of AFCI devices in January 2008. The submitter of this comment has not provided Code-Making Panel 2 with any data that would indicate that Combination Type AFCI devices will not be commercially available at that time.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
NENNINGER, B.: It is premature to expand the requirement for AFCI technology beyond the bedrooms in dwelling units. The combination type AFCI has only been commercially available since October, 2006. This said, the requirement to expand the use of AFCI's in 2008 is premature as the market

will not have sufficient experience with the newer combination type AFCI technology. It is more appropriate to leave the current code as written and gain experience with the combination type AFCI's in bedrooms only. Based on the outcome of this experience further expansion can be considered for the 2011 code.

PURVIS, R.: Comment 2-72 on Proposal 2-105 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

Comment on Affirmative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-73 Log #1408 NEC-P02 **Final Action: Reject**
(210.12)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 2-105
Recommendation: These proposals to expand the use of an untested (in the field) type of AFCI to all areas of dwelling units should have been rejected. The panel should reconsider the Comments on Negative, especially that by Mr. Nenninger.
Substantiation: Contrary to the statement in Proposal 2-142, the type of AFCI that is being applied here does not "have an excellent track record in the field." As noted in the comment by Mr. Nenninger, these devices have barely touched the market and are not required at all until 2008. Considering the controversy that has surrounded the current AFCI requirement, extending this requirement to most outlets in dwelling units is not likely to be accepted by a large portion of the jurisdictions that adopt and enforce the NEC. This proposal would add (conservatively) at least $600 to $800 to the cost of a small home, probably much more in many cases. The likely outcome if this proposal continues to be accepted is that large numbers of jurisdictions will not adopt the 2008 NEC or they will amend this provision out. Experience with the combination-type devices is needed before their use is expanded so drastically.
Panel Meeting Action: Reject
Panel Statement: The tests in UL1699 confirm the capabilities of AFCIs for arc mitigation and resistance to unwanted tripping. The panel has been provided with information stating that combination AFCIs have been beta tested and have been made commercially available for field installation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-73 on Proposals 2-105 and 2-142 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-74 Log #1759 NEC-P02 **Final Action: Reject**
(210.12)

Submitter: Michael Cole, MRC Electric
Comment on Proposal No: 2-111
Recommendation: Add to Article 590:

Branch circuits that are rated 120 volts or 240 volts or 120/240 volts single phase 10 amperes through 30 amperes on construction sites shall be equipped with arc fault circuit interrupter protection.

Add to both Article 590 and 210.12:

Exception No. b: Oil burning heating equipment, spark ignition gas burning equipment, electrostatic air cleaners, welders, plasma cutters, and other equipment that normally or deliberately produces sparks. For dwellings, exempted branch circuits shall use the combination of metal enclosed wiring and ground fault protection for equipment in place of AFCI protection.

Exception No. c: Permanently installed heating, ventilation, and freeze protection equipment including accessories for heating, ventilation, and air conditioning equipment such as humidifiers and dampers. An indicator light that such equipment is energized shall be included in this exception. For dwellings, exempted branch circuit shall use the combination of metal enclosed wiring and ground fault protection for equipment in place of AFCI protection.

Exception No. c: Sump pumps and other equipment that is vital to protection of property. For dwellings, exempted branch circuits shall use the combination of metal enclosed wiring and ground fault protection for equipment in place of AFCI protection.

Substantiation: a. The next generation of AFCIs are supposed to be more sensitive to arcing faults but I do not see how more sensitive can be compatible with oil burners or electrostatic air cleaners. These types of appliances do not create extra fire hazard because of their sparking. I have an electrostatic air cleaner in my bedroom yet the main problem with using it when trying to sleep is that the low speed for the fan still generates too much noise.

There are also some arc welders and plasma cutters that will run on a 20-amp 120-volt circuit. I do not see how these things can be compatible with AFCI.

The combination of metal enclosed wiring and equipment ground fault protection will provide just as much or even more protection against nail penetrations. There is also NOT a way to prove that the equipment ground fault protection in an AFCI is what is really protecting against nail penetrations particularly those nail penetrations that are creating an arc that is only a few amperes.

b. I can agree with extending AFCI protection to include living rooms, dining rooms, and similar areas where cords can be trapped underneath furniture feet or trampled underfoot. At one rooming house where I lived one of the other tenants kept knocking out the power because he was parking his bar stool on top of extension cords. He was so heavy that he would crunch the hollow metal legs of his barstool right through the rubber feet and then into the extension cord.

This also requires coordination with the manufacturers of bar stools and step stools to the effect that a metal plate needs to be welded to the bottom of hollow metal legs to avoid this kind of problem.

c. Where AFCI protection is also needed is on construction sites as an additional protection against cord cuts, cord pinches, and cord crushing.

d. The cost of additional AFCI protection could bring us back to the days when an upscale suburban house had only 10 120-volt branch circuits. Fewer branch circuits results in heavier loading of each branch circuit resulting in more heat resulting in more net fire hazard. Likewise, people who have older houses could be deterred form having service upgrades and replacements done.

I recently replaced the service cable and meter socket for a single family dwelling where a previous electrician had run aluminum SEU cable from a meter socket with brass terminals to a new service panelboard. Worse, he did not use any antioxidant compound on this work. That was a fire hazard!

e. Ban 16 gauge and 14 gauge junior grade e.g., SJTW consumer grade cords. These things are junk and are a fire hazard if someone hooks up an electric heater to them. 16 gauge and 14 gauge extension cords that are oil resistant industrial grade extra hard usage would still be OK. Those people who want the extra insulation thickness and crush resistance of an SOOWA cord need to trade off some of the copper weight when taking these things up ladders and are the kind of people who know what constitutes an overload.

f. Ban the use of 15-ampere wiring to supply receptacles in dwellings. This would save on extra heat generation not to mention that a 1500-watt 120-volt electric heater is theoretically illegal on a 15-ampere branch circuit. About half the jurisdictions (cities) around where I live have banned 15-amp wiring.

g. An uninterruptible power supply nullifies AFCI protection. If we are going to connect a secondary power supply such as a UPS to a smoke alarm circuit, why even have the AFCI upstream?

h. 240-volt outlets all over the house might get to be popular. Theoretically, a 1500-watt comfort heater that is cord and plug connected can be 240 volts in a dwelling but there is no AFCI requirement. Theoretically, a fixed electric heater in a dwelling can be 277 volts!

i. Connecting a furnace or a sump pump to an AFCI could create a flood. Likewise for antifreeze tapes for water and sewer pipe. There is not a whole lot of evidence that these kind of appliances will present the kind of hazard where an AFCI would provide additional protection. The antifreeze tapes that have a grounded shield and are self regulating have an excellent safety record, particularly when equipment ground fault protection or GFCI protection for people is used. When furnaces go bad they either short circuit, stop working, or release carbon monoxide into the air. When sump pumps go bad they either short circuit or stop working. For both furnaces and sump pumps an AFCI would not provide worthwhile additional protection for the appliance.

j. Has anybody tested AFCIs for compatibility with OLD refrigerators or any other old equipment? Some of these things have a life of 40 years yet can have goofy characteristics. Old refrigerators tend to trip GFCI receptacles because among other things the motor insulation is rather cheap. There are also instances where when the starting switch of a cheap split phase motor opens the circuit inductance forces a phantom ground fault to flow through the insulation capacitance ground which trips a GFCI or AFCI. Since the motor runs fine on a standard circuit breaker the problem cannot be inrush or locked rotor current but rather the transient response during the starting sequence.
Panel Meeting Action: Reject
Panel Statement: Listed AFCI devices are evaluated for unwanted tripping per UL 1699. The submitter has not provided any substantiation that the equipment noted is incompatible with AFC's. The panel also notes that the recommended change to Article 590 is not under the jurisdiction of this panel.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-75 Log #1760 NEC-P02 **Final Action: Reject**
(210.12)

Submitter: Michael Cole, MRC Electric
Comment on Proposal No: 2-132
Recommendation: Extending AFCI protection to more branch circuits needs to be done with caution. Panelboard stuffing could create fires!

Also add to the proposal offered by Mr. John Fiorello:

Maybe this should be placed elsewhere in the NEC but here it is:

No more than 12 AFCI or GFCI circuit breakers shall be installed in a panelboard that is less than 457 mm (18 in.) wide.

Substantiation:

a. This and similar proposals could cause residential panelboards to catch on fire. The first problem is that AFCI and GFCI circuit breakers approximately double or triple the number of wires in the panelboard gutter(s). Unlike column width panelboards in factories, residential panelboards are sometimes surrounded on 1, 4, or 5 sides by thermal insulation or thermal insulation that is used for soundproofing purposes. Some residential panelboards are not surrounded by thermal insulation but have heat dissipation problems because there is a wooden door over the panelboard that restricts air circulation.

I am not trying to be a smart alec, I am just trying to point out a potential gotcha.

The reason why this has not occurred with GFCI circuit breakers is that GFCI receptacles are cheaper which limits the use of GFCI circuit breakers to instances where light switches, swimming pool pumps, and so forth need protection.

The reason why this problem has not occurred with equipment ground fault protection for roof deicing systems is that EGFP circuit breakers need to be located close to the start of the roof deicing tapes to reduce nuisance tripping. Also, in large buildings it is more effective and economical to control voltage drop by using oversized feeder wires and smaller panelboards located more frequently than to use oversized branch circuit wires.

The present generation of 14 in. wide residential panelboards needs to be investigated for heat generation and cold flow of electrical insulation when 20 or 30 AFCI circuit breakers are stuffed into a panelboard.

In the case of Seimens, AFCI circuit breakers, the circuit breaker extends a short extra distance into the wiring gutter so as to cover the neutral terminals. This is a potential installation and maintenance headache.

Even worse, Square D AFCI circuit breakers stick an extra 1.5 in. into the wiring gutter which makes an overcrowded situation worse. Sticking 4 SquareD Q0115AFI circuit breakers into a 40 slot 14 in. wide created a nightmare with one installation. This was even though the electric cooking and clothes dryer circuit went out the bottom of the panelboard that I installed and into a separate wireway which contained current transformers and current relays for demand management.

There are some solutions to this. One of them would be panelboards and circuit breakers that connect to the neutral bus without a neutral pigtail but rather with an extra jaw on the back of the circuit breaker. Besides AFCI and GFCI circuit breakers such a panelboard would be more practical for neutral switching circuit breakers that supply circuits in areas that have hazardous atmospheres.

Panel Meeting Action: Reject
Panel Statement: The submitter has not provided the panel with adequate technical data to support his recommendation. The panelboards are designed to accept a full complement of circuit breakers, including AFCI and GFCI circuit breakers without creating an overheating condition. With regard to the gutter space, the requirements of Article 312 continue to apply.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-76 Log #1761 NEC-P02 **Final Action: Reject**
(210.12)

Submitter: Michael Cole, MRC Electric
Comment on Proposal No: 2-142
Recommendation: Add to Article 240:

Arc Fault Circuit Interrupter, Ground Fault Circuit Interrupter, and Equipment Ground Fault Protection Circuit Breakers. Branch circuit breakers that provide arc fault circuit interrupter protection, GFCI protection for people, and/or equipment ground fault protection shall provide separate indication of arc fault trip and separate indication of ground fault trip from the trip indication for overloads and short circuits. The indication shall be a display of a number, illumination of different color light emitting diodes, or the number of blinks of a light emitting diode and such indication shall be standardized for all manufacturers. Such circuit breakers shall be permitted to have a universal serial bus port for uploading current and voltage data during the period immediately prior to the trip provided that such a port can only be accessed by removing the circuit breaker.

Substantiation: a. An indicator as to trip initiation for AFCI, GFCI, and EGFP (Equipment Ground Fault Protection) circuit breakers will aid troubleshooting and prove or disprove that AFCI protection is providing any useful protection. For instance, the equipment ground fault protection that is built into an AFCI is probably what is sensing and disconnecting nail penetrations particularly those nail penetrations that draw only a few amperes.

b. A suggested standardization for a numeric display or the number of blinks of a light emitting diode would be:

1. for overload trip or optionally overload or short circuit trip,
2. optionally for short circuit trip,
3. for ground fault trip that is not a short circuit,
4. for arc fault trip,
5. for short circuit level ground fault,
6. tripped by means of the test button,
7. circuit breaker needs to be replaced, and 8. and 9. reserved for future use

There is no reason why these electronic devices cannot be made just a little smarter which will help us troubleshoot electrical problems.

c. One problem that some of my buddies have encountered is that when a load is turned off or when the starting switch of a 120 volt single phase motor cuts off the starting winding, a GFCI or AFCI will nuisance trip. What causes this is that circuit inductance forces a phantom ground fault to flow through the insulation capacitance to ground. Since 120 volt single phase split phase motors are built as cheaply as possible, the windings will have more than their fair share of insulation capacitance to ground. If say 0.16 percent of the starting current of a 1/2 horsepower 120 volt split phase motor diverts into the motor frame when the starting switch opens, an AFCI will read that as a ground fault and trip. This is particularly so when motors are old and very little if any compatibility testing has been done using OLD electrical equipment.

For GFCI protection, the problem is much worse. In one instance, a fellow electrical contractor had a commercial bathroom light wired to a GFCI receptacle for extra safety and the wiring method was EMT or Type MC cable. Every once in a while when the light was turned off the GFCI receptacle would nuisance trip. Wiring capacitance that is upstream of the GFCI, particularly the neutral wire capacitance, contributes to this and certain magic circuit lengths are more troublesome. The problem is not with steady state capacitance but with transient response to ballast inductance and wiring capacitance.

d. I am also suspicious that some people play with the test button of a GFCI receptacle or even deliberately plug themselves in just to see if it will stop them from being electrocuted.

Panel Meeting Action: Reject
Panel Statement: The submitter's recommendation is a product feature that does not directly enhance performance or safety. The substantiation is also anecdotal in nature and lacks the necessary technical data to support his recommendation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-77 Log #1763 NEC-P02 **Final Action: Reject**
(210.12)

Submitter: Michael Cole, MRC Electric
Comment on Proposal No: 2-142
Recommendation: Add the following text:

Rooms that have 1 or more lighting circuits including switched and nonswitched receptacles and fixed lighting that are supplied by AFCI or GFCI devices shall have 1 or more emergency lights arranged so that failure of any circuit will activate the emergency lights. Interposing relays for 1 emergency luminaire or individual emergency luminaires shall be permitted where there are 2 or more AFCI or GFCI protected lighting circuits in a room. The luminaire shall contain or have attached to it an audible alarm. The receptacles required by 210.11(C) shall not be required to have emergency luminaires, but shall be required to have monitoring for tripping of an AFCI and/or GFCI receptacle, device, or circuit breaker. Where a burglar alarm or fire alarm system is installed, this system shall monitor all AFCI, GFCI or people protection, and ground fault protection for equipment for tripping of such protective devices and shall be permitted to serve as the power failure alarm.

Substantiation:

a. We are forgetting that when an AFCI or GFCI trips, people might need to be evacuated and there needs to be egress lighting. An AFCI trips in response to a possible spark which means that a fire could still be starting - the AFCI only removes an accelerant. An AFCI does NOT prevent a fire, it just prevents the fire from growing. Similarly, a GFCI does not stop you from getting shocked, it only stops the shock from killing.

Therefore, emergency lighting and a power failure alarm is needed for each AFCI protected circuit. This should also be linked into fire alarm and burglar alarm systems. Without a power failure alarm, a small spark could trip an AFCI and start a small fire. Waiting for the fire to get bigger for an alarm to ring is a bit asinine.

b. Something can be said in favor of installing a REAL fire alarm system instead of Mickey Mousing things with 120 volt smoke alarms. These systems can also be combination fire alarm, burglar alarm, furnace failure, flooding, refrigeration failure, and power failure systems.

Panel Meeting Action: Reject

Panel Statement: NFPA 70 does not contain requirements for emergency egress lighting. NFPA 101 addresses emergency egress lighting.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-78 Log #1802 NEC-P02 **Final Action: Reject (210.12)**

Submitter: Michael Walls, American Chemistry Council

Comment on Proposal No: 2-105

Recommendation: The proposal should be rejected at this time, and the installation of AFCI's should be limited to bedrooms only.

Substantiation: The use of combination type AFCI's is already a requirement in 2008. However, they will not be commercially available until the Summer of 2006. This said, the requirement to expand an AFCI product beyond bedrooms to all dwelling unit locations in 2008 is pre-mature as the market will not have sufficient experience with the newer combination type AFCI technology. It is more appropriate to leave the current code as written and gain experience with the combination type AFCI's in bedrooms only. Based on the outcome of this experience further Expansion can be considered for the 2011 code.

Panel Meeting Action: Reject

Panel Statement: See panel statement on Comment 2-73.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 3

Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-78 on Proposal 2-105 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-79 Log #1998 NEC-P02 **Final Action: Reject (210.12)**

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)

Comment on Proposal No: 2-105

Recommendation: Reject the proposal.

Substantiation: Let's get to the bottom line on this matter - There is absolutely no fire data that can be used to support the expansion of AFCIs to all receptacles, let alone the mandatory installation of AFCIs in bedrooms.

Looking at the latest data from NFPA in the report "The U.S. Home Product Report (Appliances and Equipment Involved in Fires)", by John R. Hall, Jr., of the Fire Analysis and Research Division of NFPA dated November 2005, the report shows that the annual average number of home fires is 372,900, with direct property damage of $443,000.000. Of this number 32,000 (or 9% = $39,870,000) of these fires are caused by "electrical distribution equipment." Of that 9%, only 14,500 (or 4% = $17,720,000) of those fires are attributed to "fixed wiring, switches, outlets, and receptacles." And, there is no data or study to support that of these 14,500 fires and the installation of an AFCI device would have prevented the fire.

Using the U.S. Census Bureau data on building permits for 2004 (Table (S-3) Final) shows 1,656,413 one- and two-family dwelling units and 413,664 multifamily units for that year.

There are typically 20 (twenty) 20-volt, single phase, 15- and 20-ampere branch circuits in each one- and two-family dwelling unit, and 10 in each multifamily dwelling unit. Using these numbers, there will be 33,128,260 AFCIs in OTFDs and 4,136,640 for multifamily units, for a total of 37,264,900 AFCIs.

Using a wholesale cost of $34.00 per breaker, marked-up the industry standard percentage of 66 percent, produces a cost per breaker of $56.44 to the homeowner.

In all, the average annual total cost to the public for the mandatory installation of AFCIs will be $2,103,230.956 ($1,267,006,600 wholesale). That is 2 BILLION, 130 MILLION, 230 THOUSAND AND 956 DOLLARS.

Using current fire loss data, society will be spending $2,103,230.956 per year to cover losses of only $39,870,000. That means spending 52 times the amount of money that would be lost if the devices were not installed and that is if the devices work 100% of the time. If you use the losses relating only to "fixed wiring, switches, outlets, and receptacles" (the part of the wiring that is claimed to be protected by AFCI breakers) the ratio to money spent relative to monetary loss ($17,720,000) is 119 times, again, if they work 100% of the time.

In addition to the submitter's substantiation, there is no data to support the contention of a neither "excellent track record", nor information that these "installations have found numerous wiring errors" or "they have found wiring damage and equipment damage that could have been a potential source of fire". That statement alone provides no correlation between the purported problems and the use of AFCIs.

It should also be noted that it appears the method used to certify these devices actually only tests to make sure the device will not cause an electrical shock or fire problem. IT DOES NOT TEST THE DEVICE TO ENSURE IT WILL PREVENT A FIRE CAUSED BY THE MANY SITUATIONS OF ELECTRICAL ARCING THAT COULD CAUSE A FIRE.

IN OTHER WORDS, NO ONE CAN PROVE THESE DEVICES WILL HAVE ANY COST-BENEFIT TO SOCIETY.

The Panel needs to reconsider the mandatory installation of AFCIs, let alone the expansion of requiring these devices for all 120-volt, single phase, 15- and 20-ampere branch circuits in dwelling units. Until true field test data on the efficacy of AFCIs can be directly related to saving society monetary loss there is no cost-benefit in this provision.

Panel Meeting Action: Reject

Panel Statement: The cost benefit analysis included in the submitter's substantiation does not include the benefit of lives saved due to AFCI devices ability to reduce the number of electrically oriented fires. Comparable studies presented to Panel 2 over several code cycles show a positive cost benefit with the use of these devices. The panel disagrees with the submitter of this comment that there are no fire data available to support the requirement for AFCI devices in dwelling units. The portion of the substantiation regarding certification of AFCIs is incorrect, since UL1699, standard for Arc Fault Circuit Interrupters, includes arc detection test sequence.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 3

Explanation of Negative:

BROWN, L.: The Panel's Action to not require AFCI protection only for the receptacles that typically require GFCI protection is backtracking from the Panel Actions and Statements shown in the Report on Proposals (ROP). If they felt the entire house should be protected what relevant fire data changed their minds? Please read NAHB's Ballot Comment 2-95. Calling this a "limited approach to the expansion of AFCI" still results in no cost-benefit for society, it just needlessly increases the costs of housing. No jurisdiction should burden its citizens with this unneeded expense. There was never any fire study or cost-benefit study to support installing these devices only for bedrooms in the 1999 NEC. Since then NO data or study has ever been assembled to support the expansion to the whole house. The fact still remains that home buyers in the U.S. will spend approximately 2 BILLION, 130 MILLION, 230 THOUSAND, and 956 DOLLARS per year to cover losses of only $17,720,000. That is a ratio of 119 times the money spent relative to the monetary loss of $17,720,000. And, that is if the devices work 100 percent of the time. If you break that down by each state, that lack of a cost-benefit becomes apparently clear. All jurisdictions that contemplate adopting the 2008 NEC, especially those jurisdiction that by law must show a cost-benefit in the adoption, should look closely at this cost-benefit fact and not adopt the 2008 NEC until all provisions requiring AFCIs is stricken (Section 210.12).

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-79 on Proposal 2-105 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-80 Log #1999 NEC-P02 **Final Action: Reject (210.12)**

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)

Comment on Proposal No: 2-106

Recommendation: Reject the proposal.

Substantiation: Let's get to the bottom line on this matter - There is absolutely no fire data that can be used to support the expansion of AFCIs to all receptacles, let alone the mandatory installation of AFCIs in bedrooms.

Looking at the latest data from NFPA in the report "The U.S. Home Product Report (Appliances and Equipment Involved in Fires)", by John R. Hall, Jr., of the Fire Analysis and Research Division of NFPA dated November 2005, the report shows that the annual average number of home fires is 372,900, with direct property damage of $443,000.000. Of this number 32,000 (or 9% = $39,870,000) of these fires are caused by "electrical distribution equipment." Of that 9%, only 14,500 (or 4% = $17,720,000) of those fires are attributed to "fixed wiring, switches, outlets, and receptacles." And, there is no data or study to support that of these 14,500 fires and the installation of an AFCI device would have prevented the fire.

Using the U.S. Census Bureau data on building permits for 2004 (Table (S-3) Final) shows 1,656,413 one- and two-family dwelling units and 413,664 multifamily units for that year.

There are typically 20 (twenty) 20-volt, single phase, 15- and 20-ampere branch circuits in each one- and two-family dwelling unit, and 10 in each multifamily dwelling unit. Using these numbers, there will be 33,128,260 AFCIs in OTFDs and 4,136,640 for multifamily units, for a total of 37,264,900 AFCIs.

Using a wholesale cost of $34.00 per breaker, marked-up the industry standard percentage of 66 percent, produces a cost per breaker of $56.44 to the homeowner.

In all, the average annual total cost to the public for the mandatory installation of AFCIs will be $2,103,230.956 ($1,267,006,600 wholesale). That is 2 BILLION, 130 MILLION, 230 THOUSAND AND 956 DOLLARS.

Using current fire loss data, society will be spending $2,103,230.956 per year to cover losses of only $39,870,000. That means spending 52 times the amount of money that would be lost if the devices were not installed and that is if the devices work 100% of the time. If you use the losses relating only to "fixed wiring, switches, outlets, and receptacles" (the part of the wiring that is claimed to be protected by AFCI breakers) the ratio to money spent relative to monetary loss ($17,720,000) is 119 times, again, if they work 100% of the time.

In addition to the submitter's substantiation, there is no data to support the contention of a neither "excellent track record", nor information that these "installations have found numerous wiring errors" or "they have found wiring damage and equipment damage that could have been a potential source of fire". That statement alone provides no correlation between the purported problems and the use of AFCIs.

It should also be noted that it appears the method used to certify these devices actually only tests to make sure the device will not cause an electrical shock or fire problem. IT DOES NOT TEST THE DEVICE TO ENSURE IT WILL PREVENT A FIRE CAUSED BY THE MANY SITUATIONS OF ELECTRICAL ARCING THAT COULD CAUSE A FIRE.

IN OTHER WORDS, NO ONE CAN PROVE THESE DEVICES WILL HAVE ANY COST-BENEFIT TO SOCIETY.

The Panel needs to reconsider the mandatory installation of AFCIs, let alone the expansion of requiring these devices for all 120-volt, single phase, 15- and 20-ampere branch circuits in dwelling units. Until true field test data on the efficacy of AFCIs can be directly related to saving society monetary loss there is no cost-benefit in this provision.

Panel Meeting Action: Reject

Panel Statement: See panel statement on Comment 2-79.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 3

Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-80 on Proposal 2-106 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-81 Log #2001 NEC-P02 **Final Action: Reject (210.12)**

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-111
Recommendation: Reject the proposal.
Substantiation: Let's get to the bottom line on this matter - There is absolutely no fire data that can be used to support the expansion of AFCIs to all receptacles, let alone the mandatory installation of AFCIs in bedrooms.

Looking at the latest data from NFPA in the report "The U.S. Home Product Report (Appliances and Equipment Involved in Fires)", by John R. Hall, Jr., of the Fire Analysis and Research Division of NFPA dated November 2005, the report shows that the annual average number of home fires is 372,900, with direct property damage of $443,000.000. Of this number 32,000 (or 9% = $39,870,000) of these fires are caused by "electrical distribution equipment." Of that 9%, only 14,500 (or 4% = $17,720,000) of those fires are attributed to "fixed wiring, switches, outlets, and receptacles." And, there is no data or study to support that of these 14,500 fires and the installation of an AFCI device would have prevented the fire.

Using the U.S. Census Bureau data on building permits for 2004 (Table (S-3) Final) shows 1,656,413 one- and two-family dwelling units and 413,664 multifamily units for that year.

There are typically 20 (twenty) 20-volt, single phase, 15- and 20-ampere branch circuits in each one- and two-family dwelling unit, and 10 in each multifamily dwelling unit. Using these numbers, there will be 33,128,260 AFCIs in OTFDs and 4,136,640 for multifamily units, for a total of 37,264,900 AFCIs.

Using a wholesale cost of $34.00 per breaker, marked-up the industry standard percentage of 66 percent, produces a cost per breaker of $56.44 to the homeowner.

In all, the average annual total cost to the public for the mandatory installation of AFCIs will be $2,103,230.956 ($1,267,006,600 wholesale). That is 2 BILLION, 130 MILLION, 230 THOUSAND AND 956 DOLLARS.

Using current fire loss data, society will be spending $2,103,230.956 per year to cover losses of only $39,870,000. That means spending 52 times the amount of money that would be lost if the devices were not installed and that is if the devices work 100% of the time. If you use the losses relating only to "fixed wiring, switches, outlets, and receptacles" (the part of the wiring that is claimed to be protected by AFCI breakers) the ratio to money spent relative to monetary loss ($17,720,000) is 119 times, again, if they work 100% of the time.

In addition to the submitter's substantiation, there is no data to support the contention of a neither "excellent track record", nor information that these "installations have found numerous wiring errors" or "they have found wiring damage and equipment damage that could have been a potential source of fire". That statement alone provides no correlation between the purported problems and the use of AFCIs.

It should also be noted that it appears the method used to certify these devices actually only tests to make sure the device will not cause an electrical shock or fire problem. IT DOES NOT TEST THE DEVICE TO ENSURE IT WILL PREVENT A FIRE CAUSED BY THE MANY SITUATIONS OF ELECTRICAL ARCING THAT COULD CAUSE A FIRE.

IN OTHER WORDS, NO ONE CAN PROVE THESE DEVICES WILL HAVE ANY COST-BENEFIT TO SOCIETY.

The Panel needs to reconsider the mandatory installation of AFCIs, let alone the expansion of requiring these devices for all 120-volt, single phase, 15- and 20-ampere branch circuits in dwelling units. Until true field test data on the efficacy of AFCIs can be directly related to saving society monetary loss there is no cost-benefit in this provision.

Panel Meeting Action: Reject

Panel Statement: See panel statement on Comment 2-79.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 3

Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-102 on Proposal 2-111 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-82 Log #2004 NEC-P02 **Final Action: Reject (210.12)**

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-113
Recommendation: Accept the proposal.
Substantiation: Let's get to the bottom line on this matter - There is absolutely no fire data that can be used to support the expansion of AFCIs to all receptacles, let alone the mandatory installation of AFCIs in bedrooms.

Looking at the latest data from NFPA in the report "The U.S. Home Product Report (Appliances and Equipment Involved in Fires)", by John R. Hall, Jr., of the Fire Analysis and Research Division of NFPA dated November 2005, the report shows that the annual average number of home fires is 372,900, with direct property damage of $443,000.000. Of this number 32,000 (or 9% = $39,870,000) of these fires are caused by "electrical distribution equipment." Of that 9%, only 14,500 (or 4% = $17,720,000) of those fires are attributed to "fixed wiring, switches, outlets, and receptacles." And, there is no data or study to support that of these 14,500 fires and the installation of an AFCI device would have prevented the fire.

Using the U.S. Census Bureau data on building permits for 2004 (Table (S-3) Final) shows 1,656,413 one- and two-family dwelling units and 413,664 multifamily units for that year.

There are typically 20 (twenty) 20-volt, single phase, 15- and 20-ampere branch circuits in each one- and two-family dwelling unit, and 10 in each multifamily dwelling unit. Using these numbers, there will be 33,128,260 AFCIs in OTFDs and 4,136,640 for multifamily units, for a total of 37,264,900 AFCIs.

Using a wholesale cost of $34.00 per breaker, marked-up the industry standard percentage of 66 percent, produces a cost per breaker of $56.44 to the homeowner.

In all, the average annual total cost to the public for the mandatory installation of AFCIs will be $2,103,230.956 ($1,267,006,600 wholesale). That is 2 BILLION, 130 MILLION, 230 THOUSAND AND 956 DOLLARS.

Using current fire loss data, society will be spending $2,103,230.956 per year to cover losses of only $39,870,000. That means spending 52 times the amount of money that would be lost if the devices were not installed and that is if the devices work 100% of the time. If you use the losses relating only to "fixed wiring, switches, outlets, and receptacles" (the part of the wiring that is claimed to be protected by AFCI breakers) the ratio to money spent relative to monetary loss ($17,720,000) is 119 times, again, if they work 100% of the time.

In addition to the submitter's substantiation, there is no data to support the contention of a neither "excellent track record", nor information that these "installations have found numerous wiring errors" or "they have found wiring damage and equipment damage that could have been a potential source of fire". That statement alone provides no correlation between the purported problems and the use of AFCIs.

It should also be noted that it appears the method used to certify these devices actually only tests to make sure the device will not cause an electrical shock or fire problem. IT DOES NOT TEST THE DEVICE TO ENSURE IT WILL PREVENT A FIRE CAUSED BY THE MANY SITUATIONS OF ELECTRICAL ARCING THAT COULD CAUSE A FIRE.

IN OTHER WORDS, NO ONE CAN PROVE THESE DEVICES WILL HAVE ANY COST-BENEFIT TO SOCIETY.

The Panel needs to reconsider the mandatory installation of AFCIs, let alone the expansion of requiring these devices for all 120-volt, single phase, 15- and 20-ampere branch circuits in dwelling units. Until true field test data on the efficacy of AFCIs can be directly related to saving society monetary loss there is no cost-benefit in this provision.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-79.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-83 Log #2005 NEC-P02 **Final Action: Reject**
(210.12)

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-115
Recommendation: Accept the proposal.
Substantiation: Let's get to the bottom line on this matter - There is absolutely no fire data that can be used to support the expansion of AFCIs to all receptacles, let alone the mandatory installation of AFCIs in bedrooms.

Looking at the latest data from NFPA in the report "The U.S. Home Product Report (Appliances and Equipment Involved in Fires)", by John R. Hall, Jr., of the Fire Analysis and Research Division of NFPA dated November 2005, the report shows that the annual average number of home fires is 372,900, with direct property damage of $443,000.000. Of this number 32,000 (or 9% = $39,870,000) of these fires are caused by "electrical distribution equipment." Of that 9%, only 14,500 (or 4% = $17,720,000) of those fires are attributed to "fixed wiring, switches, outlets, and receptacles." And, there is no data or study to support that of these 14,500 fires and the installation of an AFCI device would have prevented the fire.

Using the U.S. Census Bureau data on building permits for 2004 (Table (S-3) Final) shows 1,656,413 one- and two-family dwelling units and 413,664 multifamily units for that year.

There are typically 20 (twenty) 20-volt, single phase, 15- and 20-ampere branch circuits in each one- and two-family dwelling unit, and 10 in each multifamily dwelling unit. Using these numbers, there will be 33,128,260 AFCIs in OTFDs and 4,136,640 for multifamily units, for a total of 37,264,900 AFCIs.

Using a wholesale cost of $34.00 per breaker, marked-up the industry standard percentage of 66 percent, produces a cost per breaker of $56.44 to the homeowner.

In all, the average annual total cost to the public for the mandatory installation of AFCIs will be $2,103,230.956 ($1,267,006,600 wholesale). That is 2 BILLION, 130 MILLION, 230 THOUSAND AND 956 DOLLARS.

Using current fire loss data, society will be spending $2,103,230.956 per year to cover losses of only $39,870,000. That means spending 52 times the amount of money that would be lost if the devices were not installed and that is if the devices work 100% of the time. If you use the losses relating only to "fixed wiring, switches, outlets, and receptacles" (the part of the wiring that is claimed to be protected by AFCI breakers) the ratio to money spent relative to monetary loss ($17,720,000) is 119 times, again, if they work 100% of the time.

In addition to the submitter's substantiation, there is no data to support the contention of a neither "excellent track record", nor information that these "installations have found numerous wiring errors" or "they have found wiring damage and equipment damage that could have been a potential source of fire". That statement alone provides no correlation between the purported problems and the use of AFCIs.

It should also be noted that it appears the method used to certify these devices actually only tests to make sure the device will not cause an electrical shock or fire problem. IT DOES NOT TEST THE DEVICE TO ENSURE IT WILL PREVENT A FIRE CAUSED BY THE MANY SITUATIONS OF ELECTRICAL ARCING THAT COULD CAUSE A FIRE.

IN OTHER WORDS, NO ONE CAN PROVE THESE DEVICES WILL HAVE ANY COST-BENEFIT TO SOCIETY.

The Panel needs to reconsider the mandatory installation of AFCIs, let alone the expansion of requiring these devices for all 120-volt, single phase, 15- and 20-ampere branch circuits in dwelling units. Until true field test data on the efficacy of AFCIs can be directly related to saving society monetary loss there is no cost-benefit in this provision.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-79.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-84 Log #2131 NEC-P02 **Final Action: Reject**
(210.12)

Submitter: Keith Wallace, SE & D Electric
Comment on Proposal No: 2-157
Recommendation: Revise text to read as follows:
Arc fault protection on every general purpose branch circuit.
Substantiation: I feel this is a bad idea because of nuisance tripping. I fe el this would happen frequently due equipment that requires ballast home entertainment, etc.
Panel Meeting Action: Reject
Panel Statement: The submitter's intent is not clear. The proposal referenced deals with the use of smoke detectors on AFCI protected circuits. The recommendation is to provide AFCI on every branch circuit and the substantiation implies there is a concern with having AFCIs on all branch circuits due to nuisance tripping. The submitter of this comment has not provided Panel 2 with any technical data that would indicate that there is a compatibility issue with listed AFCI devices and listed electrical equipment.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-85 Log #2153 NEC-P02 **Final Action: Accept in Principle in Part**
(210.12)

Submitter: Chris Simpson, Sensata Technologies
Comment on Proposal No: 2-105
Recommendation: The Code Making Panel should continue to "Accept in Principle in Part" this revised text. We agree with the code making panel's decision to reject the deletion of "combination type" devices.
Substantiation: Combination type AFCI technology is available from Sensata Technologies and we are pursuing UL listing for the circuit breaker application before the end of 2006. Sensata has brought this technology to market in the form of a plug cap for the RAC application in 2004. We're entering field trials with our combination type product for the circuit breaker application in November 2006 and will be making commercial shipments in early 3Q07.
Panel Meeting Action: Accept in Principle in Part
The panel is accepting a portion of the proposal that expands the requirement for AFCIs in a more limited fashion. The panel is not accepting the expansion to all 15- and 20-ampere branch circuits.
Panel Statement: See panel action and statement on Comment 2-95.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

PURVIS, R.: Comment 2-85 should be rejected. Even this "limited" expansion should be reevaluated the next code cycle after additional field experience with the new combination type AFCI is available for review along with further substantiation of the need to expand AFCI requirements beyond bedrooms.
Comment on Affirmative:
KING, D.: See my Affirmative with Comment on Comment 2-95.

2-86 Log #2219 NEC-P02 **Final Action: Reject**
(210.12)

Submitter: Richard W. Becker, Engineered Electrical Systems, Inc.
Comment on Proposal No: 2-113
Recommendation: Delete this section.
Substantiation: The panel statement claims documentation that supports the panel's position; the documentation referenced does not distinguish between "arcing" and "joule heating". As a result, there is no compelling basis for this device.
Panel Meeting Action: Reject
Panel Statement: The panel has concluded that arcing faults contribute significantly to electrical fires. The submitter has not provided adequate substantiation to support his position that arcing is not a substantial cause of electrical fires.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
BECKER, R.: The panel conclusion that arcing faults contribute signifcantly to electrical fires is not supported by the susbstantiation that has been submitted to and on file at NFPA.

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-87 Log #2333 NEC-P02 **Final Action: Accept in Principle in Part**
(210.12)

Submitter: Alan Manche, Square D Company
Comment on Proposal No: 2-142
Recommendation: Continue to Accept the Proposal.
Substantiation: We continue to support expanding AFCI protection to all 125V, 15 and 20A circuits. The action taken by the panel is clearly understood and has been expected by the industry. Square D introduced a Listed Combination AFCI circuit breaker for sale on October 1, 2006, well over a year in advance of the present NEC requirement for Combination AFCI on January 1, 2008. Our Combination AFCIs have thousands of hours of successful field experience and many thousands more in laboratory testing of various loads.

The panel should continue to support protection of the entire branch circuit. We have investigated multiple home fires that originated in a homerun. Compromising AFCI protection on the homerun is as fundamental as forgoing overload or short circuit protection on that branch circuit.

I would like to share a personal story with regard to AFCI protection for those that remain skeptical of the benefit. I moved into a new construction home in February 2004 that had AFCI protection in accordance with NEC on the bedroom circuits. Shortly after occupancy, the AFCI tripped in my daughter's bedroom. After a short investigation, I found a can light where the wire insulation had been compromised within the can itself. A couple of weeks later and the AFCI tripped in the master bedroom, once again, the AFCI found a recessed light where the wire insulation had been compromised within the can itself. Concerned with the can lights at this point, I reviewed all 31 recessed lights in my new house and found one more with a similar wire insulation issue. There are numerous stories similar to this one where a standard overcurrent device would have permitted a potential fire ignition source to persist. Beyond a shadow of a doubt, AFCIs are finding issues in the electrical system that are potential ignition sources.
Panel Meeting Action: Accept in Principle in Part

See panel action and statement on Comment 2-85.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

PURVIS, R.: Comment 2-87 should be rejected. Even this "limited" expansion should be reevaluated the next code cycle after additional field experience with the new combination type AFCI is available for review along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-273 Log #1762 NEC-P02 **Final Action: Reject**
(210.12 and Article 240 (New))

Submitter: Michael Cole, MRC Electric
Comment on Proposal No: 2-142
Recommendation: Add the following text to 300.4(A):

Wiring shall not be installed in exterior wood frame walls until after installation of exterior building finish. This requirement shall apply to nonflexible steel raceways as well as any other wiring methods and shall apply regardless of wiring spacing from exterior building finish.

Substantiation: a. One of the sources of nail penetrations is that alleged carpenters like to use framing nail guns to install sheathing and siding. This is so that they only have to own and maintain 1 nail gun. Worse, these people sometimes miss the 2x4s or 2x6s with the result that a conventional antinailing plate does NOT work as advertised.

Also, nail guns can drive a framing nail into steel EMT. Somebody I know told me that when he was working as an electrician for his dad in Canada somebody else drove a big nail right through EMT when putting up the drywall. This incident occurred BEFORE nail guns.

I can actually be glad that one of my customers had to wait a year in order to be able to afford to have me install nonmetallic sheathed cable in a commercial wood framed room.
Panel Meeting Action: Reject
Panel Statement: The submitter's recommendation does not correspond to the original proposal number. Additionally, it is not the intent of the code to attempt to control the sequence of construction.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-88 Log #1764 NEC-P02 **Final Action: Reject**
(210.12 Exception (New))

Submitter: Michael Cole, MRC Electric
Comment on Proposal No: 2-142
Recommendation: Add an Exception to read as follows:

Exception No. a: Where an automatic fire suppression system e.g., sprinkler system is installed in all habitable rooms including rooms finishable for future use and a fire alarm system is installed rooms that are not bedrooms shall be permitted to not have AFCI protection. If the fire suppression system uses water there shall be a locking receptacle with pilot light and without AFCI or GFCI protection for the purpose of supplying a dry pipe air compressor. A fire extinguishing agent that displaces oxygen shall not be used.

Substantiation: a. Arguably, a homeowner will get more antibang for the buck from a fire suppressive sprinkler system. CHILDREN playing with matches as well as careless smokers cause more fires than electrical systems. Simply put, sprinkler systems will save more lives than expanded AFCI requirements will.

I also know someone who died while smoking and subsequently burned down her house. That was not the way to save on cremation and burial expenses! A sprinkler system protects against this kind of hazard and AFCI just does not provide any protection.

The sprinkler system interests have spent a kajillion dollars on low water consumption sprinkler heads for residential use on typical residential water services and water wells. Some of these sprinkler heads shut themselves off after the fire goes out. There have also been some experiments with sprinkler system construction using plastic pipe to lower construction costs.

I am just trying to point out that a different set of gadgetry will provide more protection.

b. The cost of additional AFCI protection could bring us back to the days when an upscale suburban house had only 10 120-volt branch circuits. Fewer branch circuits results in heavier loading of each branch circuit resulting in more heat resulting in more net fire hazard. Likewise, people who have older houses could be deterred from having service upgrades and replacements done.

I recently replaced the service cable and meter socket for a single family dwelling where a previous electrician had run aluminum SEU cable from a meter socket with brass terminals to a new service panelboard. Worse, he did not use any antioxidant compound on this work. That was a fire hazard! And, AFCIs would do nothing to stop this kind of electrical hazard.

c. In proposal 2-154 (Log #1721) NEC-P02, Mr. Michael McQuade quotes the Consumer Product Safety Commission estimate of 890,000 unreported home electrical fires as being even more concerning. This is a misleading and self defeating argument in 2 ways. First, this number was derived from the precision engineering formula G=U-E+SxS. Second, electrical fires go unreported precisely because a conventional stopped the fire. This statement on the part of the Consumer Product Safety Commission works against increased AFCI protection.

d. What is hard to distinguish in this debate is the problem that Federal Pacific, Wadsworth, and Zinsco (including the Zinsco clones made by Sylvania) alleged circuit breakers develop arthritis after a few years and provide essentially ZERO overcurrent protection. Dr. Jesse Aronstein is one of the people who has investigated this problem and has some documents onhis website at www.inspect-ny.com. The argument by Consumer Product Safety Commission that AFCIs will provide greater protection does NOT state how many fires were caused by conventional circuit breakers that refuse to work correctly after a few years. That is, AFCI protection seems to be overkill for a problem that would be correctly solved by installing newer and better thermal magnetic circuit breakers.

My experience with Federal Pacific circuit breakers is that turning off the circuit breaker and then turning it back on restores normal operation for a while. Then, the customer discovers that they have 30 or 35 amperes of load on a 20 ampere circuit. Even SquareD, which is the best in the business, recommends exercising circuit breakers once per year.
Panel Meeting Action: Reject
Panel Statement: Panel 2 recognizes that all fires that occur in dwelling units are not the result of electrical arcing and supports the use of fire suppression systems to extinguish these fires. The benefit of AFCI protection is that arcing faults are mitigated before surrounding combustible surfaces can be ignited, thus saving many lives and the costs associated with property damage due to electrically oriented fires.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-89 Log #18 NEC-P02 **Final Action: Accept**
(210.12(A))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 2-119
Recommendation: The Technical Correlating Committee understands that the Panel Action on this Proposal modifies the Panel Action on Proposal 2-105.

The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal to revise the definition to comply with 2.2.2 of the NEC Style Manual by deleting the term within the definition.

This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Revise the definition to read as follows:

"Arc-Fault Circuit Interrupter (AFCI): A device intended to provide protection from the effects of arc faults by recognizing characteristics unique to arcing and by functioning to de-energize the circuit when an arc fault is detected."
Panel Statement: The panel action satisfies the directive of the Technical Correlating Committee.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-90 Log #2266 NEC-P02 **Final Action: Reject**
(210.12(A))

Submitter: Michael Beanland, Vancouver, WA
Comment on Proposal No: 2-142
Recommendation: Revise text to read as follows:

An arc-fault circuit interrupter shall be designed and manufactured ~~is a device intended~~ to provide protection from the effects...
Substantiation: If we mandate the use of AFCI devices, the good intentions of manufacturers are insufficient. AFCI manufacturers must be held to a higher performance standard than good intentions. It is reasonable to require that the AFCI device be designed to achieve its objective and that it be manufactured to achieve its design.
Panel Meeting Action: Reject
Panel Statement: The recommended text does not comply with 2.2.2.2 of the NEC Style Manual. Requirements are not permitted in a definition.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-91 Log #912 NEC-P02 **Final Action: Reject**
(210.12(A) and 210.12(B))

Submitter: Aaron B. Chase, Leviton Mfg. Co. Inc.
Comment on Proposal No: 2-105
Recommendation: I agree with the Panel's action in 210.12(A), but strongly disagree with the deletion of the word "bedrooms" in 210.12(B).

The Panel should reject Proposal 2-105.
Substantiation: In support of my comment to reject the expansion of combination AFCIs to all dwelling unit circuits is the fact that as of October 13, 2006 there are no commercially available units. With no real world experience on any circuit, it would not be prudent to jump forward from no circuits to all dwelling unit circuits.

I concur with Mr. Nenninger's negative vote and comments and concerns that he supplied which state as follows:

"The proposal should be rejected at this time, and the installation of AFCI should be limited to bedrooms only. The use of combination type AFCIs will be a requirement in 2008. However, they will not be commercially available until the summer of 2006. The requirement to expand an AFCI product beyond bedrooms to all dwelling unit locations in 2008 is premature as the market will not have sufficient experience with the newer combination type AFCI technology. It is more important to leave the current code as written and gain experience with the combination type in bedrooms only. Based on the outcome of this experience, further expansion can be considered for the 2011 code".

Mr. Nenninger's concerns are only amplified by the fact that the summer of 2006 has come and gone without these products being made commercially available.

As a representative of a large manufacturer of products used in the infrastructure, I am extremely concerned over how these devices will react with our products as well as the multitude of loads that can be found on any given branch circuit.

This is not like a case of expanding a known technology that has "X" number of units out in the field operating for "Y" number of hours. This is not expansion, but unknown introduction. This is a tremendous leap of faith to go from zero units to what could possibly be at least twenty, thirty, forty million, or more units **annually!**

I, again, implore the panel to please reconsider the expansion until we have some sound proven technical data.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-72.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-91 on Proposal 2-105 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-92 Log #398 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Greg Fretwell, Blue Light Inspection Services
Comment on Proposal No: 2-142
Recommendation: Reject the proposal entirely.
Substantiation: In addition to the remarks of Mr. Weber, Mr. Purvis, Mr. Brown and Mr. Becker, I also question the thermal implications of adding 20 AFCI breakers to a panel that can be in an unair-conditioned space which may have ambients in the 35-38c range. The addition of 20 AFCI breakers could easily take the panel out of the 40c range that the breakers are rated for. If nothing else, this could shorten the life of the electronics in the AFCI breakers and it could also cause problems with the trip range of the standard breakers.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any technical data to support his substantiation. The problem outlined in the substantiation is a product design issue and needs to be addressed through the applicable product standards.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-92 on Proposal 2-142 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-93 Log #534 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-128
Recommendation: Accept as revised:

Add: "and dormitory" after "dwelling unit" in the text and heading.
Substantiation: Bedrooms in dormitories in colleges, penal institutions, recreational camps, etc. should merit AFCI protection. If without permanent provisions for cooking they are not dwelling units, per definition.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided substantiation to support the expansion of AFCI devices to dormitories.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

KING, D.: The discussion at the ROC meeting concluded that the use of the term dormitories is too broad and would implement a requirement that is impractical in certain applications. The intent of this comment is to provide AFCI Protection in occupancies that are similar to dwelling units. The same hazards from the use of electricity exists in dormitories that exist in dwelling units and in many incidences the hazards are compounded by the number of occupants required to share the same room. The Panel should have accepted this Comment in Principal and revised the submitter's recommended text to read as follows:
"and in dormitories in colleges, penal institutions, recreational camps, etc." after "dwelling unit" in the text and heading.

The revised text would add clarity as to where and when AFCI protection would be required in dormitories along with satisfying the submitter's intent.
Comment on Affirmative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-94 Log #697 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Steve Campolo, Leviton Manufacturing Co., Inc.
Comment on Proposal No: 2-134
Recommendation: Panel 2 should have accepted the original proposal. Availability is an issue. How can I substitute a negative (none available)?
Substantiation: As of today (10/4/06) No combination type AFCIs are available at New York Electrical Supply houses in my area. Panel 2 was assured that these devices would be available for wide field and pre testing. They are not. Postponing all expansion and combination types for at least one more cycle (2 yrs) is not an option.
Panel Meeting Action: Reject
Panel Statement: See panel statements on Comments 2-72 and 2-73.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
NENNINGER, B.: See my Negative Explanation given in Comment 2-72.
Comment on Affirmative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-95 Log #757 NEC-P02 **Final Action: Accept in Principle**
(210.12(B))

Submitter: Jack Wells, Pass & Seymour/Legrand
Comment on Proposal No: 2-142
Recommendation: The Panel should accept in principle and revise 210.12(B) as follows:
(B) Dwelling Units. All 120-volt, single phase, 15- and 20-ampere branch circuits ~~supplying outlets~~ installed in dwelling unit bedrooms, family rooms, living rooms, parlors, libraries, dens, sun rooms, recreation rooms or similar rooms shall be protected by a listed arc-fault circuit interrupter, combination type installed to provide protection of the branch circuit. ~~Branch/feeder AFCIs shall be permitted to be used to meet the requirements of 210.12(B) until January 1, 2008.~~
Substantiation: Accepting Proposal 2-142 made two significant changes in the requirements for the installation of AFCIs. 210.12(B) will now require:
- AFCI protection for all branch circuits in dwelling units instead of only bedroom branch circuits
- Combination AFCIs are to provide this protection instead of branch/feeder AFCIs

Based on the requirements in the UL1699, the standard for AFCIs, and information provided to the panel during previous code cycles, it is apparent that the panel made the appropriate decision to require combination AFCIs as the means of protection for branch circuits. Combination AFCIs provide protection that is superior to branch/feeder AFCIs by detecting both series and parallel arcs. There should be little debate that the superior means of protection should be mandated by the code.
The panel made the correct decision in the 2005 NEC by first requiring the "combination type" AFCI before expanding the requirements. It should not waver from this decision.
However, accepting this proposal couples the introduction of Combination AFCI technology that has little or not field history with the expansion of AFCI protection to a significantly greater number of branch circuits.
The current requirement for AFCI protection of bedroom branch circuits most likely involves 3, 4, or 5 branch circuits in a typical dwelling unit. The acceptance of this proposal may increase the number of circuits requiring AFCI protection to upwards of 30 branch circuits in a dwelling unit. Many of these additional branch circuits will be used with equipment that is not found in bedrooms. This may introduce an additional element of nuisance tripping due to the unknown affect of these products on the operation of the relatively new technology of the Combination AFCI which has not been exposed to these conditions in the field. This is especially true in locations such as kitchens, garages, and outdoors where many different appliances and electric tools are used.
Accepting this proposal seems to be a departure from the code Panel's previously well justified approach of limiting the expansion of the AFCI requirement until there is sufficient information available for the panel to determine that such an expansion is adequately supported by data. The substantiation for the proposal states that AFCIs have an excellent track record in the field. This may be true for Branch/feeder AFCIs but there is no substantiation provided to indicate that this same track record has been established for Combination AFCIs. It will take time to develop the same data for Combination AFCIs that supported the Panel's consideration for expansion of the Branch/feeder AFCI requirements.
We believe "combination type" AFCIs can be made that will function satisfactorily on a branch circuit without excessive nuisance tripping. However, we believe it is prudent to be cautious and permit "combination technology" to be introduced gradually.
Accepting the proposal to require Combination AFCIs is an important first step in providing the best arc fault protection that current technology has to offer. However, the Combination AFCI should be given the opportunity to develop a field proven track record before expansion to all branch circuits is accepted. Accepting this comment will allow a significant but limited expansion of AFCIs which will allow such a field track record to be developed for the Combination AFCI.
Panel Meeting Action: Accept in Principle
The panel revised the wording in the recommendation of the comment to read as follows:
"(B) Dwelling Units. All 120-volt, single-phase, 15- and 20-ampere branch circuits supplying outlets installed in dwelling unit family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sun rooms, recreation rooms, closets, hallways, or similar rooms or areas shall be protected by a listed arc-fault circuit interrupter, combination-type, installed to provide protection of the branch circuit."
Panel Statement: The panel accepts the submitter's concept of a more limited approach to the expansion of AFCI. The panel has used language that is arranged in a manner that parallels the language in 210.52(A) and has also included hallways and closets to address previous proposals about those areas. The panel did not accept the submitter's deletion of the words "supplying outlets," because it would introduce confusion regarding branch circuits that passed through these areas but did not supply any outlets in the area.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 8 Negative: 4
Explanation of Negative:
BECKER, R.: Expansion of AFCI protection is not supported by the substantiation that has been submitted to and that is on file at NFPA.
BROWN, L.: The Panel's Action to not require AFCI protection only for the receptacles that typically require GFCI protection is backtracking from the Panel's Actions and Statements shown in the Report on Proposals (ROP). If they felt the entire house should be protected what relevant fire data changed their minds? Please read NAHB's Comment 2-79. Calling this a "limited approach to the expansion of AFCI" still results in no cost-benefit for society, it just needlessly increases the costs of housing. No jurisdiction should burden its citizens with this unneeded expense. There was never any fire study or cost-benefit study to support installing these devices only for bedrooms in the 1999 NEC. Since then NO data or study has ever been assembled to support the expansion to the whole house. The fact still remains that home buyers in the U. S. will spend approximately 2 BILLION, 130 MILLION, 230 THOUSAND, and 956 DOLLARS per year to cover losses of only $17,720,000. That is a ratio of 119 times the money spent relative to the monetary loss of $17,720,000.
And, that is if the devices work 100 percent of the time. If you break that down by each state, that lack of a cost-benefit becomes apparently clear. All jurisdictions that contemplate adopting the 2008 NEC, especially those jurisdiction that by law must show a cost-benefit in the adoption, are encouraged to look closely at this cost-benefit fact and not adopt the 2008 NEC until all provisions requiring AFCIs is stricken (Section 210.12).
NENNINGER, B.: See my Negative Explanation given in Comment 2-72.
PURVIS, R.: Comment 2-95 should be rejected. Even this "limited" expansion should be reevaluated the next code cycle after additional field experience with the new combination type AFCI is available for review along with further substantiation of the need to expand AFCI requirements beyond bedrooms.
Comment on Affirmative:
KING, D.: I commend Panel 2 on their decision to expand the requirement for AFCI protection to a significantly larger portion of dwelling units. Although I still support expansion of this requirement to the entire dwelling unit as originally proposed, I recognize the value and benefit of a larger Panel consensus in advancing this life saving technology both today and in the future. I am confident that future field data will continue to reflect the reliability and life saving benefit of these devices.

2-96 Log #893 NEC-P02 **Final Action: Accept in Principle in Part**
(210.12(B))

Submitter: Michael P. O'Quinn, MOGO Enterprises, Inc.
Comment on Proposal No: 2-126
Recommendation: Revise as follows:
(B) Dwelling Unit Bedrooms. All 120-volt, single phase, 15- and 20-ampere branch circuits supplying outlets installed in dwelling unit bedrooms shall be protected by a listed arc-fault circuit interrupter in accordance with 210.12(B)(1), (B)(2), or (B)(3) ~~combination type installed to provide protection of the branch circuit.~~

~~Branch/feeder AFCIs shall be permitted to be used to meet the requirements of 210.12(B) until January 1, 2008.~~

FPN: For information on types of arc-fault circuit interrupters, see UL 1699-1999, Standard for Arc-Fault Circuit Interrupters.

(1) For outlets installed using noncombustible construction methods and employing metallic raceways or metal-sheathed cab arc-fault protection shall only be required to protect appliances or equipment connected to the outlet.

FPN: For a listing of construction type, see Annex E.

(2) For outlets not covered in 210.12(B)(1), arc-fault protection shall be of the combination type provided to protect the entire circuit.

Substantiation: As Mr. Becker stated in his Explanation of Negative, there is no substantiation of combustion risk when wiring is enclosed in metallic raceways or metal-sheath cable. Even though no technical data was provided with the proposal, consider the following:

A. 250.118 allows the use of metallic raceways, with some limitations, to be used as an equipment grounding conductor providing an "effective ground-fault current path". If arcing occurs within the metal raceway or metal-jacketed cable, the low impedance path of the raceway or cable will facilitate the opening of the overcurrent device to de-energize the circuit, complying with 110.10 and 250.4(A)(5).

B. 310.15(A)(2) Exception allows the use of the higher of two different ambient temperature-based ampacities for a conductor when the higher temperature is a small portion of the circuit length (just as an arc-fault) because of the dissipation of heat through the metallic raceway or conductor.

This means the use of metallic-based products (metal raceways or metallic-sheathed cables) acts as a heat sink, similar to the cooling effect metal enclosures afford, dissipating any heat connected to an arc-fault until the overcurrent device trips.

C. If the metal raceway or metallic-sheathed cable is installed in noncombustible walls, there is nothing to burn/cause a fire during the time the arc-fault occurs until the overcurrent device trips under "A" above.

This proposal does focus on the major cause of arc-fires - those caused by supply cords and equipment failure - by requiring arc-fault protection for cords and equipment regardless of the raceway/cable or wall construction. This could be in the form of the presently required combination-type AFCI device (UL AWAH), or the outlet type (UL AWBZ or AWZGC)!

Panel Meeting Action: Accept in Principle in Part

The panel rejects the submitter's proposed deletion of "combination type AFCIs" in item (1) and accepts in principle the use of metal raceways for physical protection to the first outlet device.

Panel Statement: The submitter has not provided any substantiation to support his recommendation to delete the requirement for combination-type devices. Metal raceways are acceptable independent of the type of construction. The remainder of the recommendation is addressed with the panel action on Comment 2-129. See panel action and statement on Comment 2-129.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-97 Log #894 NEC-P02 **Final Action: Reject (210.12(B))**

Submitter: Michael P. O'Quinn, MOGO Enterprises, Inc.

Comment on Proposal No: 2-142

Recommendation: Reject proposal and reinstate previous wording.

Substantiation: Expansion of the arc-fault circuit-interrupter protection to all 125-volt, 15- and 20-ampere outlets in a dwelling should be rejected at this time due to several reasons:

A. As Mr. Nenninger pointed out in his Explanation of Negative on Proposal 2-105, combination-type AFCI devices will not be commercially available until later this year and no data is available to recognize its practical use. It would be wise to use studies conducted after these new types of devices have been installed to determine expansion of the AFCI technology.

B. As Mr. Becker points out in his Explanation of Negative on Proposal 2-142, there is no data on the field performance of these devices - whether they actually prevented arc-fault initiated fires. Test data in a laboratory and actual performance in the field can be (and actually is) quite different. Expansion of untested technology is not prudent.

C. It would appear the provisions of 300.4 "Protection Against Physical Damage" would sufficiently protect dwelling wiring installations from arc-faults in the wiring from the panelboard to the outlet(s). Add to that 334.15(B) "Protection From Physical Damage" and 334.15(C) "In Unfinished Basements" and it would seem any dwelling installation following these requirements could have arc-faults originating only from appliance cords or the appliances themselves. This would then be best protected by either AFCI devices at the receptacle location (UL AWBZ or AWCG), or product standards requiring the installation of AFCI protection within the last 12 inches of the supply cord.

D. The only proven benefit, according to field data, of AFCI devices (Branch/Feeder type) is the ability to detect wiring errors, such as loose connections. This seems a costly requirement to detect violations of 110.12 and 110.10.

F. In the NFPA report, "The U.S. Home Product Report (Appliances and Equipment Involved in Fires)", there is no breakdown of the number or percentage of fires based on the age of the dwelling. It would be expected that a greater number of these fires reported were involved with older dwellings - those without the benefit of increased wiring safety afforded by new code requirements in Articles 300 and 334. At the present time, there is no enforcement of newer wiring requirements on existing dwellings unless a municipal permit is taken out, leaving the most possible source of branch-circuit wiring unprotected against arc-faults.

Panel Meeting Action: Reject

Panel Statement: The submitter's concept that it must be proven how many fires were "not started" is an attempt to prove a negative. The fact that a fire did not occur is not reported. However, there has been extensive review of data and studies associated with AFCI, and the panel supports their continued use as well as expansion. See the panel statement on Comment 2-72, which addresses the submitter's concerns about the availability of these devices.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 3

Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-97on Proposal 2-142 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-98 Log #910 NEC-P02 **Final Action: Reject (210.12(B))**

Submitter: Aaron B. Chase, Leviton Mfg. Co. Inc.

Comment on Proposal No: 2-142

Recommendation: I strongly disagree with the Panel's acceptance of the modifications proposed by the submitter. I would recommend reinstating the words "supplying outlets" and "bedrooms". I do support the deletion of the reference to branch feeder AFCIs.

Reject Proposal 2-142.

Substantiation: Proposal 2-142 should be rejected based on the lack of availability of the combination type devices. In essence, the submitter of Proposal 2-142 has recommended that the panel so called "expand" the use of a technology which has no field history and at the time of writing this comment (October 16, 2006) the product cannot be found for sale in the market. This proposal is not an expansion, but rather a "full blown" introduction of an unproven technology on a very grand scale.

During the last code cycle, the panel made it clear that this was the technology (combination type) they wanted all along and put an effective date to convert over to this technology to gain some field experience.

At the ROP stage, of the present code cycle the panel again reiterated its support for the combination type technology only and expressed their desire to be made commercially available now. The panel was promised this by the Square D presenter at the Hilton Head meetings. However, after persistent visits to this company's electrical distributors the product has never been able to be purchased. As a last resort, the Square D tech line was contacted on October 11th through October 13th as to where the product could be purchased and we were advised that it would not be available until the first quarter of 2007.

The concern over availability relates to performance. In theory, the concept of a combination type AFCI is one that I wholeheartedly support, since my belief is that the superior wiring methods in new home construction are not what really needs to be protected as much as the exposed extended wiring such as extension cords; appliance cords; etc. that are subject to physical damage. However, in order to provide this well justified protection (combination type) the technology is much more sensitive by the very nature of the level of protection it is providing over a branch feeder AFCI. As such, it was expected that we would learn how this unknown technology would perform in real world environments interacting with other products comprising of or utilizing our electrical infrastructure. With no knowledge, I implore the panel members to reconsider expanding the use of this new technology until we have some field experience.

If we leave the current code text to require the use of combination type AFCIs only on bedroom circuits, we will gain the experience and correct any pitfalls that may be encountered before we embark on requiring their use on all branch circuits.

If the product had a proven track record, expansion would be justified. Without any record, we ask that the panel move judiciously until we have some experience.

The unfortunate history originally with GFCIs should not be lost as a reminder as to what can happen if we push technology before it is ready.

Panel Meeting Action: Reject
Panel Statement: The panel action on the original proposal was based on the commercial availability of AFCI devices in January 2008. The submitter of this comment has not provided Panel 2 with any data that would indicate that combination-type AFCI devices will not be commercially available at that time. The tests in UL1699 confirm the capabilities of AFCIs for arc mitigation and resistance to unwanted tripping. The panel has been provided with information stating that combination AFCIs have been beta tested and have been made commercially available for field installation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.
NENNINGER, B.: See my Negative Explanation given in Comment 2-72.
PURVIS, R.: Comment 2-98 on Proposal 2-142 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-99 Log #913 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Aaron B. Chase, Leviton Mfg. Co. Inc.
Comment on Proposal No: 2-111
Recommendation: I strongly disagree with the panel accepting the deletion of "bedrooms" in 210.12(B) but I am in support of rejecting the deletion of "combination-type" in the same paragraph.
Substantiation: The submitter of this comment support the panel's position not to accept branch feeder AFCIs as an acceptable alternative to combination type AFCIs as recommended in the original proposal.
Conversely, the submitter of this comment does not agree with the panel's position to expand combination type AFCI protection to all dwelling unit circuits.
The panel should accept the existing text of the code (combination type on bedroom circuits) with the reference to branch feeders AFCIs deleted.
Substantiation:
Justification for branch feeder AFCI protection in new construction does not correlate to the original data presented. The data strongly suggests that branch feeder AFCIs are warranted on older existing dwellings, but since the level of protection they provide can be provided by combination types, their need in older homes would fail to address the extended wiring too.
Protecting the branch circuit conductors is appropriate and enhances the safety of the electrical distribution system in older existing dwellings, but we must not forget the weakest element of today's system which is frequently the supply cord or extension cord to the utilization equipment. This is the component that is most likely to be subjected to physical damage and provide a source of ignition to nearby products of combustion. This comment ensures that the benefits of the AFCI protection are encouraged and extended to the weakest component in the electrical system that is subject to many abuses while gaining valuable field experience.
While the effectiveness of a combination device and its functionality in real world applications is unknown, an appropriate validation of such technology would be to require its sole use only on bedroom circuits and not permit branch feeder types to be used alternatively. Not only will this encourage the introduction of combination type AFCIs, but valuable field experience will be gained.
New construction per today's codes has excellent premises wiring requirements. However, occupants of these new dwellings can be expected to use utilization equipment that has old and/or damaged supply cords. Further, even new utilization cords are openly exposed to many types of damage that may result in conditions leading to electrical fires.
The original data presented to CMP-2 to justify branch circuit AFCIs were based on trailing data; not current data dealing with older homes. A good example is a staff report by the CPSC in 1987 entitled "Residential Electric Distribution Fires" which provided evidence that fires originating in branch circuit wiring predominately occurred in dwellings over 20 years old with the highest rate of fires occurring in dwellings over 40 years old. Based on this, the residential wiring systems were far inferior in the dwellings from that time period as to what is constructed today. During that span prevalent wiring systems were knob and tube wiring and old style cloth NM cable. Much of the more recent data could be attributed to aluminum wiring. In light of this the use of Branch Feeder AFCIs in new construction would be moot.
With the improvements in today's wiring systems and code adoption, branch feeders AFCIs would have been better suited for service change outs in older homes although the philosophy behind combination types are superior. Combination type, once available and proven (perhaps in a cycle or two from now) will serve any unlikely damage to branch circuit conductors while serving to protect the exposed extended wiring that is subject to abuse where the vast majority of electrical fires in new dwellings can be expected.
Panel Meeting Action: Reject
Panel Statement: No specific recommendation has been made. The comment does not comply with Section 4.3.3(c) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.
NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

2-100 Log #1008 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 2-142
Recommendation: Revise text to read as follows:
(B) Dwelling Units. ~~All~~ Every 120-volt, single phase, 15- and 20-ampere branch circuit~~s~~ supplying outlets installed in dwelling unit bedrooms shall be protected by a...
Substantiation: A minor grammatical fiddle, to restore correspondence of number. If "all" circuits must be protected by "a" GFCI, literally, we're shifting to the British system of having a single Earth Leakage device protecting the entire panelboard. I believe it is preferable that the Code not require reinterpretation, generally: "I know what it means to say, and that's what I'm going to enforce; don't come at me with what it says." The enforcement of this section, as written, by a literalist would be worse yet.
Panel Meeting Action: Reject
Panel Statement: The present use of the term "all" is clear in its intent.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-101 Log #1027 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Patsy Spirelli, Spirelli Electric Inc. / Rep. Putnam County Electrical Contractors Association
Comment on Proposal No: 2-105
Recommendation: Revise text to read as follows:
(B) Dwelling Units. ~~All~~ 120 volt single phase, 15- and 20-ampere branch circuits installed in dwelling units ~~shall~~ should be protected by a listed arc-fault circuit interrupter, combination type installed to provide protection of the branch circuit.
Substantiation: The nuisance tripping from branch circuits such as igniters, appliances, etc. will cause a home owner much inconvenience and contractor to be forced to go back.
Panel Meeting Action: Reject
Panel Statement: The recommended language does not comply with 3.1.1 of the NEC Style Manual, which states that the word "shall" must be used for mandatory language. In addition, see the panel action and statement on Comment 2-100.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-102 Log #1041 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Gilbert L. Thompson, MEIA Codes and Standards
Comment on Proposal No: 2-142
Recommendation: The Panel should reconsider their action and reject this proposal. The wording should remain the same as is now found in Section 210.12(B) of the 2005 NEC. The inspector's association agrees with the four negative comments by Mr. Becker, Mr. Brown, Mr. Nenninger, and Mr. Purvis that the proposal should be rejected. Note: Not all enforcement jurisdictions have adopted the 2005 NEC or the requirement for combination AFCI protection. This new proposal sets no time table to allow for any other type of protection other than just combination type breakers. And again, it is an industry proposed change.
Substantiation: Mr. Nenninger's comments on Proposal 2-105 are right on target, especially since the tripping values have been adjusted by UL for the combination type AFCI. There have been recent reports of some nuisance tripping that result in the removal of this protective device and then replacing it with general use breakers. To allow for more research and development of

other possible methods of protecting circuit conductors, we feel it is more appropriate to leave the current code as written and then gain experience with AFCIs in bedrooms circuits only. Further expansion could then be considered for the 2011 code after other data is supplied and experience gained.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-98.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.
NENNINGER, B.: See my Negative Explanation given in Comment 2-72.
PURVIS, R.: Comment 2-102 on Proposal 2-142 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-103 Log #1043 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Gilbert L. Thompson, MEIA Codes and Standards
Comment on Proposal No: 2-127
Recommendation: The Panel should reconsider their action and accept this proposal with the following words added to the heading:
Dwelling units/and structures with similar sleeping accommodation usage
Building codes, zoning regulations, and fire codes have different definitions for structures that house people, but the same electrical conditions exist when persons are allowed to use their own personal appliances, devices, accessories and equipment in these type sleeping quarters.
Substantiation: Our inspectors associations agree with Mr. Mettalo's substantiation and especially the negative comments made by Mr. Brown, Mr. King, and Mr. Weber in support of his proposal. This change would allow for the expansion of AFCI protection to many structures that have similarities to dwelling unit bedrooms. It would also allow the industry the opportunity to gain experience and data as AFCIs would provide protection to a greater number of occupants. In the 2005 code, it requires by January 1, 2008 that combination AFCIs be used so this would give a great deal of experience and data allowances.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided substantiation to support the expansion of AFCI devices to other structures.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: I agree with the submitter's substantiation. The life saving benefit afforded by this technology should be expanded to include all occupancies that are similar to and function as dwelling units. See my explanation of negative on Comment 2-93.
Comment on Affirmative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-104 Log #1147 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 2-125
Recommendation: Reject Proposal 2-125 in its entirety.
Substantiation: Proposal 2-125 should be rejected since the data does not support the expansion of the use of present AFCI technology to the entire dwelling unit. Present AFCIs (available to purchase today) have not been proven to reliably protect against series arcs in extension cords. The combination type AFCIs have not been installed and proven to work in the field at this time. There has been a lot of discussion about protecting building wiring with the circuit breaker type AFCI. EEI supports the concept of protection of wiring in older homes. However, wiring properly installed in new homes in accordance with the requirements of the NEC does not require the additional level of protection for branch circuit wiring by AFCIs.
Panel Meeting Action: Reject
Panel Statement: The tests in UL1699 confirm the capabilities of combination-type AFCIs for series arc mitigation. The panel has been provided with information stating that combination AFCIs have been beta tested and have been made commercially available for field installation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.
NENNINGER, B.: See my Negative Explanation given in Comment 2-72.
PURVIS, R.: Comment 2-104 on Proposal 2-125should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-105 Log #1314 NEC-P02 **Final Action: Accept in Principle in Part**
(210.12(B))

Submitter: Herbert S. Pharo, Cape May, NJ
Comment on Proposal No: 2-126
Recommendation: This Proposal should be Accept in Principle as follows:
210.12 Arc-Fault Circuit-Interrupter Protection
(B) Dwelling Units ~~Bedrooms~~.
(1) 120-Volt, 15 and 20-Ampere Branch Circuits. All 120-volt, single phase, 15- and 20-ampere ~~branch circuits supplying~~ outlets installed in dwelling units ~~bedrooms~~ shall be protected by a listed arc-fault circuit interrupter, combination type installed in accordance with one of the following: ~~to provide protection of the branch circuit.~~
(1) All 120-volt, single phase, 15- and 20-ampere branch circuits shall be protected. All other circuits shall be installed in:
a. EMT or
b. Type AC cable with a steel a outer jacket and a copper equipment grounding conductor
(2) All 120-volt, single phase, 15- and 20-ampere outlets and branch circuit conductors shall be protected at, and downstream of the first outlet, in accordance with the following:
a. Branch circuit conductors to the first outlet of all 120-volt, single phase, 15- and 20-ampere circuits are installed in EMT or type AC cable with a steel a outer jacket and a copper equipment grounding conductor and
b. All other circuits shall be installed in EMT or type AC cable with a steel a outer jacket and a copper equipment grounding conductor .....
~~Branch/feeder AFCIs shall be permitted to be used to meet the requirements of 210.12(B) until January 1, 2008.~~
~~FPN: For information on types of arc-fault circuit interrupters, see UL 1699-1999, Standard for Arc-Fault Circuit Interrupters.~~
~~Exception: The location of the arc-fault circuit interrupter shall be permitted to be at other than the origination of the branch circuit in compliance with (a) and (b):~~
~~(a) The arc-fault circuit interrupter installed within 1.8 m (6 ft) of the branch circuit overcurrent device as measured along the branch circuit conductors.~~
~~(b) The circuit conductors between the branch circuit overcurrent device and the arc-fault circuit interrupter shall be installed in a metal raceway or a cable with a metallic sheath.~~
Substantiation: The AFCI debate can be quite controversial. A significant amount of data has been accumulated with respect to electrically related fires in dwelling units. No one can dispute the fact that the electrical industry must take steps reduce the fires in dwelling units which are started through the use of electricity in the home. The data on which these changes are based is sometimes lost in the discussion. To some degree it seems we are attempting to develop an electronic fire extinguisher without eliminating the root cause of the problem. The AFCI is and will continue to be a LIFE SAVING device. I fully support requirements for AFCI protection in dwelling units. That said, let's look at where these fires start and what is causing or contributing to these fires. The following discussion is based on the most recent data that I could find. In November of 2005 the CPSC released the "1999 Revised – 2002 Residential Fire Loss Estimates." Table 4a on page 17 outlines the number of fires for different types of electrical equipment in residential structures. Table 1a outlines the total number of fires. This report is included for the members of CMP-2. The entire report is available online at http://www.cpsc.gov/library/fire02.pdf
In order for one to objectively review the 2002 fire data, with respect to the proposed AFCI requirements, we must identify where and at what voltages fires are occurring. Please read the note at the bottom of table 4a. As fire statistics are rounded off to the nearest 100, adding the individual categories for fires will not equal the column total. Adding the individual categories for 2002 comes to a total of 82,400.

Total Electrical Fires	**82,400**	**100%**
Electrical Fires not mitigated by AFCI	**[,900**	**2%**
Upstream, Panelboards, meters		
Other, torch?		
Over 120-volts, not mitigated by AFCI	**41,500**	**50%**
Central & fixed heating, water heater,		
Fixed central AC, range/oven/hood,		
Clothes dryer		
Note that the fire may have been in the branch		
circuit or in the equipment		
Note that the total cooking equipment fires are		
listed on table 1a at 117,700 and table 4a lists		
35,500 electrical cooking equipment fires at		
Note that the total heating and cooling fires are		
listed on table 1a at 55,800 and table 4a lists		
13,200 electrical heating and cooling		
Installed Wiring	**81,100**	**10%**
Note that not all installed wiring will be at		
120-volt, single phase, 15- and 20-ampere		
And may not be AFCI protected		
Load side of Outlet	**30,900**	**38%**
This includes all other selected electrical		
equipment on table 4a		

No data exists in this or in any report I have seen to differentiate between fires which were started due to an "arcing fault" or a fire started due to misapplication or user error. The data does reveal significant problems. One may argue that the cooking, heating and cooling fires are incorrectly listed as electrical. Please note that table 1a lists total fires and 4a lists electrical fires. Total heating and cooling fires were 55,800 on table 1a and heating and cooling fires electrical in nature were 13,200 on table 4a. Total cooking equipment fires were 117,700 on table 1a and cooking fires electrical in nature were 35,500. One may also argue that some of the "other" categories may not fall into the "load side" category. The data as outlined represents the CPSC findings and is extremely interesting.

It is extremely disturbing to see that undeniably 50% of electrical residential fires occur with equipment not protected at 120-volt, single phase, 15- and 20-amps. Did these fire start in the equipment or on the load outlet? Could AFCI protection have prevented these fires? Protection of these branch circuits must be considered by CMP-2. EMT is proposed as it would offer significant protection. Type AC cable with a steel outer jacket is proposed as it would also provide necessary protection. It is also proposed to use a copper equipment grounding conductor as the intended purpose of the steel jacket in this comment is for protection only. Type AC cable is required to be constructed with an outer jacket of at least 25 mils. The jacket of most MC cable is NOT recognized as a fault return path and the jacket is permitted to be significantly thinner.

Regardless of how this data is interpreted there are two issues CMP-2 must focus on, fixed wiring and load side of the outlet.

Fixed wiring

Depending upon which report you are reading, fixed wiring causes between 10% and 35% of electrical fires. This problem can be fixed by providing protection of the wiring method. The wiring method of choice in a dwelling unit is type NM. This wiring method is easily damaged and pierced by screws or nails. We could eliminate a significant number of residential fires if we were to eliminate type NM cable from all dwelling units.

Load side of the outlet

AFCI protection will always be necessary to provide protection from arcing faults on the load side of an outlet. Allowing the protection at the first outlet provides protection for all outlets and fixed wiring downstream of AFCI protection at the first outlet. Requiring EMT or type AC cable with a steel outer jacket to the first outlet will provide adequate protection of the home run.

Note: Supporting Material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle in Part

The panel rejects the addition of subdivision (1).

Panel Statement: The data provided in the proposed subdivision (1) does not clearly indicate that the fires that occurred in circuits over 15- and 20- amp, 120 volt would have been prevented by installing the conductors in metal raceways and cables. The panel notes that the proposed subdivision (1) introduces new material. The remainder of the recommendation is addressed by the panel action on Comment 2-129. See panel action and statement on Comment 2-129.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

KING, D.: Panel 2 should have given further consideration to the submitter's substantiation regarding fires that occur in fixed wiring circuits rated over 120 volts. The data provided by the submitter from the Consumer Product Safety Commission illustrates an alarming number of electrically oriented fires in circuits rated above 120 volts that are not protected by the requirements of 210.12(B) as presently written. Panel 2 should have addressed these unprotected circuits by accepting in principle this comment with the following revised text:

Revise Subdivision (1)(A) to read as follows: EMT, Rigid Metal Conduit, Intermediate Metal Conduit or...

Revise Subdivision (2)(A) to read as follows:

Branch circuit conductors to the first outlet of all 120-volt, single phase, 15-and 20-ampere circuits are installed in EMT, Rigid Metal Conduit, Intermediate Metal Conduit or type AC with a steel outer jacket and a copper equipment grounding conductor and...

(B) all other circuits shall be installed in EMT, Rigid Metal Conduit, Intermediate Metal Conduit or Type AC cable with a steel outer jacket and a copper equipment grounding conductor.

The revised text includes other types of metal raceway that would provide an equivalent level of protection for the portion of branch circuit wiring t hat is not protected by an AFCI device.

Although I applaud the advancements in safety made by the Panel action on Comment 2-129, a much greater level of safety would have been achieved through my recommended Panel action on this Comment.

2-106 Log #1325 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: David R. Carpenter, Florence, AL
Comment on Proposal No: 2-142
Recommendation: This proposal and the expansion of requirements for AFCIs in dwelling units should be rejected.
Substantiation: Replacing the term "All 120-volt, single phase, 15- and 20-ampere branch circuit supply outlets installed in dwelling units bedrooms" with the term "All 120-volts, single phase, 15- and 20-ampere branch circuits" is a huge and far reaching change without substantiation. The submitter convinced the panel with knee jerk logic, but has provided no substantiation for this change. Nothing has been presented that proves AFCIs have reduced loss of property or life. The AFCI is not a "Catch All" breaker that can eliminate every fault signature hazard. The present technology is based on certain frequencies of an arc.

As an inspector, I find it very difficult to defend this code requirement to my constituents. I see no justification by the submitter based on history of an unsafe condition nor do I see any technical data to back the claim. Without proper justification, it appears the code is being used as a tool simply to sell products and not to prevent shock and fire hazards as in the stated purposed 90.1.

Panel Meeting Action: Reject
Panel Statement: Based on data submitted over several code cycles, The panel continues to support the belief that AFCIs provide a significantly improved level of protection for the electrical system.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-106 on Proposal 2-142 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-107 Log #1405 NEC-P02 **Final Action: Accept in Principle in Part**
(210.12(B))

Submitter: J.A. Wafer, Eaton Electrical
Comment on Proposal No: 2-142
Recommendation: Continue to Accept the Proposal as submitted.
Substantiation: This comment is intended to confirm Eaton Electrical's support for the Panel action. There is no question that the 1999 Code provided a significant improvement in residential electrical safety by requiring AFCI protection for dwelling unit bedroom circuits, effective January 1, 2002. The Panel's acceptance of this proposal will further increase this level of safety. As noted in the submitter's substantiation to Proposal 2-142, "...it is an appropriate time to expand AFCIs to all 15 and 20 ampere branch circuits in the dwelling." In particular, the increased fire protection by AFCIs should not be limited to the branch circuits supplying outlets in dwelling unit bedrooms.

Panel Meeting Action: Accept in Principle in Part
Panel Statement: See panel action and statement on Comment 2-85.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.
NENNINGER, B.: See my Negative Explanation given in Comment 2-72.
PURVIS, R.: Comment 2-107 should be rejected. Even this "limited" expansion should be reevaluated the next code cycle after additional field experience with the new combination type AFCI is available for review along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-108 Log #1480 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: James Murphy, Lawrence Berkeley National Laboratory
Comment on Proposal No: 2-142
Recommendation: Reject this proposal.
Substantiation: Expanding the use of AFCIs to all 15 and 20 amp circuits installed in dwelling units is unsubstantiated and entirely too far-reaching a proposal. The fire statistics and other material that have been presented as substantiation for expanding AFCIs deal largely with fires occurring in one and two family dwellings. According to NFPA's U.S. Fires in Selected Occupancies (March 2006) which lists the leading causes of structure fires, fires caused by electrical distribution or lighting equipment in one and two family homes represent 10 percent of the total while they represent only 5 percent of the total in apartments. As the report states: "The systems that tend to be centrally installed, maintained and supervised in apartment buildings, such as heating and electrical distribution equipment, cause a smaller share of the fires in apartments than they do in dwellings."

This proposal would apply to any type of dwelling unit, whether a single family home or a condominium in a 60 story hi-rise that would have fire-resistant construction, sprinklers, and more robust wiring methods than those typically used in single family homes. The requirement for AFCIs in these dwelling units is an unnecessary feature and is not justified when more stringent building and electrical safety requirements already are mandated by Codes.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree that multi-family dwelling units should have a different level of protection than single family dwellings. See panel statement on Comment 2-106.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.
NENNINGER, B.: See my Negative Explanation given in Comment 2-72.
PURVIS, R.: Comment 2-108 on Proposal 2-142 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-109 Log #1781 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Joseph A. Hertel, Safety and Buildings
Comment on Proposal No: 2-142
Recommendation: The text should remain as written in the 2005 NEC until such time as there is data to support the expansion of AFCI technology.
Substantiation: The substantiation provided to the panel is a statement that the CMP has reviewed extensive amounts of data and information pertaining to the benefit of AFCIs for the protection of dwelling unit branch circuits. If the CMP has been provided significant amounts of information and data is this information and data available to the public? Anyone is free to install AFCI protection for any and all circuits they desire without a mandate in the NEC. The NEC is by its own intention not a design manual. As a member of the public and NFPA, I follow literature and have not seen data that indicate the fire rates in dwelling units have been affected by the installation of AFCI devices.
Panel Meeting Action: Reject
Panel Statement: The panel has reviewed adequate substantiation that supports AFCI technology and its ability to mitigate arcing faults that can ignite surrounding combustible material. This information is available at NFPA Headquarters. Additional information attesting to the reliability of these devices is available at NFPA Headquarters and was reviewed by the Panel. Actual fire data that reflect the benefit of these devices will not be available until they are required to be used in broader applications in the field.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.
NENNINGER, B.: See my Negative Explanation given in Comment 2-72.
PURVIS, R.: Comment 2-109 on Proposal 2-142 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-110 Log #2006 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-121
Recommendation: Reject the proposal.
Substantiation: Let's get to the bottom line on this matter - There is absolutely no fire data that can be used to support the expansion of AFCIs to all receptacles, let alone the mandatory installation of AFCIs in bedrooms.

Looking at the latest data from NFPA in the report "The U.S. Home Product Report (Appliances and Equipment Involved in Fires)", by John R. Hall, Jr., of the Fire Analysis and Research Division of NFPA dated November 2005, the report shows that the annual average number of home fires is 372,900, with direct property damage of $443,000.000. Of this number 32,000 (or 9% = $39,870,000) of these fires are caused by "electrical distribution equipment." Of that 9%, only 14,500 (or 4% = $17,720,000) of those fires are attributed to "fixed wiring, switches, outlets, and receptacles." And, there is no data or study to support that of these 14,500 fires and the installation of an AFCI device would have prevented the fire.

Using the U.S. Census Bureau data on building permits for 2004 (Table (S-3) Final) shows 1,656,413 one- and two-family dwelling units and 413,664 multifamily units for that year.

There are typically 20 (twenty) 20-volt, single phase, 15- and 20-ampere branch circuits in each one- and two-family dwelling unit, and 10 in each multifamily dwelling unit. Using these numbers, there will be 33,128,260 AFCIs in OTFDs and 4,136,640 for multifamily units, for a total of 37,264,900 AFCIs.

Using a wholesale cost of $34.00 per breaker, marked-up the industry standard percentage of 66 percent, produces a cost per breaker of $56.44 to the homeowner.

In all, the average annual total cost to the public for the mandatory installation of AFCIs will be $2,103,230.956 ($1,267,006,600 wholesale). That is 2 BILLION, 130 MILLION, 230 THOUSAND AND 956 DOLLARS.

Using current fire loss data, society will be spending $2,103,230.956 per year to cover losses of only $39,870,000. That means spending 52 times the amount of money that would be lost if the devices were not installed and that is if the devices work 100% of the time. If you use the losses relating only to "fixed wiring, switches, outlets, and receptacles" (the part of the wiring that is claimed to be protected by AFCI breakers) the ratio to money spent relative to monetary loss ($17,720,000) is 119 times, again, if they work 100% of the time.

In addition to the submitter's substantiation, there is no data to support the contention of a neither "excellent track record", nor information that these "installations have found numerous wiring errors" or "they have found wiring damage and equipment damage that could have been a potential source of fire". That statement alone provides no correlation between the purported problems and the use of AFCIs.

It should also be noted that it appears the method used to certify these devices actually only tests to make sure the device will not cause an electrical shock or fire problem. IT DOES NOT TEST THE DEVICE TO ENSURE IT WILL PREVENT A FIRE CAUSED BY THE MANY SITUATIONS OF ELECTRICAL ARCING THAT COULD CAUSE A FIRE.

IN OTHER WORDS, NO ONE CAN PROVE THESE DEVICES WILL HAVE ANY COST-BENEFIT TO SOCIETY.

The Panel needs to reconsider the mandatory installation of AFCIs, let alone the expansion of requiring these devices for all 120-volt, single phase, 15- and 20-ampere branch circuits in dwelling units. Until true field test data on the efficacy of AFCIs can be directly related to saving society monetary loss there is no cost-benefit in this provision.
Panel Meeting Action: Reject
Panel Statement: See panel statements on Comments 2-79 and 2-97.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.
NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

2-111 Log #2007 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-125
Recommendation: Reject the proposal.
Substantiation: Let's get to the bottom line on this matter - There is absolutely no fire data that can be used to support the expansion of AFCIs to all receptacles, let alone the mandatory installation of AFCIs in bedrooms.

Looking at the latest data from NFPA in the report "The U.S. Home Product Report (Appliances and Equipment Involved in Fires)", by John R. Hall, Jr., of the Fire Analysis and Research Division of NFPA dated November 2005, the report shows that the annual average number of home fires is 372,900, with direct property damage of $443,000.000. Of this number 32,000 (or 9% = $39,870,000) of these fires are caused by "electrical distribution equipment." Of that 9%, only 14,500 (or 4% = $17,720,000) of those fires are attributed to "fixed wiring, switches, outlets, and receptacles." And, there is no data or study to support that of these 14,500 fires and the installation of an AFCI device would have prevented the fire.

Using the U.S. Census Bureau data on building permits for 2004 (Table (S-3) Final) shows 1,656,413 one- and two-family dwelling units and 413,664 multifamily units for that year.

There are typically 20 (twenty) 20-volt, single phase, 15- and 20-ampere branch circuits in each one- and two-family dwelling unit, and 10 in each multifamily dwelling unit. Using these numbers, there will be 33,128,260 AFCIs in OTFDs and 4,136,640 for multifamily units, for a total of 37,264,900 AFCIs.

Using a wholesale cost of $34.00 per breaker, marked-up the industry standard percentage of 66 percent, produces a cost per breaker of $56.44 to the homeowner.

In all, the average annual total cost to the public for the mandatory installation of AFCIs will be $2,103,230.956 ($1,267,006,600 wholesale). That is 2 BILLION, 130 MILLION, 230 THOUSAND AND 956 DOLLARS.

Using current fire loss data, society will be spending $2,103,230.956 per year to cover losses of only $39,870,000. That means spending 52 times the amount of money that would be lost if the devices were not installed and that is if the devices work 100% of the time. If you use the losses relating only to "fixed wiring, switches, outlets, and receptacles" (the part of the wiring that is claimed to be protected by AFCI breakers) the ratio to money spent relative to monetary loss ($17,720,000) is 119 times, again, if they work 100% of the time.

In addition to the submitter's substantiation, there is no data to support the contention of a neither "excellent track record", nor information that these "installations have found numerous wiring errors" or "they have found wiring damage and equipment damage that could have been a potential source of fire". That statement alone provides no correlation between the purported problems and the use of AFCIs.

It should also be noted that it appears the method used to certify these devices actually only tests to make sure the device will not cause an electrical shock or fire problem. IT DOES NOT TEST THE DEVICE TO ENSURE IT WILL PREVENT A FIRE CAUSED BY THE MANY SITUATIONS OF ELECTRICAL ARCING THAT COULD CAUSE A FIRE.

IN OTHER WORDS, NO ONE CAN PROVE THESE DEVICES WILL HAVE ANY COST-BENEFIT TO SOCIETY.

The Panel needs to reconsider the mandatory installation of AFCIs, let alone the expansion of requiring these devices for all 120-volt, single phase, 15- and 20-ampere branch circuits in dwelling units. Until true field test data on the efficacy of AFCIs can be directly related to saving society monetary loss there is no cost-benefit in this provision.

Panel Meeting Action: Reject
Panel Statement: See panel statements on Comments 2-79 and 2-97.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-111 on Proposal 2-125 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-112 Log #2008 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-129
Recommendation: Reject the proposal.
Substantiation: Let's get to the bottom line on this matter - There is absolutely no fire data that can be used to support the expansion of AFCIs to all receptacles, let alone the mandatory installation of AFCIs in bedrooms.

Looking at the latest data from NFPA in the report "The U.S. Home Product Report (Appliances and Equipment Involved in Fires)", by John R. Hall, Jr., of the Fire Analysis and Research Division of NFPA dated November 2005, the report shows that the annual average number of home fires is 372,900, with direct property damage of $443,000.000. Of this number 32,000 (or 9% = $39,870,000) of these fires are caused by "electrical distribution equipment." Of that 9%, only 14,500 (or 4% = $17,720,000) of those fires are attributed to "fixed wiring, switches, outlets, and receptacles." And, there is no data or study to support that of these 14,500 fires and the installation of an AFCI device would have prevented the fire.

Using the U.S. Census Bureau data on building permits for 2004 (Table (S-3) Final) shows 1,656,413 one- and two-family dwelling units and 413,664 multifamily units for that year.

There are typically 20 (twenty) 20-volt, single phase, 15- and 20-ampere branch circuits in each one- and two-family dwelling unit, and 10 in each multifamily dwelling unit. Using these numbers, there will be 33,128,260 AFCIs in OTFDs and 4,136,640 for multifamily units, for a total of 37,264,900 AFCIs.

Using a wholesale cost of $34.00 per breaker, marked-up the industry standard percentage of 66 percent, produces a cost per breaker of $56.44 to the homeowner.

In all, the average annual total cost to the public for the mandatory installation of AFCIs will be $2,103,230.956 ($1,267,006,600 wholesale). That is 2 BILLION, 130 MILLION, 230 THOUSAND AND 956 DOLLARS.

Using current fire loss data, society will be spending $2,103,230.956 per year to cover losses of only $39,870,000. That means spending 52 times the amount of money that would be lost if the devices were not installed and that is if the devices work 100% of the time. If you use the losses relating only to "fixed wiring, switches, outlets, and receptacles" (the part of the wiring that is claimed to be protected by AFCI breakers) the ratio to money spent relative to monetary loss ($17,720,000) is 119 times, again, if they work 100% of the time.

In addition to the submitter's substantiation, there is no data to support the contention of a neither "excellent track record", nor information that these "installations have found numerous wiring errors" or "they have found wiring damage and equipment damage that could have been a potential source of fire". That statement alone provides no correlation between the purported problems and the use of AFCIs.

It should also be noted that it appears the method used to certify these devices actually only tests to make sure the device will not cause an electrical shock or fire problem. IT DOES NOT TEST THE DEVICE TO ENSURE IT WILL PREVENT A FIRE CAUSED BY THE MANY SITUATIONS OF ELECTRICAL ARCING THAT COULD CAUSE A FIRE.

IN OTHER WORDS, NO ONE CAN PROVE THESE DEVICES WILL HAVE ANY COST-BENEFIT TO SOCIETY.

The Panel needs to reconsider the mandatory installation of AFCIs, let alone the expansion of requiring these devices for all 120-volt, single phase, 15- and 20-ampere branch circuits in dwelling units. Until true field test data on the efficacy of AFCIs can be directly related to saving society monetary loss there is no cost-benefit in this provision..

Panel Meeting Action: Reject
Panel Statement: See panel statements on Comments 2-79 and 2-97.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

2-113 Log #2010 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-142
Recommendation: Reject the proposal.
Substantiation: Let's get to the bottom line on this matter - There is absolutely no fire data that can be used to support the expansion of AFCIs to all receptacles, let alone the mandatory installation of AFCIs in bedrooms.

Looking at the latest data from NFPA in the report "The U.S. Home Product Report (Appliances and Equipment Involved in Fires)", by John R. Hall, Jr., of the Fire Analysis and Research Division of NFPA dated November 2005, the report shows that the annual average number of home fires is 372,900, with direct property damage of $443,000.000. Of this number 32,000 (or 9% = $39,870,000) of these fires are caused by "electrical distribution equipment." Of that 9%, only 14,500 (or 4% = $17,720,000) of those fires are attributed to "fixed wiring, switches, outlets, and receptacles." And, there is no data or study to support that of these 14,500 fires and the installation of an AFCI device would have prevented the fire.

Using the U.S. Census Bureau data on building permits for 2004 (Table (S-3) Final) shows 1,656,413 one- and two-family dwelling units and 413,664 multifamily units for that year.

There are typically 20 (twenty) 20-volt, single phase, 15- and 20-ampere branch circuits in each one- and two-family dwelling unit, and 10 in each multifamily dwelling unit. Using these numbers, there will be 33,128,260 AFCIs in OTFDs and 4,136,640 for multifamily units, for a total of 37,264,900 AFCIs.

Using a wholesale cost of $34.00 per breaker, marked-up the industry standard percentage of 66 percent, produces a cost per breaker of $56.44 to the homeowner.

In all, the average annual total cost to the public for the mandatory installation of AFCIs will be $2,103,230.956 ($1,267,006,600 wholesale). That is 2 BILLION, 130 MILLION, 230 THOUSAND AND 956 DOLLARS.

Using current fire loss data, society will be spending $2,103,230.956 per year to cover losses of only $39,870,000. That means spending 52 times the amount of money that would be lost if the devices were not installed and that is if the devices work 100% of the time. If you use the losses relating only to "fixed wiring, switches, outlets, and receptacles" (the part of the wiring that is claimed to be protected by AFCI breakers) the ratio to money spent relative to monetary loss ($17,720,000) is 119 times, again, if they work 100% of the time.

In addition to the submitter's substantiation, there is no data to support the contention of a neither "excellent track record", nor information that these "installations have found numerous wiring errors" or "they have found wiring damage and equipment damage that could have been a potential source of fire". That statement alone provides no correlation between the purported problems and the use of AFCIs.

It should also be noted that it appears the method used to certify these devices actually only tests to make sure the device will not cause an electrical shock or fire problem. IT DOES NOT TEST THE DEVICE TO ENSURE IT WILL PREVENT A FIRE CAUSED BY THE MANY SITUATIONS OF ELECTRICAL ARCING THAT COULD CAUSE A FIRE.

IN OTHER WORDS, NO ONE CAN PROVE THESE DEVICES WILL HAVE ANY COST-BENEFIT TO SOCIETY.

The Panel needs to reconsider the mandatory installation of AFCIs, let alone the expansion of requiring these devices for all 120-volt, single phase, 15- and 20-ampere branch circuits in dwelling units. Until true field test data on the efficacy of AFCIs can be directly related to saving society monetary loss there is no cost-benefit in this provision.

Panel Meeting Action: Reject

Panel Statement: See panel statements on Comments 2-79 and 2-97.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 3

Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-113 on Proposal 2-142 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-114 Log #2012 NEC-P02 **Final Action: Reject (210.12(B))**

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)

Comment on Proposal No: 2-132

Recommendation: Reject the proposal.

Substantiation: Let's get to the bottom line on this matter - There is absolutely no fire data that can be used to support the expansion of AFCIs to all receptacles, let alone the mandatory installation of AFCIs in bedrooms.

Looking at the latest data from NFPA in the report "The U.S. Home Product Report (Appliances and Equipment Involved in Fires)", by John R. Hall, Jr., of the Fire Analysis and Research Division of NFPA dated November 2005, the report shows that the annual average number of home fires is 372,900, with direct property damage of $443,000.000. Of this number 32,000 (or 9% = $39,870,000) of these fires are caused by "electrical distribution equipment." Of that 9%, only 14,500 (or 4% = $17,720,000) of those fires are attributed to "fixed wiring, switches, outlets, and receptacles." And, there is no data or study to support that of these 14,500 fires and the installation of an AFCI device would have prevented the fire.

Using the U.S. Census Bureau data on building permits for 2004 (Table (S-3) Final) shows 1,656,413 one- and two-family dwelling units and 413,664 multifamily units for that year.

There are typically 20 (twenty) 20-volt, single phase, 15- and 20-ampere branch circuits in each one- and two-family dwelling unit, and 10 in each multifamily dwelling unit. Using these numbers, there will be 33,128,260 AFCIs in OTFDs and 4,136,640 for multifamily units, for a total of 37,264,900 AFCIs.

Using a wholesale cost of $34.00 per breaker, marked-up the industry standard percentage of 66 percent, produces a cost per breaker of $56.44 to the homeowner.

In all, the average annual total cost to the public for the mandatory installation of AFCIs will be $2,103,230.956 ($1,267,006,600 wholesale). That is 2 BILLION, 130 MILLION, 230 THOUSAND AND 956 DOLLARS.

Using current fire loss data, society will be spending $2,103,230.956 per year to cover losses of only $39,870,000. That means spending 52 times the amount of money that would be lost if the devices were not installed and that is if the devices work 100% of the time. If you use the losses relating only to "fixed wiring, switches, outlets, and receptacles" (the part of the wiring that is claimed to be protected by AFCI breakers) the ratio to money spent relative to monetary loss ($17,720,000) is 119 times, again, if they work 100% of the time.

In addition to the submitter's substantiation, there is no data to support the contention of a neither "excellent track record", nor information that these "installations have found numerous wiring errors" or "they have found wiring damage and equipment damage that could have been a potential source of fire". That statement alone provides no correlation between the purported problems and the use of AFCIs.

It should also be noted that it appears the method used to certify these devices actually only tests to make sure the device will not cause an electrical shock or fire problem. IT DOES NOT TEST THE DEVICE TO ENSURE IT WILL PREVENT A FIRE CAUSED BY THE MANY SITUATIONS OF ELECTRICAL ARCING THAT COULD CAUSE A FIRE.

IN OTHER WORDS, NO ONE CAN PROVE THESE DEVICES WILL HAVE ANY COST-BENEFIT TO SOCIETY.

The Panel needs to reconsider the mandatory installation of AFCIs, let alone the expansion of requiring these devices for all 120-volt, single phase, 15- and 20-ampere branch circuits in dwelling units. Until true field test data on the efficacy of AFCIs can be directly related to saving society monetary loss there is no cost-benefit in this provision.

Panel Meeting Action: Reject

Panel Statement: See panel statements on Comments 2-79 and 2-97.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 3

Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-114on Proposal 2-142 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-115 Log #2136 NEC-P02 **Final Action: Accept in Principle (210.12(B))**

Submitter: Craig Lauder, Dover, NH

Comment on Proposal No: 2-139

Recommendation: Revise text to read as follows:

(B) Dwelling unit ~~bedrooms~~ All 120-volt, single phase, 15- and 20-ampere branch circuits supplying ~~receptacle~~ outlets installed dwelling in unit ~~bedrooms~~ shall be...

Substantiation: UL 1699 tests have shown that AFCI combination breakers protect against parallel arcs for any circuit, so they should not be limited to just the bedrooms. Requiring AFCI for just "receptacle" outlets would not protect hard wired appliances.

Panel Meeting Action: Accept in Principle

See panel action and statement on Comment 2-95.

Panel Statement: See panel action and statement on Proposal 2-142, which satisfies the submitter's intent.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 3

Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-115 on Proposal 2-142 should be rejected. Even this "limited" expansion should be reevaluated the next code cycle after additional field experience with the new combination type AFCI is available for review along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-116 Log #2140 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: David R Carpenter, Florence, AL
Comment on Proposal No: 2-142
Recommendation: This Proposal and all expansion of requirements for AFCIs in dwelling units should be Rejected.
Substantiation: Replacing the term "All 120-volt, single phase, 15- and 20-ampere branch circuits supplying outlets installed in dwelling units bedrooms" with the term "All 120-volt, single phase, 15- and 20-ampere branch circuits" is a huge and far reaching change without substantiation. The submitter convinced the panel with knee jerk logic, but has provided no substantiation for this change. None of the "Fire Cause" sections described on NFPA and CPSC websites concern branch circuits except bedrooms.

Nothing has been presented that proves AFCIs have reduced loss of property or life. The AFCI is not a "catch all" breaker that can eliminate every fault signature hazard. The present technology is based on certain frequencies of an arc but not all that could occur. See "Leading Causes of Structure Fires in Homes" on NFPA's website.

As an inspector, I find it very difficult to defend this code requirement. The past justification was based on CPSC findings of high rates of fire in bedrooms, I see no justification by the submitter based on history of an unsafe condition nor do I see any technical data to back the claim. Without proper justification it appears the code is being used as a tool simply to sell products and not to prevent shock and fire hazard as is the stated purpose of the NEC in 90.1.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-106.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-116 on Proposal 2-142 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-117 Log #2174 NEC-P02 **Final Action: Accept in Principle in Part**
(210.12(B))

Submitter: Chris Simpson, Sensata Technologies
Comment on Proposal No: 2-132
Recommendation: The Code Making Panel should continue to "Accept in Principle in Part" this revised text. We agree with the code making panel's decision to reject the deletion of "combination type" devices.
Substantiation: Combination type AFCI technology is available from Sensata Technologies and we are pursuing UL listing for the circuit breaker application before the end of 2006. Sensata has brought this technology to market in the form of a plug cap for the RAC application in 2004. We're entering field trials with our combination type product for the circuit breaker application in November 2006 and will be making commercial shipments in early 3Q07.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: See panel action and statement on Comment 2-85.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

PURVIS, R.: Comment 2-117 should be rejected. Even this "limited" expansion should be reevaluated the next code cycle after additional field experience with the new combination type AFCI is available for review along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-118 Log #2175 NEC-P02 **Final Action: Accept in Principle in Part**
(210.12(B))

Submitter: Chris Simpson, Sensata Technologies
Comment on Proposal No: 2-142
Recommendation: The Code Making Panel should continue to "Accept" this revised text.
Substantiation: Combination type AFCI technology is available from Sensata Technologies and we are pursuing UL listing for the circuit breaker application before the end of 2006. Sensata has brought this technology to market in the form of a plug cap for the RAC application in 2004. We're entering field trials with our combination type product for the circuit breaker application in November 2006 and will be making commercial shipments in early 3Q07.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: See panel action and statement on Comment 2-85.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-118 should be rejected. Even this "limited" expansion should be reevaluated the next code cycle after additional field experience with the new combination type AFCI is available for review along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-119 Log #2192 NEC-P02 **Final Action: Accept in Principle in Part**
(210.12(B))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 2-142
Recommendation: Continue to Accept the Proposal as submitted.
Substantiation: As noted in the substantiation, it is time to expand the use of AFCI. This comment is intended to address the comments with the negative votes by Mr. Becker, Mr. Brown, Mr. Nenninger, and Mr. Purvis.

Mr. Becker questions the reliability of AFCIs and whether there is enough data on the effectiveness of AFCI to justify expansion. There are over 20,000,000 AFCI in service and the number grows daily. This is a large base and manufacturers are not aware of reliability issues and Mr. Becker does not present any data supporting his claim of a reliability issue nor has he provided any information to the manufacturers supporting this claim.

Relative to the effectiveness of AFCI, there are situations where AFCIs are detecting arcing situations and protecting the circuit. The devices are functioning and are effective.

Mr. Becker states that substantiation must provide a demonstrable link between the present installation of AFCIs in bedrooms and a reduction of fires before expansion. The effort to quantify a reduction in fires and the use of AFCI will forever be difficult (as it would be with other products) and code making bodies have been careful over the years not to withhold advancements in safety for this type of justification. AFCIs do detect arcing situations that if not detected could develop into dangerous situations where a fire could occur. The branch/feeder devices introduced in the 2002 Code provided a significant improvement in safety and the change to combination devices in 2008 will increase this safety level further. AFCI technology is relatively new and will continue to develop and increase the level of safety.

Mr. Becker questions whether AFCIs provide any protection beyond that provided by a standard circuit breaker. AFCI devices function in a range of protection outside of that provided by standard circuit breakers so there is no question that there is additional protection beyond what is provided by a standard circuit breaker. Combination devices function to detect arcing situations well below the handle rating of the circuit breaker.

Mr. Becker raised a question about installing GFCIs on branch circuits protected by AFCIs but it is unknown what the issue or question is. GFCIs can be, and have been, installed on the same circuit since AFCIs were introduced. There is no issue and, indeed, some AFCIs have been designed to include 5ma GFCI protection.

Mr. Brown's negative comments indicate that the issue is purely dollars and cents. He does not seem to question that AFCIs provide additional safety, but questions whether the increased safety is worth the cost.

It should be noted that home builders took similar positions when GFCI and smoke alarm requirements were introduced. The same argument is occurring presently with sprinkler protection for dwellings. If all of these issues were viewed only as a dollars and cents issues, we would not have many of the safety improvements we have today. If one applied this same type of analysis as justification for overcurrent protection of circuits, you would arrive at the conclusion that there is no justification for having any overcurrent protection - fuse or circuit breaker - on every circuit. A circuit breaker trip in a dwelling is relatively rare and the number of trips relative to the number installed is infinitesimally low.

The same type of dollars and cents analysis would likely show that GFCI and smoke detectors were not justified. If homeowner's insurance was evaluated on the same basis that Mr. Brown uses, the numbers would probably indicate that the cost of insurance far exceeds the losses and, therefore, no one should purchase insurance.

Mr. Brown notes that until data is available to indicate that AFCIs are directly related to saving society monetary loss that AFCIs should not be required. That logic would result in codes and standards that would have no safety provisions.

Mr. Nenninger questions the timing of expansion. AFCIs have been required in the 2002 and 2005 Code so there is significant experience with the devices (20,000,000+ installed). It is true that the 2008 Code will require a new type of device with expanded safety, but that does not justify not moving forward with expansion of AFCI.

Mr. Purvis comments that field problems, manufacturer recalls, nuisance trips, and lack of support are reasons to not include AFCI in the NEC.

● Relative to field problems there have been some trips with AFCI and while many of these were due to actual arc faults there have been some trips that can be attributed to improper wiring or a specific issue with a connected load. In the instances where there was a question about utilization equipment, AFCI manufacturers have responded to these and made adjustments to the AFCI, if possible and warranted, and the result has been that there are few actual unwanted trip issues reported today. When GFCIs were first introduced, there were numerous complaints of nuisance trips (any trip is a nuisance and many of these were valid trips due to ground faults) but what if GFCI were never added to the Code because of perceived nuisance tripping issues?

● Relative to recalls, there was a single AFCI recall from one manufacturer. Although this was due to the specific performance of a component and not the AFCI design, the manufacturer responded quickly and effectively. It should also be noted that in this instance the push-to-test function of the AFCI did exactly as it was supposed to do and indicated that the device had a problem with the arc detection function. The idea that a product recall means that the concept should be removed from the market is not logical. None of us would have an automobile today under this concept.

● The issue of local adoption is indicated as lack of support and, therefore, somehow important in including this in the Code. Local adoption is many times driven for reasons other than safety - e.g., politics - and should not be an issue in what the NEC does. It is also noteworthy that far more jurisdictions have adopted AFCI than those that have not.

The need for AFCI in new houses is questioned because of improvements in wiring. Wiring practices do continue to improve, but unintended things happen in new installations. Systems also continue to age and they are often modified. A perfect installation where nothing goes wrong with the wiring and the loads would not need a circuit breaker or fuse to protect the circuit, but it is understood that the system needs protection against various modes of faults that can occur. The AFCI is an extension of this safety.

Panel Meeting Action: Accept in Principle in Part
Panel Statement: See panel action and statement on Comment 2-85.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-119 should be rejected. Even this "limited" expansion should be reevaluated the next code cycle after additional field experience with the new combination type AFCI is available for review along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

Comment on Affirmative:

PAULEY, J.: The panel statement should reference Comment 2-95 instead of Comment 2-85.

2-120 Log #2215 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Jeff Fitzloff, State of Idaho Division of Building Safety
Comment on Proposal No: 2-105
Recommendation: Revise text to read as follows:

210.12 Arc-Fault Circuit-Interrupter Protection.

(A) Definition: Arc-Fault Circuit Interrupter (AFCI). An arc-fault circuit interrupter is a device intended to provide protection from the effects of arc faults by recognizing characteristics unique to arcing and by functioning to deenergize the circuit when an arc fault is detected. [ROP 2-119].

(B) Dwelling Units. All 120-volt, single phase, 15- and 20-ampere branch circuits installed in dwelling sleeping rooms ~~units~~ shall be protected by a listed arc-fault circuit interrupter, combination type installed to provide protection of the branch circuit.

Substantiation: At this time, I am receiving overwhelming resistance to this change with recommendations to not adopt the 2008 NEC.
Panel Meeting Action: Reject
Panel Statement: The submitter of this comment has not provided adequate substantiation to support his recommendation to limit the requirements for AFCI devices to sleeping areas. The use of the term "sleeping rooms" is vague and unenforceable.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

Comment on Affirmative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-121 Log #2225 NEC-P02 **Final Action: Accept in Principle in Part**
(210.12(B))

Submitter: Randy Dollar, Siemens Energy & Automation
Comment on Proposal No: 2-142
Recommendation: Continue to Accept the Proposal as submitted.
Substantiation: Fire data historically takes years of data analysis to show trends in any direction. As an example, the most recent home structure fire statistics information on the NFPA website (dated April 2006) only uses data collected and analyzed through 2002.

The AFCI, combination type, provides an expanded level of protection over the branch/feeder type. To wait the necessary years for fire data analysis to indicate the benefit of AFCIs in bedroom circuits before expanding to all 120V, 15 and 20 ampere circuits is unnecessarily subjecting unwary homeowners to risks.

An example already exits today against the argument of cost considerations used by Mr. Becker in his explanation. Homeowners pay significantly more than the stated "$250 to $500 per dwelling unit" in homeowners insurance each year, not just as a one time purchase as with the AFCI. However, the typical homeowner never files a claim in excess of that amount. The explanation by Mr. Brown is essentially the same as that provided by Mr. Becker, only using the total numbers as opposed to the "per house" numbers. In addition, the numbers used by Mr. Brown only indicate the direct property damage. It does not take any consideration for the cost of human lives, irreplaceable personal items, lost work, time and wages, temporary housing costs, etc.

Panel Meeting Action: Accept in Principle in Part
Panel Statement: See panel action and statement on Comment 2-85.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my Negative Explanation given in Comment 2-72.

PURVIS, R.: Comment 2-87 should be rejected. Even this "limited" expansion should be reevaluated the next code cycle after additional field experience with the new combination type AFCI is available for review along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

Comment on Affirmative:

KING, D.: See my Affirmative with Comment on Comment 2-95.

2-122 Log #2229 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Douglas A. Lee, U.S. Consumer Product Safety Commission
Comment on Proposal No: 2-138
Recommendation: Reconsider Proposal 2-138 changing "circuit" to "overcurrent". The revised new text shall read as follows:

These requirements shall also apply to existing installations whenever the overcurrent protection device is replaced as part of a service capacity upgrade or renovation.

Substantiation: I agree with the negative comments of Messrs. King, LaRocca, and Weber. All available information indicates that AFCIs are compatible with older wiring systems. Furthermore, Technology for Detecting and Monitoring Conditions that Could Cause Electrical Wiring System Fires (Underwriters Laboratories, September 1995) indicates that installing AFCIs in older homes will help mitigate fires, thus saving lives. The Panel's progressive approach in adopting requirements for AFCIs in the 1999 NEC is commendable but subsequently falls short of making a major impact on reduction of fire losses by rejecting inclusion into existing homes. Regardless of Panel 2s action on Proposal 2-142 and the availability of combination-type AFCIs, there should be no further delay in requiring AFCIs to be installed to supply bedroom circuits when a panelboard is replaced and existing wiring is used.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-141.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

KING, D.: See my explanation of negative on Comment 2-141.

LAROCCA, R.: See my explanation of negative vote on Comment 2-141.

Comment on Affirmative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-123 Log #2243 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Stephen Barrett, Bear Electric
(Log #2421) Kenny Adair, Portsmouth, NH
(Log #2431) Craig Allard, Manchester, NH
(Log #2423) Dan Barfield, Portsmouth, NH
(Log #2375) Leo T. Boivin, South Berwick, ME
(Log #2389) Shannon Booth, Northhampton, NH
(Log #2419) Randall Burnham, Portsmouth, NH
(Log #2432) Chris Burns, Manchester, NH
(Log #2365) Rich Casey, South Berwick, ME
(Log #2396) Chester Cilly, Pelham, NH
(Log #2409) Dana W. Clarke, Loudon, NH
(Log #2427) Tracey Collins, Manchester, NH
(Log #2415) Frank Cookinham, Loudon, NH
(Log #2429) Louis Crescentini, Manchester, NH
(Log #2411) Bryan Curtis, Loudon, NH
(Log #2390) Robert Deyab III, Northhampton, NH
(Log #2371) Dale Fife, South Berwick, ME
(Log #2374) Samantha Fife, South Berwick, ME
(Log #2418) Robert Fisher, Portsmouth, NH
(Log #2392) Bruce Fraser, Pelham, NH
(Log #2364) Albea Gagnon, South Berwick, ME
(Log #2368) Penny Gagnon, South Berwick, ME
(Log #2393) Mark Gemas, Pelham, NH
(Log #2367) Susan W. Gilley-Casey, South Berwick, ME
(Log #2417) Matt Greenwood, Portsmouth, NH
(Log #2422) Terry Harvey, Portsmouth, NH
(Log #2405) Nicholas Hayward, Pelham, NH
(Log #2426) Michael Healy, Manchester, NH
(Log #2370) Tracey Hovan, South Berwick, ME
(Log #2424) Martin Jennison, Portsmouth, NH
(Log #2385) Eric Johnson, Northhampton, NH
(Log #2366) Jeff Jones, South Berwick, ME
(Log #2383) David Knapp, Northhampton, NH
(Log #2388) A. Stephen La Fach, Northhampton, NH
(Log #2403) Sylvain Lacasse, Pelham, NH
(Log #2401) Daniel Laliberte, Pelham, NH
(Log #2420) Gregg lamontagne, Portsmouth, NH
(Log #2398) Richard Lannan, Pelham, NH
(Log #2394) Kevin Lefebvre, Pelham, NH
(Log #2376) R. H. Longtin, South Berwick, ME
(Log #2408) Harold Maclaughlan, Loudon, NH
(Log #2425) Renato Maldini, Portsmouth, NH
(Log #2430) Steve McClintock, Jr., Manchester, NH
(Log #2373) David Melvin, South Berwick, ME
(Log #2391) Don Mendzela, Pelham, NH
(Log #2369) Carol Mick, South Berwick, ME
(Log #2381) Blake Miller, Northhampton, NH
(Log #2402) Daniel Moriarty, Pelham, NH
(Log #2413) Heath Mulhney, Loudon, NH
(Log #2359) Jane Parent, South Berwick, ME
(Log #2358) Robert Parent, South Berwick, ME
(Log #2384) Taylor Phillips, Northhampton, NH
(Log #2386) Stephen J. Pilling, Northhampton, NH
(Log #2412) Gary Potvin, Loudon, NH
(Log #2434) Michael Putane, Manchester, NH
(Log #2404) Tamara N. Quirie, Pelham, NH
(Log #2410) Janet Rachdorf, Loudon, NH
(Log #2414) Kevin Rae, Loudon, NH
(Log #2406) Alice Rancourt, Pelham, NH
(Log #2397) Joanna Rancourt, Pelham, NH
(Log #2407) Robert Rancourt, Pelham, NH
(Log #2399) Steven Rancourt, Pelham, NH
(Log #2357) Sandy Rice, South Berwick, ME
(Log #2387) James Russell, Northhampton, NH
(Log #2428) Bob Saunders, Manchester, NH
(Log #2416) Edward Sheppard, Loudon, NH
(Log #2363) Alan Smith, South Berwick, ME
(Log #2380) Rob Smith, Northhampton, NH
(Log #2382) Troy Snow, Northhampton, NH
(Log #2395) Henry Szumiesz, Pelham, NH
(Log #2361) Michael Taylor, South Berwick, ME
(Log #2378) Michael Thibeau, South Berwick, ME
(Log #2377) Peter Thibeau, South Berwick, ME
(Log #2360) Bill Tobey, South Berwick, ME
(Log #2362) Stephanie Tobey, South Berwick, ME
(Log #2433) Timothy Vallee, Manchester, NH
(Log #2372) Sue Woodman, South Berwick, ME
(Log #2379) Bruce Yelle, Northhampton, NH
(Log #2400) Bruce Zheaunne, Pelham, NH
Comment on Proposal No: 2-142
Recommendation: Proposal should be rejected.
Substantiation: 1. At this point and time there are no combination type AFCIs (series and parallel fault) devices on the market. Manufacturers have had years to produce a product for sale, for commercial use and testing since the original inception of AFCIs and have not. To install this protection using the existing technology would not be in the public's best interest. They would only be getting an AFCI with series protection instead of combination type protection (series and parallel). Many areas where this device can be helpful are on older parallel wiring circuits.

2. Even though this may be a step in the right direction, with the existing technology still in its infancy, this board should require that additional testing be done under the existing NEC code, before having consumers spend BILLIONS of dollars on installing AFCI protection that will be changing or advancing by the 2011 code cycle. It is in the consumer's best interest to only have to pay once for this to be done and not a second time after the manufacturers finally make advances to meet the code requirements.

3. There is not enough data to support any possible issues that may arise with the use of AFCIs in conjunction with GFCIs which are common throughout dwelling unit living areas. Until additional equipment is available, you may not be able to meet the requirement of the proposed code for every application that may arise.

4. Most AFCIs over the last 2 years have been installed in new dwelling units which on a normal basis would not have any problems with these arc faults for quite a few years, if at all, unless there was an installation error. This alone would make the data and research results supplied by the manufacturers unreliable. There must be more time allowed to evaluate the true safety factor that these provide.
Panel Meeting Action: Reject
Panel Statement: The panel action on the original proposal was based on the commercial availability of AFCI devices in January 2008. The submitter of this comment has not provided Panel 2 with any data that would indicate that combination -type AFCI devices will not be commercially available at that time. The submitter has not substantiated that listed combination-type AFCI devices are not compatible with listed GFCI devices.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.
NENNINGER, B.: See my Negative Explanation given in Comment 2-72.
PURVIS, R.: Comment 2-123 on Proposal 2-142 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-124 Log #2245 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 2-142
Recommendation: This proposal should be rejected.
Substantiation: There is not an AFCI device on the market that can do what the original proposals, some 13 years ago, said that the AFCI device could do. The manufactures have not been able to make a product that fulfills the promises made in the original proposals and now they want to require more sales of this uncompleted product so that they can force the consumer to pay the additional research and development costs that are needed to make a workable product. These costs should come from the stockholders, not the consumer. This proposal should be rejected until such time as there is a product that does what they promised it could. At this point in time the available AFCI provides so little protection that it is almost worthless.
Panel Meeting Action: Reject
Panel Statement: The submitter of this comment has not provided any documentation to support his claim that AFCI devices do not function as intended to mitigate arcing faults.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.
NENNINGER, B.: See my Negative Explanation given in Comment 2-72.
PURVIS, R.: Comment 2-124 on Proposal 2-142 should be accepted. AFCI requirements should not be considered for expansion until the combination type AFCIs have had one code cycle of experience along with further substantiation of the need to expand AFCI requirements beyond bedrooms.

2-125 Log #2264 NEC-P02 **Final Action: Reject**
(210.12(B))

Submitter: Michael Beanland, Vancouver, WA
Comment on Proposal No: 2-142
Recommendation: Delete entire section 210.12(B).
Substantiation: AFCI devices are a nice "concept." Manufacturers cannot provide assurance that the devices will provide reliable (~100%) and secure (no false operation) parallel and series arc detection. Though UL tests are valuable, they do not represent the real world and do not test for proper performance, only basic operation & non-failure. Independent testing has shown that

overcurrent and GFCI devices provide equivalent protection to AFCI. This rule will require significant added construction expense with no substantial improvement in safety and the possible significant degradation in reliability. Unless manufacturers can be held to substantial performance criteria by NFPA rule, the blanket requirement for AFCI is not justified.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree with the submitter's assertion that the UL standard only evaluates for "basic operation". The submitter has not presented any substantiation that "overcurrent and GFCI devices provide equivalent protection to AFCI", given that neither of these devices address low-level arcing conditions in multiple modes.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-126 Log #972 NEC-P02 **Final Action: Accept in Principle**
(210.12(B), FPN)

TCC Action: The Technical Correlating Committee understands that the panel action refers to the new FPN No. 3 rather than FPN. No. 2.
Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 2-143
Recommendation: Revise as follows:
FPN No. 2: See ~~760.21 and 760.41~~ 760.41 and 760.121 for circuits supplying fire detection and warning equipment.
Substantiation: Changed reference numbers in accordance with section number changes in Article 760 for the 2008 NEC.
Panel Meeting Action: Accept in Principle
Revise the fine print note to read as follows:
"FPN No. 2: See 760.41(B) and 760.121(B) for power supply requirements for fire alarm systems."
Panel Statement: The panel has revised the FPN to be consistent with the FPN that was added in 210.8(A)(5).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-127 Log #558 NEC-P02 **Final Action: Accept in Principle**
(210.12(B) Exception)

Submitter: Steve Campolo, Leviton Manufacturing Company, Inc.
Comment on Proposal No: 2-144
Recommendation: The Technical Correlating Committee action was correct in accepting Proposal 2-144 in Part and correlating it with Proposal 2-147. The Panel should modify the proposal to bring the action closer to being even-handed and promoting new technologies and installation practices without requiring ONLY circuit breaker AFCIs to meet the code rule. Parts (a) and (b) of the exception should, indeed, be removed and the exception modified as follows:
Exception: The location of the arc fault circuit interrupter shall be permitted to be at other than the origination of the branch circuit. ~~in compliance with (a) and (b)~~ A Listed combination type receptacle AFCI shall be permitted provided it is installed as the first outlet on the branch circuit and the branch circuit wiring is continuous from the service panel to the AFCI receptacle.
Substantiation: By removing (a) and (b) and modifying the exception, this will allow competitive AFCIs namely receptacle types, to be installed and help level the playing field while giving users a choice and placing the reset convenience closer to the living area as opposed to a service panel typically located in a basement, garage or outdoor location. This will also facilitate easier troubleshooting when the AFCI detects an arc and trips. After repeated requests, no data was presented originally, or later, that substantiates AFCI protection on the "home run" portion of the branch circuit. The data was clear in indicating arcs at receptacles and in branch circuit extensions.
Panel Meeting Action: Accept in Principle
Panel Statement: The submitter's recommendation would remove AFCI protection from a significant portion of the branch circuit. Given that 210.12 is intended to provide protection for the branch circuit, the exception is in conflict with the basic intent. The submitter's claim that "the data was clear in indicating arcs at receptacles and in branch circuit extensions" is not supported since a significant percentage of the fires are estimated to be in the distribution system itself and not just in extension and appliance cords. The panel has added language that would permit a relocation of the AFCI where metal conduit or steel "Type AC cable" is installed. See panel action and statement on Comment 2-129.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-128 Log #755 NEC-P02 **Final Action: Accept in Principle**
(210.12(B) Exception)

Submitter: Jack Wells, Pass & Seymour/Legrand
Comment on Proposal No: 2-147
Recommendation: Continue to accept in principle but revise the text adopted in the panel meeting action to read as follows:
Exception: The location of the arc-fault circuit interrupter shall be permitted to be at other than the origination of the branch circuit where the arc-fault circuit interrupter is installed ~~within 1.8 m (6 ft)~~ at the first outlet of the branch circuit ~~overcurrent device as measured along the branch circuit conductors.~~
Substantiation: Permitting the arc-fault circuit interrupter to be installed at the first outlet of the branch circuit will allow the introduction of receptacle type AFCIs into the market. The technology for receptacle type Combination AFCIs is well developed, but without a clearly defined application for the receptacle AFCIs in the NEC it is unlikely that any manufacturer of these products will undertake the production of receptacle AFCIs. Accepting this comment will allow the continued development of AFCI technology and provide the consumer an alternate product for providing AFCI protection.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel statement on Comment 2-127.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-129 Log #797 NEC-P02 **Final Action: Accept in Principle in Part**
(210.12(B) Exception)

Submitter: Richard E. Loyd, Sun Lakes, AZ
Comment on Proposal No: 2-126
Recommendation: Revise text to read as follows:
~~Exception: The location of the arc-fault circuit interrupter shall be permitted to be at other than the origination of the branch circuit where the arc-fault circuit interrupter is installed within 1.8 m (6 ft) of the branch circuit overcurrent device as measured along the branch circuit conductors.~~
Exception No 1: Where RMC, IMC or EMT and metal outlet and junction boxes are installed for the branch circuit wiring, it shall be permitted to provide outlet-type or combination-type AFCI protection for each outlet in the branch circuit.
Exception No. 2: Where RMC, IMC or EMT using metal outlet and junction boxes is installed for the portion of the branch circuit between the branch circuit overcurrent device and the first outlet, it shall be permitted to install a combination AFCI at the first outlet to provide protection for the remaining portion of the branch circuit. The AFCI installed at the first outlet shall also provide protection for any equipment connected to that outlet.
Substantiation: This comment would accomplish the objective of allowing an outlet AFCI to be used where the entire branch circuit is in metal conduit and would allow the combination AFCI to be relocated to the first outlet if steel conduit is used for the portion of the circuit between the panelboard and the first outlet.
The submitter of Proposal 2-126 makes a valid point about the need to have different rules for AFCI protection when metal conduit used a branch circuit wiring method. This comment rewords 210.12(B) to include that concept and allow for the location of the AFCI to be different than the panelboard if metal conduit is used.
The steel conduit industry worked with Georgia Tech a number of years ago to develop software that analyzes the effectiveness of steel raceways used as an equipment grounding conductor. An analysis of residential branch circuits shows that the fault current levels available in 15 and 20 ampere branch circuits are not sufficient enough to damage the metal raceway to the point igniting combustibles external to the conduit. In looking at the history the need for AFCI protection, it has been focused around wiring methods other than steel raceways.
It is important for the panel to recognize that this is intended to be limited to RMC, IMC and EMT conduits. There is no data available that would extend this same logic to metal sheathed cables (that do not provide the same level of physical protection) or to other wiring methods (such as flexible metal conduit) that do not provide a suitable ground fault return path.
The existing exception that provides for a 6' allowance is deleted. This revision is because the new provisions for metal conduit provide for the necessary allowance in all cases without a 6' limitation. In essence, if you want to relocate the AFCI out of the panelboard, it is the metal conduit provisions that allow it to be located at any point downstream to the first outlet. This will also make the panels approach very consis
tent in that any trade off in AFCI location is fully based on the ability of the branch circuit to have sufficient physical protection, a suitable return path for fault current and be of sufficient material to contain any internal fault. The limited length approach does not provide as much flexibility and it ignores that the 6 feet of wiring could be the point of failure.

This approach provides the installer and user with multiple options in providing AFCI protection. Nothing is lost through these provisions and the trade-off between the AFCI and the metal conduit has valid technical merit without sacrificing the expected levels of protection of the branch circuit wiring.

This also gives greater flexibility in a number of hi-rise and large multi-family installations as well as some hotel/motel installations where the individual units are defined as dwelling unit rules via 210.18 but are wired with metal raceways.

Panel Meeting Action: Accept in Principle in Part

The panel rejects adding the proposed Exception No.1, deletes the last sentence in Exception No. 2, deletes "No.(2)" of Exception No. 2, and adds to the new exception the following wording: "or steel armored cable, Type AC, meeting the requirements of 250.118," after the word "EMT."

Also, delete the word "or" before "EMT".

Panel Statement: The panel accepts the deletion of the 6 ft rule.

The panel rejects adding the proposed Exception No.1 because combination-type AFCIs are required, and Exception No. 2 covers the approach of using steel conduit and cables in a more general manner.

The panel has deleted the last sentence in Exception No. 2 because combination devices protect the branch circuit downstream and, therefore, the sentence is unnecessary.

The panel has deleted "No. (2)" from Exception No. 2 and added to the new exception the following wording, "or steel armored cable, Type AC, meeting the requirements of 250.118." after the word "EMT" based on the substantiation provided with Comment 2-105.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

Comment on Affirmative:

KING, D.: I applaud the Panel action on this Comment. Adequate physical protection of conductors will provide an acceptable level of safety for that portion of the branch circuit that does not have AFCI protection. It will also allow for the installation of AFCI devices in many applications where it would have been difficult with the present language of 210.12(B). Further protection could have been achieved through a different Panel action on Comment 2-105. The circuits left unprotected as outlined by the submitter of Comment 2-105 cannot be ignored and must be addressed by Panel 2. See my explanation on negative on Comment 2-105.

2-130 Log #842 NEC-P02 **Final Action: Accept in Principle**
(210.12(B) Exception)

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 2-147
Recommendation: Reject the Proposal.
Substantiation: The panel should reconsider and reject the proposal. Elimination of this physical protection for the branch circuit should not go forward. The entire approach would be better served by the panel requiring the use of EMT, RMC or IMC for any tradeoff in the location of an AFCI. In fact, the panel could take the approach that a combination AFCI be permitted at the first outlet if metal conduit were the installed wiring system. The panel should not ignore any portion of the branch circuit that doesn't have metal conduit for the physical protection.

The submitters approach in the substantiation that the exception somehow limits technological advances is a statement made in a vacuum of history and reality. The original intended purpose of AFCI protection is for the branch circuit wiring. It appears that he is claiming that the purpose should simply be ignored to allow some unstated or undemonstrated "advancement". No portion of the branch circuit wiring should be ignored relative to the need for AFCI protection. All of the installed system is equally susceptible to being an ignition source and unless the physical protection of the steel conduit system is provided, none of it should be exempted.

Panel Meeting Action: Accept in Principle
Panel Statement: The panel has accepted the requirement of branch circuit conductors in metal raceway through the panel action on Comment 2-129. See panel action and statement on Comment 2-129.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-131 Log #895 NEC-P02 **Final Action: Accept in Principle**
(210.12(B) Exception)

Submitter: Michael P. O'Quinn, MOGO Enterprises, Inc.
Comment on Proposal No: 2-147
Recommendation: Revise as follows:

Exception: The location of the arc-fault circuit interrupter shall be permitted to be at other than the origination of the branch circuit. ~~in compliance with (a) and (b).~~

~~(a) The arc fault circuit-interrupter installed within 1.8 m (6 ft) of the branch circuit overcurrent device as measured along the branch circuit conductors.~~

~~(b) The circuit conductor between the branch circuit overcurrent device and the arc fault circuit interrupter shall be installed in a metal raceway or a cable with a metallic sheath.~~

Substantiation: Mr. Chase's substantiation seems to point not to the elimination of 210.12(B) Exception (b), but to 210.12(B) Exception (a) - the elimination of the 6 foot allowance between the overcurrent device and the AFCI device.

I agree with the elimination of the 6 ft rule and the substantiation for the following reasons:

A. Even though 210.12(A) requires arc-fault protection "...to de-energize the circuit when an arc fault is detected", and 210.12(B) requires the arc-fault protection "...to provide protection of the branch circuit", this does not necessarily mean the protection/deenergization device must be at the origination of the circuit.

Arcing can only occur when current is flowing, indicating a complete circuit. When no load is present because a device has opened the circuit, no current is flowing, stopping the arc. In an open circuit, there is also no voltage difference at the point of an arc source, hence any arcing stops. This is basic electrical theory.

Even though the intent of 210.12 at the adoption in the 1999 NEC was for arc-fault devices to be in the panelboard, equivalent safety can be accomplished by a device placed anywhere in the circuit.

B. Mr. Chase rightly points out that the majority of arc-fires are due to supply cord and equipment damage. If arc-fault protection was at the receptacle location, either a combination type (UL AWAH) or receptacle type (UL AWBZ or AWCG) arc-fault device, the focus would be on protecting, the circuit from the source of the majority of arc-fires, as well as opening the circuit when an arc-fault is detected.

It would appear the provisions of 300.4 "Protection Against Physical Damage", along with 334.15(B) "Protection From Physical Damage" and 334.15(C) "In Unfinished Basements", would sufficiently protect dwelling wiring installations from arc-faults in the wiring from the panelboard to the outlet(s).

By retaining the original wording of the exception, protection for arc-faults following 210.12(A) and 210.12(B) would be followed. Eliminating the restrictions would clarify that protection can be achieved by any type of combination-type arc-fault device.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel statement on Comment 2-127.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-132 Log #1741 NEC-P02 **Final Action: Accept in Principle**
(210.12(B) Exception)

Submitter: Timothy Arendt, Shamrock Electric Co.
Comment on Proposal No: 2-142
Recommendation: Replace the existing exception with the following revised language.

Exception: AFCI protection shall not be required for that portion of the branch circuit continuously enclosed in metal raceway with metal outlet and junction boxes. Outlet-type or combination-type AFCI protection shall be required for that portion of the branch circuit not enclosed in metal raceway.

Substantiation: The action of CMP 2 to require AFCIs on all dwelling unit branch circuits is too broad and will lead to a move away from a "without amendments" use of the NEC. The term "dwelling unit" includes not only one and two family homes but also condominiums and apartments. Dwelling units in condominiums and apartments - especially in hi-rises - usually have fire resistive construction and more stringent wiring method requirements which override the need for whatever benefit combination type AFCIs may provide. My experience as past Chief Electrical Inspector for the City of Chicago leads me to believe that an exception where metal raceway is used would be appropriate and would provide an option that may make this requirement easier for jurisdictions to accept.

In Chicago for the past 50 plus years 100% of legally constructed dwelling type structures have used metal raceway and metal boxes as the wiring method for the fixed wiring in dwellings. I have attached substantiation in the form of NIFRS Data that compares Chicago vs National residential electrical fires. The data shows that Chicago, which uses metal raceway exclusively for dwelling occupancies, has (4) times fewer residential electrical fires as a percentage of total residential fires, than found nationally. Moreover, there are nearly (3) times fewer fires caused by the distribution, which includes the fixed or installed wiring. The requirement for AFCI protection where NM Cable is used will certainly lead to a reduction in fires. Unlike arc faults in combustible NM cable, arc faults either series or parallel within non-combustible steel raceway become enclosed short-circuits and ground faults. These short circuits and ground faults are completely isolated from the fuel load and are handled very well by conventional circuit breakers or fuses. The cost of requiring AFCI protection to circuits already protected by non-combustible steel raceway is

not warranted. In fact, my fear would be that the additional AFCI cost would result in less use of metal raceway, which is a superior wiring method for dwellings. All of the benefits of being able to add circuits or replace damaged or aged conductors would be lost. The benefits of metal raceway in reducing dwelling electrical fires was documented at the October 18-19, 2006 NFPRF Symposium on Aging Electrical Wiring Systems.

This revised exception would also have the much desired effect of encouraging device manufacturers to develop and reintroduce their outlet-type AFCIs for protecting extensions to the fixed branch circuits. The combination of metal raceway with outlet-type AFCIs should be an option for those desiring this increased level of safety and protection.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel statement on Comment 2-129.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-133 Log #1742 NEC-P02 **Final Action: Accept in Principle**
(210.12(B) Exception)

Submitter: Timothy Arendt, Shamrock Electric Co.

Comment on Proposal No: 2-147

Recommendation: Replace the existing exception with the following revised language.

Exception: AFCI protection shall not be required for that portion of the branch circuit continuously enclosed in metal raceway with metal outlet and junction boxes. Outlet-type or combination-type AFCI protection shall be required for that portion of the branch circuit not enclosed in metal raceway.

Substantiation: The action of CMP 2 to require AFCIs on all dwelling unit branch circuits is too broad and will lead to a move away from a "without amendments" use of the NEC. The term "dwelling unit" includes not only one and two family homes but also condominiums and apartments. Dwelling units in condominiums and apartments - especially in hi-rises - usually have fire resistive construction and more stringent wiring method requirements which override the need for whatever benefit combination type AFCIs may provide. My experience as past Chief Electrical Inspector for the City of Chicago leads me to believe that an exception where metal raceway is used would be appropriate and would provide an option that may make this requirement easier for jurisdictions to accept.

In Chicago for the past 50 plus years 100% of legally constructed dwelling type structures have used metal raceway and metal boxes as the wiring method for the fixed wiring in dwellings. I have attached substantiation in the form of NIFRS Data that compares Chicago vs National residential electrical fires. The data shows that Chicago, which uses metal raceway exclusively for dwelling occupancies, has (4) times fewer residential electrical fires as a percentage of total residential fires, than found nationally. Moreover, there are nearly (3) times fewer fires caused by the distribution, which includes the fixed or installed wiring. The requirement for AFCI protection where NM Cable is used will certainly lead to a reduction in fires. Unlike arc faults in combustible NM cable, arc faults either series or parallel within non-combustible steel raceway become enclosed
short-circuits and ground faults. These short circuits and ground faults are completely isolated from the fuel load and are handled very well by conventional circuit breakers or fuses. The cost of requiring AFCI protection to circuits already protected by non-combustible steel raceway is not warranted. In fact, my fear would be that the additional AFCI cost would result in less use of metal raceway, which is a superior wiring method for dwellings. All of the benefits of being able to add circuits or replace damaged or aged conductors would be lost. The benefits of metal raceway in reducing dwelling electrical fires was documented at the October 18-19, 2006 NFPRF Symposium on Aging Electrical Wiring Systems.

This revised exception would also have the much desired effect of encouraging device manufacturers to develop and reintroduce their outlet-type AFCIs for protecting extensions to the fixed branch circuits. The combination of metal raceway with outlet-type AFCIs should be an option for those desiring this increased level of safety and protection.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel statement on Comment 2-129.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-134 Log #1743 NEC-P02 **Final Action: Accept in Principle**
(210.12(B) Exception)

Submitter: Timothy Arendt, Shamrock Electric Co.

Comment on Proposal No: 2-126

Recommendation: Replace the existing exception with the following revised language.

Exception: AFCI protection shall not be required for that portion of the branch circuit continuously enclosed in metal raceway with metal outlet and junction boxes. Outlet-type or combination-type AFCI protection shall be required for that portion of the branch circuit not enclosed in metal raceway.

Substantiation: The action of CMP 2 to require AFCIs on all dwelling unit branch circuits is too broad and will lead to a move away from a "without amendments" use of the NEC. The term "dwelling unit" includes not only one and two family homes but also condominiums and apartments. Dwelling units in condominiums and apartments - especially in hi-rises - usually have fire resistive construction and more stringent wiring method requirements which override the need for whatever benefit combination type AFCIs may provide. My experience as past Chief Electrical Inspector for the City of Chicago leads me to believe that an exception where metal raceway is used would be appropriate and would provide an option that may make this requirement easier for jurisdictions to accept.

In Chicago for the past 50 plus years 100% of legally constructed dwelling type structures have used metal raceway and metal boxes as the wiring method for the fixed wiring in dwellings. I have attached substantiation in the form of NIFRS Data that compares Chicago vs National residential electrical fires. The data shows that Chicago, which uses metal raceway exclusively for dwelling occupancies, has (4) times fewer residential electrical fires as a percentage of total residential fires, than found nationally. Moreover, there are nearly (3) times fewer fires caused by the distribution, which includes the fixed or installed wiring. The requirement for AFCI protection where NM Cable is used will certainly lead to a reduction in fires. Unlike arc faults in combustible NM cable, arc faults either series or parallel within non-combustible steel raceway become enclosed short-circuits and ground faults. These short circuits and ground faults are completely isolated from the fuel load and are handled very well by conventional circuit breakers or fuses. The cost of requiring AFCI protection to circuits already protected by non-combustible steel raceway is not warranted. In fact, my fear would be that the additional AFCI cost would result in less use of metal raceway, which is a superior wiring method for dwellings. All of the benefits of being able to add circuits or replace damaged or aged conductors would be lost. The benefits of metal raceway in reducing dwelling electrical fires was documented at the October 18-19, 2006 NFPRF Symposium on Aging Electrical Wiring Systems.

This revised exception would also have the much desired effect of encouraging device manufacturers to develop and reintroduce their outlet-type AFCIs for protecting extensions to the fixed branch circuits. The combination of metal raceway with outlet-type AFCIs should be an option for those desiring this increased level of safety and protection.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel statement on Comment 2-129.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-135 Log #1744 NEC-P02 **Final Action: Accept in Principle**
(210.12(B) Exception)

Submitter: Timothy Arendt, Shamrock Electric Co.

Comment on Proposal No: 2-144

Recommendation: Replace the existing exception with the following revised language.

Exception: AFCI protection shall not be required for that portion of the branch circuit continuously enclosed in metal raceway with metal outlet and junction boxes. Outlet-type or combination-type AFCI protection shall be required for that portion of the branch circuit not enclosed in metal raceway.

Substantiation: The action of CMP 2 to require AFCIs on all dwelling unit branch circuits is too broad and will lead to a move away from a "without amendments" use of the NEC. The term "dwelling unit" includes not only one and two family homes but also condominiums and apartments. Dwelling units in condominiums and apartments - especially in hi-rises - usually have fire resistive construction and more stringent wiring method requirements which override the need for whatever benefit combination type AFCIs may provide. My experience as past Chief Electrical Inspector for the City of Chicago leads me to believe that an exception where metal raceway is used would be appropriate and would provide an option that may make this requirement easier for jurisdictions to accept.

In Chicago for the past 50 plus years 100% of legally constructed dwelling type structures have used metal raceway and metal boxes as the wiring method for the fixed wiring in dwellings. I have attached substantiation in the form of NIFRS Data that compares Chicago vs National residential electrical fires. The data shows that Chicago, which uses metal raceway exclusively for dwelling occupancies, has (4) times fewer residential electrical fires as a percentage of total residential fires, than found nationally. Moreover, there are nearly (3) times fewer fires caused by the distribution, which includes the fixed or installed wiring. The requirement for AFCI protection where NM Cable is used will certainly lead to a reduction in fires. Unlike arc faults in combustible NM cable, arc faults either series or parallel within non-combustible steel raceway become enclosed short-circuits and ground faults. These short circuits and

ground faults are completely isolated from the fuel load and are handled very well by conventional circuit breakers or fuses. The cost of requiring AFCI protection to circuits already protected by non-combustible steel raceway is not warranted. In fact, my fear would be that the additional AFCI cost would result in less use of metal raceway, which is a superior wiring method for dwellings. All of the benefits of being able to add circuits or replace damaged or aged conductors would be lost. The benefits of metal raceway in reducing dwelling electrical fires was documented at the October 18-19, 2006 NFPRF Symposium on Aging Electrical Wiring Systems.

This revised exception would also have the much desired effect of encouraging device manufacturers to develop and reintroduce their outlet-type AFCIs for protecting extensions to the fixed branch circuits. The combination of metal raceway with outlet-type AFCIs should be an option for those desiring this increased level of safety and protection.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel statement on Comment 2-129.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-136 Log #559 NEC-P02 **Final Action: Accept in Principle**
(210.12(B) Exception (b))

Submitter: Steve Campolo, Leviton Manufacturing Company, Inc.
Comment on Proposal No: 2-147
Recommendation: The panel should modify the proposal to bring the action closer to being even-handed and promoting new technologies and installation practices without requiring (essentially) ONLY circuit breaker AFCIs to meet the code rule. By adding unnecessary impediments in order to use a receptacle, clearly steers an installer to the circuit breaker. Not only Part (b) but in addition Part (a) of the exception should, indeed, be removed and the exception modified as follows:

Exception: The location of the arc fault circuit interrupter shall be permitted to be at other than the origination of the branch circuit, ~~in compliance with (a) and (b)~~ A Listed combination type receptacle AFCI shall be permitted provided it is installed as the first outlet on the branch circuit and the branch circuit wiring is continuous from the service panel to the AFCI receptacle.

Substantiation: By removing (a) and (b) and modifying the exception, this will allow competitive AFCIs namely receptacle types, to be installed and help level the playing field while giving users a choice and placing the reset convenience closer to the living area as opposed to a service panel typically located in a basement, garage or outdoor location. This will also facilitate easier troubleshooting when the AFCI detects an arc and trips. After repeated requests, no data was presented originally, or later, that substantiates AFCI protection on the "home run" portion of the branch circuit. The data was clear in indicating arcs at receptacles and in branch circuit extensions. By allowing AFCI receptacles as a viable alternative, this will promote investment and development of these products in the same manner as the previous ruling of Code-Making Panel 2 when combination AFCI circuit breakers were mandated on the expectation that they will be developed and made available. This comment seeks to extend the panel's intent with alternative products that the industry is asking for without compromising safety since no data was ever presented on the "home run".
Panel Meeting Action: Accept in Principle
Panel Statement: See panel statement on Comment 2-127.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-137 Log #840 NEC-P02 **Final Action: Accept in Principle**
(210.12(B) Exception No. 2 (New))

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 2-142
Recommendation: Add a new Exception No. 2 to read as follows:
Exception No. 2: Where a branch circuit to a fire alarm system installed in accordance with 760.41 and 760.121 is installed in RMC, IMC or EMT with metal outlet and junction boxes, AFCI protection shall be permitted to be omitted.
Substantiation: The expansion of AFCI protection to all 15 and 20 ampere branch circuits in a dwelling unit creates a conflict with the provisions of Article 760 which states that fire alarm system branch circuits cannot be supplied through an AFCI or GFCI. This exception would provide the provisions necessary to omit the AFCI protection on this circuit alone. It is important that the panel not simply "exempt" the branch circuit without further provisions to provide some level of additional protection. The provision to install the branch circuit in metal raceway provides both the necessary physical protection as well as a proven ground-fault return path should a fault occur in the conductors in the raceway.

This is not a burdensome provision since the fire alarm panels are most often located close to the panelboard or, in the case of a Class 2 supply, they can locate the transformer using short branch circuit and run the Class 2 cabling to the fire alarm panel.
Panel Meeting Action: Accept in Principle
Revise the wording in the recommendation to read as follows:
"Exception No. 2: Where a branch circuit to a fire alarm system installed in accordance with 760.41(B) and 760.121(B) is installed in RMC, IMC, EMT, or steel armored cable, Type AC, meeting the requirements of 250.118, with metal outlet and junction boxes, AFCI protection shall be permitted to be omitted."
Panel Statement: The revised wording is consistent with the action taken on Comment 2-129 and clarifies the intent of the panel.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-138 Log #2276 NEC-P02 **Final Action: Reject**
(210.12(B) Exception No. 2)

Submitter: Joseph Watson, Watson Electrical & Mechanical Corp.
Comment on Proposal No: 2-11
Recommendation: Revise as follows:
Exception No. 2: In situations where a new service panel is being installed on an existing dwelling unit, Arc Fault Breakers shall not be required on existing circuits.
Substantiation: Many older dwelling units have shared neutral circuits which cannot work on arc fault breakers and cannot be modified without major rewiring and major expense, if at all.
Panel Meeting Action: Reject
Panel Statement: The determination as to how much of a new installation must be brought up to present code is determined by the authority having jurisdiction and applicable local ordinances.
See the panel statement on Comment 2-141.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-139 Log #756 NEC-P02 **Final Action: Reject**
(210.12(C) (New))

Submitter: Jack Wells, Pass & Seymour/Legrand
Comment on Proposal No: 2-138
Recommendation: The panel should accept in principle and revise 210.12 by adding a new section 210.12(C) as follows:
210.12(C) Existing Installations. When the overcurrent protective device for a 120-V, single phase, 15- and 20-ampere branch circuit is replaced as part of a service capacity upgrade or renovation, the branch circuit shall be protected by a listed arc-fault circuit interrupter, combination type, installed at the origination of the branch circuit or at the first outlet of the branch circuit.
Substantiation: The Panel rejected this proposal with the statement: "There is a wide variety of existing wiring configurations and the panel needs additional input on the compatibility of these wiring systems with AFCI protection". The Panel apparently did not dispute that there is a need for AFCI protection in older homes. The substantiation provided with the proposal points to CPSC data that electrical fires predominately occurred in dwellings over 20 years old with the highest rate of fires in dwellings over 40 years old. In the explanation of negatives, several panel members recognized that there is a clear need for AFCI protection in older homes. The Panel's primary concern seems to be the compatibility of AFCIs with wiring systems in older homes. This comment recommends allowing the use of a receptacle AFCI at the first outlet as an alternative to providing the AFCI at the origination of the branch circuit. Permitting the use of a receptacle AFCI at the first outlet will provide the installer with an additional option when choosing an AFCI that is appropriate for use with the wiring in older homes. A receptacle type Combination AFCI at the first outlet will provide a high level of arc fault protection in older homes.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 2-141.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
KING, D.: See my explanation of negative on Comment 2-141.
LAROCCA, R.: See my explanation of negative vote on Comment 2-141.
WEBER, R.: The panel should have accepted in principle and part the submitter's comment. Given the accept in principle actions on comment 2-95; expanding the areas in a dwelling unit requiring AFCI protection and Comment 2-129, that was accepted in principle and part, thus allowing the use of a combination AFCI outlet device use. The device protection means is allowed providing that a steel raceway or Type AC steel jacketed cable and metal outlet

and junction boxes are installed from the panelboard where the branch circuit originates; then the combination AFCI device will provide protection for the remaining portion of the branch circuit downstream from that point. Presently, there is no guidance in positive code language to direct the users for existing installations that are upgraded or changed out due to effects of aging electrical systems by failure or burn out and what the current code requirements are for new installations with new construction that are indicated in the present code text. Given the fact that AFCI are an increased safety means; with its required use in older type installations only a positive effect by limiting the potential of fire hazards will be the result. It is always repeated that the electrical code is not a design manual; it does start as a minimum base line for what must be done to electrical systems and by not addressing similar requirements for system change outs or upgrades is unfortunate and not in the public best interest. Thus, the minimum standard becomes the maximum requirement and many will not do any more than that to meet the code, irregardless of the increased safety factor. From years of experience in the field, if it is not written in prescriptive code text to be complied with, the user will normally not exceed the minimum standard? This direction is needed and should be in the code to enhance electrical safety.

Comment on Affirmative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-140 Log #1007 NEC-P02 **Final Action: Reject**
(210.12(C))

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 2-106
Recommendation: Accept Mr. Eddie Phillips' proposed Part (C) as well, as modified herewith:

(C) Other Residential Occupancies. All 125 volt, single phase, 15 and 20-ampere branch circuit wiring installed in a lodging and rooming houses, dormitories, board and care facilities shall be protected by listed arc-fault circuit interrupters.

Substantiation: Besides Mr. King's argument that these occupancies serve as dwelling units and are subject to the same hazards that arise with the use of electricity as that of any other dwelling unit, many dormitories are occupied by immature individuals, this too creating a greater risk of fire due to arcing faults. A similar argument could be made about lodging and rooming houses, especially SFOs. If the entire facility is not to be protected though-many dormitories, for example, are of sufficiently fireproof construction that it is just the individual occupancy that is primarily at risk-it is hard to make argument that the entire branch circuit be protected, all the way back to the panel, or a few feet from it. Protect the receptacles, and to the extent the new AFCIs will do so, the cords plugged into them, and protect the wiring in the walls from nails, and you've protected the individual occupancy from electrical fire starting within it, to the extent the technology makes possible.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any additional information to support the expansion of AFCI devices to the locations described in the proposed new subdivision (C).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

KING, D.: This Comment should have been accepted. I agree with the submitter's substantiation. The life saving benefit afforded by this technology should be expanded to include all occupancies that are similar to and function as dwelling units. See my explanation of negative on Comment 2-93.

WEBER, R.: The panel should have accepted in principle, the submitter's recommendation and proposed text could have been modified by including the change supported in Comment 2-238a by changing the term "dormitories" to "sleeping rooms in dormitories". With the proposed text and the enhanced safety potential provided by an AFCI protection means combination breaker or combination device type with approved wiring methods, in the occupancies noted will decrease the fire hazard. Those type of facilities do not normally have a sufficient amount of outlets provided and most when observed in the field and in actual use have a number of extension cords and relocatable power taps being utilized to connect the plethora of appliances, lamps, computers, scanners, stereos, televisions, small refrigerators and hot plates, corn poppers or other portable cooking means in use. The only way for a building manager to impact their use is to cut the ends off of the cords or remove the items; which in turn are then replaced by the occupant and the over load hazard continues once again. Given the small area in each of these type occupancies and the electrical load imposed on the system, it amazes me that fire incidences are not brought to the attention of the officials having jurisdiction more often; however, they do occur and are normally covered up by the offenders. Until such time when there is a catastrophic event and a large amount of damage done, we will not have the hard copy report to fall back on. The problem is out there and many of the adjacent unknowing users are at risk; this requirement can augment the level of safety for all. Supporters need to continue the process to incorporate this into the National Electrical Code, if not in this cycle then the next. We seem to provide a great deal of support for fire suppression systems, "sprinklers" and yet are unwilling to limit the fire source from happening in the first place as in this case, with the increased use of AFCI protection means.

Comment on Affirmative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-141 Log #1095 NEC-P02 **Final Action: Reject**
(210.12(C))

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 2-138
Recommendation: The text should be arranged by adding a new (C) to 210.12 as follows:

(C) Panelboard Replacement in Existing Installations. Where an existing dwelling unit panelboard containing 15 or 20 ampere 120V branch circuit overcurrent devices is upgraded or replaced, AFCIs shall be installed to meet the requirements of 210.12(B). Only those branch circuits that are part of the upgraded or replaced panelboard are required to comply with this section.

Substantiation: The panel statement for Proposal 2-138 asked for input on the compatibility of AFCI devices with the wide variety of wiring systems that are in the installed based of dwelling units. The purpose of this comment is to provide input to that request and to give the panel some suggested language should a retrofit requirement be pursued.

There are numerous wiring systems installed in the existing base. Some of those variations include knob and tube wiring, 2-wire NM cable without equipment grounding conductors, AC cable and various other wiring methods still in use today. AFCIs will certainly perform their arc detection function in all of these wiring systems. But, the panel must recognize that because of the likely modifications to these wiring systems, AFCIs when installed will likely detect conditions (such as crossed neutrals, grounded neutrals, etc.) that must be corrected and in some cases may require extensive investigation by the installer and some replacement of wiring. However, it should also be recognized that these are conditions that should be corrected.

Pursing a retrofit requirement should be approached with the following key points in mind:

1) The protection must be, just as it is for new construction, for the entire branch circuit. There is no logic to trying to ignore portions of the branch circuit simply because the branch circuit may contain wiring errors (crossed/grounded neutrals, etc.).

2) It's noted that the grounded/crossed neutral situations, if they exist in the installation, occur throughout the branch circuit – including (and actually most prevalent in) the wiring downstream of the first outlet. Because of this, it makes no technical sense to attempt to resolve the issue by relocating the AFCI. In addition, a relocation gives up the protection for the very wiring where it was intended – the branch circuit wiring.

3) There will be wiring systems that have so many issues that they simply need to be replaced. This could lead to decisions to not make the upgrades because of the rewiring needed.

Relative to the code language suggested in this comment:

1) The language in Proposal 2-138 is problematic because it only applies if you are "replacing" the overcurrent device. In many cases, panels are upgraded from one amperage to a higher amperage (i.e. 100A panel to 200A panel) and, if of the same manufacturer and type, the existing circuit breakers are reused. It would seem that this defeats the intended purpose of requiring a retrofit of AFCIs.

2) This comment proposes to break the retrofit requirement into a new section (C) that would be explicit to changing out the panelboard.

3) The language is revised to make the retrofit requirement apply when the panelboard is changed or replaced.

4) The language retains the approach that AFCIs have to be installed for the same circuits as specified in 210.12(B). This makes sense and allows the retrofit requirement to track the new construction requirements. This is also consistent with the GFCI retrofit requirement in 406.3(D)(2).

5) The language applies to the panelboards that contain 15 or 20 ampere 120V circuits. This avoids confusion about whether or not the panel is the service panel or a subpanel.

6) The last sentence of the provision is intended to apply the retrofit requirement only to those branch circuits that are impacted by the upgrade. If there is another panelboard installed that is not impacted by the upgrade, those circuits are not included in the AFCI requirement.

Panel Meeting Action: Reject
Panel Statement: The panel would like more experience to be obtained regarding the installation of combination type AFCIs in new dwellings before requiring the installation of combination type AFCIs in the wide variety of existing dwellings that will have numerous different wiring configurations.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

KING, D.: This Comment should have been accepted. Panel 2 has reviewed sufficient Technical data from the Consumer Product Safety Commission that shows that there is an increased number of electrically oriented fires in dwelling units that are over 20 years old with the largest number of electrically oriented fires occurring in dwelling units that are over 40 years old. Any tripping that may occur from the installation of AFCI devices in older wiring systems is an indication of problems in the electrical wiring that needs to be

and should be corrected. Many fires will be eliminated by identifying and correcting existing wiring problems in dwelling units that in the past have been ignored. I agree with the submitter of this comment that the requirements for existing dwellings should be consistent with the requirements for new construction. The addition of this proposed text would have saved many lives and saved millions of dollars in costs associated with property damage.

LAROCCA, R.: Older dwellings are the ones most likely to have wiring systems that are compromised due to age, damage, or poor installation techniques. They are the dwellings that could benefit the most from the retrofitting of AFCIs during the replacement or upgrading of a panelboard containing 15 or 20 ampere, 120 volt branch circuit over current protection devices. The panel's action to reject this comment will make the extension of AFCI protection to these dwellings difficult.

Also, even though there are a wide variety of existing wiring configurations, all should be compatible with AFCIs if they are not damaged or otherwise compromised. Adding AFCIs to these systems will help identify potential dangers in the existing wiring.

WEBER, R.: See reason for negative vote on Comment 2-139. In addition, the submitter's recommendation should have been accepted and thus fill a void in the code addressing electrical system replacements. The last sentence in the proposed text clearly states where compliance with the requirements of 210.12(B) would be mandatory; a small first step, but one that can only lead to a safer environment for more of the public, that choose to modify their electrical system. As we view the older housing stock in use and the lack of adequate inspection and maintenance given to the electrical system, if anything is to be done; it will be when something burns out or does not work, then and only then will most of the public have the least amount of cost of repairs or replacement work completed to meet the minimum code requirement. We need to be proactive and support this guidance for the user to make the change to the electrical system by clearly stated code language and what must be done on a minimum level. The electrical system may not have any additional work done for a long time; so at the upgrade point, clear code requirements must be provided to the user.

Comment on Affirmative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-142 Log #495 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: David Tweedie, Onancock, VA
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: I have recently seen a demonstration of the 2D2C, IAC line-to-line shock protection device. Electrical fires are a huge threat to seniors in homes and nursing facilities. Please check this new device out.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-143 Log #496 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Bill Pugh, Naperville, IL
Comment on Proposal No: 2-154
Recommendation: Revise as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: Each year residential fires destroy thousands of homes and kill hundreds of people in the United States. Many of these fires are caused by electrical faults, shorts, overloads, and damaged appliance wiring. An electrical outlet that detects such problems and automatically turns off the electricity would prevent a significant number of these fires saving both lives and property. I recently saw a demonstration of such a devices and the performance was impressive. Equally impressive were the statistics on property destruction and deaths caused by electrical fires that such a device would prevent.

First there were fuses, then circuit breakers, then GFIs; fault sensing and interrupting outlets re the next logical step in the continued improvement of electrical safety. I live outside Chicago and we have a stringent fire code and electrical wiring requirements; I wish that devices such as this were part of that code.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-144 Log #560 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Bernie Clum, M.D., Watsonville Emergency Medical Group
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: As an emergency physician for 20 years, I see first hand the ravages of electrical shocks and electrically induced fires on a daily basis. There are almost a million electrical fires each year in the US and nearly one death daily from electrical shock. We obviously need to better protect our citizens. The current use of GFCIs is clearly inadequate and outdated technology. I wholeheartedly support the universal adoption of the technology known as Overload Fault Circuit Interrupter Protection. In independent lab testing, it has proven to be worthy of universal adoption. Without doubt, countless lives and dollars will be saved with this revolutionary technology.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-145 Log #584 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Daniel Boeckman, Boeckman Investments
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:

All 125-volt single phase receptacles shall have overload fault circuit interrupter protection for personnel.

Substantiation: Having had several accidents with electricity as a child and now having three small children of my own, I am exceedingly concerned that we do not yet have any overload fault protection in the National Electrical Code. It seems to me that almost every other form of child safety has been taken care of in the last 15 years from child protective caps on medicine to specially-designed cabinets that can only be opened by adults. I do not know the number of deaths that occur per year in the United States from electrical outlet faiure, but if there is even one, that would be too high.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-146 Log #585 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: K. Stephan Joseph, Marietta, GA
Comment on Proposal No: 2-154
Recommendation: Revise as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: The overload fault technology is important and would be tremendously helpful in helping to protect people from the potential hazards present in electrical wiring and outlets. This technology would be particularly helpful in keeping both toddlers and senior citizens safe from today's electrical hazards.

First, let's address the issues involving toddler safety. Although we were all admonished not to insert any objects into electrical outlets, at some point in time most of us did. Why? We did it because of our natural human curiosity. Children are consistently developing quicker and becoming far more intelligent than the preceding generation. Simple objects like plastic outlet covers are no longer working as effective deterrents for today's innovative and tenacious youth.

Senior citizens on the other hand may have learned the dangers of electrical shock, they sometimes forget some of the things that they have learned or have reverted to a childlike mental state. In other cases, some seniors have not kept up with current technological advancements.

Although toddlers and senior citizens are the groups who would benefit most from this technology, individuals from all ages in between can benefit as well. It's no secret that many of us have taken risks when it comes to plugging too many items into a single outlet or plugging in items with damaged electric cords. Some of us are too lazy, too cheap or just too careless to go the extra mile to do things safely. That leads to taking chances and hoping that the outlet can take one more plug or that the vacuum plug can be run over a few more times before having to be tossed out.

With that being said, I truly feel that the world really does need this new technology. Whether it's for the toddler and senior citizens who don't know any better or the individuals who are careless and need to be protected from themselves, we are all in dire need of this sort of technology in our homes and businesses. Making this technology code would save countless lives and billions of dollars for insurance companies as well as business and homeowners.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-147 Log #588 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Paul Hughes, Saukville, WI
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: I feel that our electrical codes for new and existing households is far worse than any other industrial country. There are almost 1 million electrical fires in this nation yearly and something needs to be done. I feel that this new overload fault technology may be just the answer we're looking for.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-148 Log #589 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Marshall Hudes, Dallas, TX
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: I recently had the opportunity to see a product manufactured by a company called 2D2C Inc. I believe they are calling the product Safe Plug, which utilizes new technologies that they refer to as OFCI, SFCI and PFCI. As far as I can tell, this technology appears to solve a problem in the United States that for some unknown reason has not been addressed up until this point. When you look at the statistics and realize that there are 960,000 home fires that originate with electrical issues, and there is a technology that could arguably prevent all of these fires, I believe that this technology should be mandated. Unfortunately, when people or companies build or renovate structures, they are always looking to cut costs. In fact, the person building the structure or making the decision probably will never spend time in the structure so they are NOT motivated to make it as safe as possible. For this reason, I believe that this product needs to be mandated in the National Electrical Code in order to save lives in the United States. We spend a lot of money in the United States on technology and products that make our lives easier and more pleasant, please consider this product for a much better reason, it will SAVE LIVES!
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-149 Log #590 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Stephen Jarvis, Glenbrook, NV
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: Local municipalities are spending millions of dollars of our city resources and risking the lives of the brave fire and police personnel every year responding to electrically caused fire and electrical shock incidents that are unnecessary and now preventable. NEC code requirement language should specify the use of ac receptacles that include the features of an available electronically controlled smart technology that causes the outlet to operate as a multi-level circuit breaker and that may only be energized to provide electricity to an appliance by the recognition of a proper ac plug insertion. The proposed change in code language will cause the infusion of the electrical overload circuit technology into the electrical systems of US consumer's homes which will in turn result in millions of dollars of property being saved and countless vulnerable children and citizen lives being spared from unnecessary loss, pain, suffering and death due to preventable instances and causes of fire and shock hazards.

We consumers now use significantly more electrically powered devices within our home environments. Many US homes have antiquated electrical systems that were not designed for such use. (Consumer Reports.org FEATURED REPORT August 2001 entitled Your Home wiring: Is it safe?) The fifteen year old building in which I live part-time with an active home office, contains an abundance of consumer electronic appliances, computer work stations, fax machines and entertainment electronic systems in addition to many electrical kitchen appliances, each requiring an activated ac cord in order to be on-line and operational.

In many rooms of the home, the requirement for additional receptacles, for the many ac cords needed for the appliances, exceeds the number of those currently available receptacles within the existing wall outlets. The easy solution for me, as for most consumers, has been to use multiple outlet extension cords and various external ac distribution systems with multiple outlets.

Some of these consumer appliances contain the convenience feature of internal timers that allow the unattended appliances to turn on by themselves, at prescheduled intervals, to perform the tasks for which they were designed. (TV/VCR, coffee maker, cooker pot, etc.) In some cases, such as with the fax machine and the internet server, the ac power switch of the product remains on and active at all times for the intended operational use of the product.

When I leave and when I return home, it is not practical or convenient to plug and unplug each and every electronic product's ac cord. Nor is it always practical to do so just at each time many of the electrical products are to be used. I simply don't bend over as easily as I use to. Crawling around and behind the TV and stereo is not an easy task, nor is it particularly statically safe to be plugging in and unplugging cords in and out of live, ac wall outlets in cramped and visually impaired situations. As a consequence, many electronic appliances simply remain continuously connected to the live current of the wall outlets, or into extension cords or other temporary consumer constructed ac distribution systems external to walls of the building.

The U.S citizen and consumer is only being minimally protected by the individual 15-ampere branch service circuit breaker located at the main electrical distribution panel where electricity service enters the home.

Electrical appliances do occasionally develop faults and fail. When they do fail, they often will so in a manner that draws more AC current from the outlet than the product was designed to safely handle, but not enough current to exceed the safety threshold of the 15 amperes limit offered by the branch circuit breaker located inside of the home's electrical distribution panel.

When excess electrical current within the appliance exceeds the product's design limit, severe heat is produced which in turn may cause ignition of nearby flammable materials close to the failing appliance. If such failure happens in the home, either with or without the occupant's knowledge, the resulting fire may lead to loss, pain, suffering and even death.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-150 Log #606 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: John La Grou, Millennia Media, Inc.
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: I am the founder and CEO of a leading electronics company in the industrial audio market. I maintain professional affiliations as an electrical engineer with IEEE and AES. I've worked with AC power and related safety issues for over 30 years and am intimately familiar with safety standards such as UL 813. When the concept of Overload Fault Circuit Interruption was demonstrated to me, I immediately saw enormous value for enhanced protection of life, health and property. Based on further statistical research into the causes and effects of electrical hazards (NFPA, USFA, etc.) I am absolutely convinced that OFCI technology will save lives, prevent injury, and reduce property damage - perhaps significantly on all counts. I recommend that OFCI be installed into all habitations.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-151 Log #623 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Christopher Chambers, Rocklin, CA
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: With the use of the technology used in the Overload Fault Circuit Interrupter, electrical current would be cut off from overloaded AND faulty wiring.

From the NFPA report on Appliance Safety (http://www.usfa.dhs/gov/safety/campaigns/mediainfor/ffwf-4.shtm)

- Eighty-two percent of all fire deaths occur in the home.
- Each year there are 24,300 residential appliance fires resulting in 100 deaths and 925 injuries.
- Some electrical fires are caused by electrical system failures and appliance defects. However, many more are caused by misuse, poor maintenance of

electrical appliances, incorrectly installed wiring, and overloaded circuits and extension cords.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-152 Log #626 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Kelli Heintz, Cottage Grove, WI
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: Working for an insurance, company I know how costly fires are in both financial and human loss. As a company, we spend a great deal of money training claims adjusters and our customers on fire prevention. Many fires are started by people carelessly overloading their outlets. This product will help reduce the number of fires caused by overloaded circuits. It's tragic that these fires happen when there is now technology that will prevent them. While smoke detectors help warn once the fire is started, prevention would be much better. I have seen a demonstration of this technology and as an insurance industry employee and a mother I look forward to the day when I can use it in my home.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-153 Log #650 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Thomas Dyer, Melrose Park, IL
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: Too many children die in home fires each year. I have two children and work with a person who lost their house in a fire. Electrical fires in homes are close to 1,000,000 annually and a death to electrical shock happens in a home every other day.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-154 Log #651 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Kayla Lischka, Rockford Public Schools Dist. 205
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: As an educator in public school, I see how horrible household fires are. Children die in fires more than 2 times the US National average. Working with a diverse population, I realize mobile home fires are nearly twice the average of other homes. The use of the overload fault circuit interrupter would have a major effect on lowering these statistics and saving children from fire. I was fortunate to actually see a demonstration of this circuit interrupter.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-155 Log #654 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Ronald Ryerson, Sutter Health
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: Many home fires start because of circuit overloads that occur due to faulty appliances or overloaded wall plugs. My parents experienced such a fire in their home office many years ago while they were sleeping. Fortunately, the outcome was only minor fire and smoke damage to that portion of the home. But, many elderly people are killed by home fires caused by overloaded circuits. A wall plug which could protect against such occurrences would be a great safety feature for homes and offices. Also, it would be a boon to parents of young children if they could be guaranteed protection against electrocution or shock from conducting objects being inserted into home outlets. I understand that the current types of protection against this occurrence is limited to nonconducting plug inserts being placed into the outlet, but all of these can usually be removed by most young children.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-156 Log #699 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: George Nelson, George Nelson Law Firm
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: I have represented people injured by electric shock due to faulty wall plugs and I know of overload electrical fires that have occurred in college dorms. If these can be prevented by the code requiring devices which prevent overloads, then it is time to put the requirement in the code and save lives and property loss.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-157 Log #702 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Karl W. Nolan, Jr., Rockford, IL
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: Fire kills more Americans than all other natural disasters combined. And residential fires cause 80 percent of these fire deaths. Of all the causes of residential fires, electrical faults cause about 20 percent. Electrical faults are one of the only fire causes that can be prevented by technology. I have seen this new technology in demonstration and I believe this product can save lives and prevent electrical fires.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-158 Log #706 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Thomas Lischka, Kewaunee, WI
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: Residential fires caused by electrical faults contribute to many injuries and deaths in the U.S. A large portion of these fires are caused by electric current overload. Recently, I attended a demonstration of a new device called an Overload Fault Circuit Interrupter. This new technology can be used to prevent the current overload that causes these fires by shutting off any circuit that it detects an overcurrent draw and subsequently eliminate the overheating that causes fire. This same device was also able to detect overcurrent draw and disconnect a circuit when someone such as a child inserted a metal object into a receptacle. The current way of protecting a receptacle with a plastic outlet protector can be easily defeated by a child. I firmly believe this new device can greatly reduce the incidence of home fires and electrical shocks caused by overcurrent faults. I respectfully ask the Code-Making Panel to consider adding the requirement of this new technology into the 2008 National Electrical Code.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-159 Log #711 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Marck Dorril, Marietta, GA
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: Safety for my family is of utmost importance. The overload fault technology provides the additional safety I need to better protect my family. If this technology can save just one more life, I think it's worth the investment.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-160 Log #762 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Edward Hughes, Folsom, CA
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: In 2005, 381,000 home fires were reported with 3,030 deaths and 13,300 civilian injuries included in these reports. The fires resulted in almost 7 billion dollars in property damages. With these statistics in mind, I believe the Overload Fault Circuit Intercept should be mandated and included in the National Electrical Code. I am a retired realtor having dealt with tenant improvements in both commercial and private properties and this would have been a great construction addition at that time. As a senior citizen, age 73, I have also read that our group of citizens are the most vulnerable to home fires. These statistics have been interpreted by me from your website under National Fire Protection Association.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-161 Log #763 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Marlene Nolan, Belvidere, IL
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: Unknown to most, low levels of heat applied for extend periods of time can be a hazard. Organic compounds, like the plastic insulation on a wire or electrical plug, when warmed for long periods of time will release carbon molecules. Carbon acts as a conductor. This carbon can change the property of an insulator not a conductor. Power cord insulation can become a low resistance path between a "live" and "return" wire pair, causing an overload in that portion of the circuit. Extreme overloads in wires can heat them to the point of melting the insulation away from the wire, igniting adjacent flammables such as dust or igniting the insulation itself. I have seen this new technology in demonstration and I believe this product can save lives and prevent fires.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-162 Log #766 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: James Shivley, Rescue, CA
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: When somebody mentioned this product to me I did some research and found in a CPSC report how larger the electrical fire situation is. It would seem to me that your organization is in the vanguard of rectifying this situation. This product will stop this problem that I would think is absolutely necessary that the code mandate these products.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-163 Log #882 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Michael Auerbach, Highland Park, IL
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: We are a family with three active children. Every year, it appears that more and more technology, appliances or toys appeals to younger and younger children, and therefore, we find that our children are routinely using products that need to be plugged in. This can range from "Winnie the Pooh" night lights that play music, to electronic keyboards for the older kids.
We are aware that every year, 20 percent of residential electrical fires are caused by electrical faults. The National Fire Protection Association reports that approximately 41,500 residential fires are caused by electrical faults, and, according to the U.S. Consumer Product Safety Commission, approximately 400 deaths occur annually from electrical faults. We also have the sad experience of knowing a family whose house caught fire years ago, and the impact of that fire still remains today. The casualties in these fires are most likely the people who are least able to help themselves — children.
We understand that technology exists to prevent the types of situations that result in far too may fires and fatalities each year. We have seen a demonstration of a 125-volt single phase receptacle with an overload fault circuit interrupter. It is our opinion that any new technology or invention that can save even one life or prevent even one fire is worthwhile. It is our belief that this receptacle can do much more than that. We urge you to take whatever steps necessary to require this type of product or technology in every home so that unnecessary fires and injuries can be prevented. In a day and age when so much of our scientific knowledge is going to improve computers and virtual technology, it seems appropriate to focus on something that can go far to protect those we love.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-164 Log #901 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: John Crymes, Jr., JMC Electrical Engineering
Comment on Proposal No: 2-154
Recommendation: As I understand it, millions of dollars and much public resource, Police, Fire Dept., and Court Litigation are unnecessarily used each year in the repair and prevention of electrical fires due to the overload of receptacles and, in particular substandard electrical extension cords. Seems to me that the inclusion of NEC specifications regarding the use of an overload protection fault device would be prudent.
Substantiation: To protect property and for personal safety, all 117 Volt Ac should have a code required overcurrent (1) protection device.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-165 Log #919 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Michael McQuade, E.I. Dupont de Nemours and Company Inc.
Comment on Proposal No: 2-154
Recommendation: Revise as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter and Power Fault Circuit Interrupter protection.
Substantiation: I write this comment in response to your rejection of Proposal 2-154. I request you approve this proposal. You requested A) evidence that the proposed protective device would have prevented the fire incidents I described in the substantiation and B) independent evaluation that the safety outlets will perform their intended function and that there will be no unintended consequences such as false tripping of the device.
A) The proposed devices would have prevented many of the fire incidents.
Such a statement is impossible to absolutely support, as we cannot reenact these disasters. It is generally difficult to even identify exact percentages of fire caused by different types of electrical faults. Often, post analysis of fires does not result conclusively in cause due to lack of remaining evidence. Furthermore, the detailed analysis, including x-rays, is usually done by fire investigators, not by Fire Marshals, and paid for by a product manufacturing company that is trying to avoid liability. Therefore, this evidence is sealed from public viewing.
However, a qualitative survey of fire investigators consistently indicates three primary electrical causes of the fires they have investigated. Some of the persons interviewed include Jim Finneran of ElectroTek Consultants (Spencerville, IN), the electrical expert in the Fire Findings courses, Alfred Hogan (Winter Haven, FL), John Robison (Prattville, AL), Chris Korinek

(Cedarburg, WI), and Dr. Vytenis Babrauskas (Issaquah, WA). Most of the quantitative original research in North America on electrical ignition has been produced and published by Dr. Vytenis Babrauskas of Fire Science and Technology Inc. (www.doctorfire.com) and by Chris Korinek, P.E., of Synergy Technologies (www.synergytech.net). Their research is consistent with the experience of almost all other investigators that three events cause most of the electrical fires.

These three primary causes consist of the following in order of prevalence:
1. High current flowing through high resistance connections,
2. Excess voltage across electrical device loads, and
3. Excess current flowing through electrical device loads.

The overload protection I propose directly addresses these three causes. This preventative technology can be described as follows:

1) Over-current Fault Circuit Interrupters (OFCI) that disconnect electricity to a load (appliance, extension cord, lamp, electronic device, etc.) when the load draws more current than it has been designed to accommodate. Circuit breakers are intended to protect interior wall wiring from overloads and do not protect most loads adequately. The leakage current detection found in GFCIs and AFCIs only trips on overloads in the rare situation when the overload is caused by a current path to ground, or when excessive heating from the overload leads to carbonization of materials leading to leakage currents or arcing. Therefore, this primary fault mechanism has virtually no existing protection in the electrical distribution system presently, being presently detectable only by secondary symptoms subsequent to excessive heating. In contrast, the OFCI can detect primary symptoms that occur before an immediate fire hazard exists.

2) Power Fault Circuit Interrupters (PFCI) that disconnect electricity to a load when it measures either of the following:

a. High current flowing through a high-resistance connection in the distribution wiring
b. Excess line voltage across a load, or
c. Inadequate voltage across a load.

High resistance connections are most often found in loose wire nuts or loose wire-bonding screw down connections. High-resistance connections can exist for years without causing a fire if little current flows through the connection. However, a 1 Ohm junction results in over 200 Watts of power dissipation with a load pulling 15 amperes through it. A high resistance junction with high current flowing through it can glow red hot and act as a fire ignition source. Investigators universally agree this to be the top cause of electrically-ignited fires.

Excess voltage across a load should not occur if the electrical system has been maintained properly. However, in a residential 2-leg system, if the common (Neutral) return path disappears, the leg voltage depends on the leg-to-leg ratio of load impedance. A load imbalance results in little voltage across low resistance loads on leg A and high voltage across high resistance load on leg B. For example, with 120 VAC per leg, nothing but a 25W load plugged into a leg A outlet and a 1500W load plugged into a leg B outlet, 236 VAC would drop across the 25W load and 4 VAC drop across the 1500W load. The 25W load would experience 400 percent the normal power dissipation and could easily overheat and act as an ignition source.

Inadequate voltage across a 120 VAC relay can cause relay chatter, where the voltage is too low to hold the normally-open relay closed. Thus, the relay continuously and cyclically opens and closes. You may have experienced the equivalent "chatter" effect on your car starter solenoid with a low battery. With a load attached, the chatter causes the relay contacts to overheat to the level where it can ignite fires. 120VAC relays are often used with motors. Furthermore, inadequate voltage can damage electronics.

To my knowledge, nothing presently required by the NEC within a residential electrical distribution system protects against these faults.

I have provided a document that describes the technology itself in more detail. The document was written by a technologist at 2D2C, Inc. It describes generally how Overload Fault Circuit Interrupters, Power Fault Circuit Interrupters and Shock Fault Circuit Interrupters work.

The document also describes the first products to implement OFCI and PFCI commercially. These products are the SafePlug Model 1200 and Model 1300 safety outlets made by 2D2C, Inc., (www.safeplug.com).

B) Independent evaluation that the safety outlets will perform their intended function and that there will be no unintended consequences such as false tripping of the device.

To prove the product reliability, safety and functionality, the SafePlug products were tested against and exceeded the requirements of UL 498A (November 2005) and UL 498 (October 2006) for the US, and CSA C22.2 42-99 for Canada. See CSA International Master Contract 230670, Certification of Compliance 1686590.

Additionally, two independent fact-finding reports provide evidence of how the overload and power fault circuit interrupters would prevent the ignition of fires by the primary ignition techniques as discovered by fire investigation experts. These studies were performed by CSA International (February 2006) and by ETL Intertek Semko (December 2005).

The CSA fact finding report also tested the SafePlug product under extreme surge conditions, to match the tests applied to Ground Fault Circuit Interrupters. The SafePlug outlets not only survived the extreme surges but continued operation as normal after experiencing the series of back-to-back surges. The products have also been designed to survive corrosive environments with zinc coated steel grounding yokes and solid brass terminal screws. For more details, please contact the product developers at OFI, Inc.

I have provided copies of these fact finding reports.

In summary, these circuit interrupters must be implemented at the outlet location, not the circuit breaker panel location to be able to detect this bevy of fire ignition source faults. The OFCI and PFCI supplement the preventative protection already provided by circuit breakers, by Arc Fault Circuit Interrupters (AFCI), and by Ground Fault Circuit Interrupters (GFCI). Nevertheless, circuit breakers, AFCI and GFCI cannot protect against the ignition sources described above.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-166 Log #951 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Jerald Baldridge, Republic Energy Inc
Comment on Proposal No: 2-154
Recommendation: Revise as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: Seeking a reduction in the number of deaths from fires as well as costs of fire damage, costs of fire department expenses of the local committee, and hospital costs to the community.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-167 Log #1049 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Scott Richter, Richmond, VA
Comment on Proposal No: 2-154
Recommendation: Revise as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: Too many deaths, injuries, property damage, expense, loss of worker production hours are caused by fires and electrocution due to currently unsafe outlets in homes. If technology is in place now to prevent social loss ($2.2 billion estimate in 2000 by CPSC Chairman), the United States needs to take action now to implement and mandate such technology.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-168 Log #1244 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Dianne E. Caso, Placerville, CA
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: Thousands of injuries and hundreds of deaths are attributed annually to electrically caused fires, electrocution and electric shock. Small children and the elderly are its most likely household victims. Like many parents, I have witnessed the fascination and determination with which toddlers approach electrical outlets, and the speed and ease with which they defeat plastic electrical protectors, current protective devices are not adequate. I have seen a demonstration of the overload fault technology, and as a concerned American, strongly recommend its inclusion in the 2008 National Electrical Code.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-169 Log #1247 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Lawrence A. Caso, Placerville, CA
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: I have been electrocuted in the past. My personal experience has taught me that the danger is the greatest at the residential and commercial level where non-professionals are involved. There is no way to absolutely prevent the many ways we can be hurt and/or suffer property damage. However, the demonstrations of this technology, I have seen, come as close as possible. The CPSC, US NFPA, USFA, and Canadian CCFM and FC statistics I have seen, warrant the mandating of this technology in as many locations and applications as possible and as soon as possible.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-170 Log #1271 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Bob Boutin, BE Safe Consultants, Inc.
Comment on Proposal No: 2-155
Recommendation: Add new text to read as follows:
Electrical outlets in residential and commercial environments will not provide electrical current until a valid electrical plug is inserted.
Substantiation: My proposal was rejected due to a lack of independent testing. One company that makes a listed (CSA Certificate # 1818366) electrical outlet that meets my proposed criteria has provided me with a test report from ETL/ Intertek that submitted the outlet to a variety of UL tests for false tripping and other testing to show that the outlet works properly for the proposed use. I have also modified the wording of the proposal to address the concerns of the panel as indicated in their response.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 2-177. In addition, it is uncertain what constitutes a "valid" electrical plug, as all plugs are manufactured to an industry standard for their particular application.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-171 Log #1315 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Robert Spare, Pasadena, CA
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: Current protection devices do no adequately address the danger of electrical faults causing residential fires which has resulted in significant loss of life and property. I have witnessed a demonstration of the Overload Fault Circuit Interrupter (OFCI) and believe that mandating installation of the device would provide a major deterrent to fires caused by failure of current devices. Additionally, the OFCI would eliminate line to line shocks suffered by young children inserting metal objects into current electrical outlets. The safety enhancements and benefits of OFCI are compelling reasons for approval.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-172 Log #1334 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Frank-Paul King, Dallas, TX
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel
Substantiation: It is a fact that since, the introduction of the GFCI technology the number of deaths by electrocution has dropped significantly. We can reduce accidents and deaths with technology.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-173 Log #1339 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Wade Wegner, King Shalegle
Comment on Proposal No: 2-154
Recommendation: Revise text as follows:
All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel
Substantiation: Recommendation: Include overload fault technology into the National Electrical Code. Comments: Close to 5% of home fires are caused by fault or overloaded electrical distribution equipment according to The U.S. National Fire Protection Association citing the 2000 report from the CPSC whereby the staff estimated that there are 960,000 electrical fires in the US each year.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-174 Log #1356 NEC-P02 **Final Action: Reject**
(210.13)

Submitter: Gary S. Santoro, Town of Wethersfield / Rep. New England Association of Fire Marshals
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:
All 125-volt single phase 15- and 20-ampere receptacles shall have Overload Fault Circuit Interrupter and Power Fault Circuit Interrupter protection.
Substantiation: 2D2C, Inc., a US company, has developed several technologies to prevent the ignition of fires from excess heat due to electrical faults. These fire prevention technologies have been implemented in the form of circuit interrupters. The interrupters disconnect loads before adequate heat can be generated to ignite a fire. These interrupters supplement the preventative protection already provided by circuit breakers, by Arc Fault Circuit Interrupters, and by Ground Fault Circuit Interrupters. They fill the fire-cause gaps that remain after implementation of these protective devices - they are complimentary and not redundant technologies that should be implemented in all residential wiring systems to prevent fires.
I personally learned about the technology at the NFPA Exposition in Orlando in June 2006. I received a demonstration of the technology as implemented in the SafePlug brand of electrical safety outlets. The technology works. And from my experience as a Fire Marshal, it will save lives by preventing a large number of fires. You can view an overview of the products at their website: www.safeplug.com. I am sure company representatives would travel to the NFPA review meeting to demonstrate the product. The contact that demonstrated the product to me and gave me NFPA sanctioned technical talk of the technology at the NFPA Expo was Steve Montgomery.
These primary causes of fires from electrical faults are outlined in three primary reference documents used in the fire investigation industry. These documents include the following:
● "Guide to Fire and Explosion Investigations", NFPA 921
● "Kirk's Fire Investigation, 6th Edition", John DeHaan, Prentice Hall, 2007, Chapter 10 "Electrical Causes of Fire" by Chris Korinek, P.E.
● "Fire Ignition", Dr. Vyto Babrauskas, Fire Science Publishers, 2003
These documents all suggest that the top electrical causes of heat to ignite flammables consist of the following:
1. High current flowing through high resistance connections
2. Excess voltage across electrical device loads, and
3. Excess current flowing through electrical device loads
2D2C, Inc. has designed Fault Circuit Interrupters to remove the load after detecting these conditions. The heat source disappears if no current flows. Thus, although the Interrupter approach does not fix the wiring or load device problem, it prevents the calamity of ignition from the fault. Below is a simple description of what the two types of interrupters accomplish to prevent fires:
● Power Fault Circuit Interrupter (PFCI): Removes a load if it detects excess current flowing through a high resistance connection in the circuit OR if it detects excess AC Line utilization voltage across the device load
● Overload Fault Circuit Interrupter (OFCI): Removes a load if it detects excess current flowing into the load using a fast-trip, variable threshold, resettable breaker. The trip level matches the electrical load ampacity through RightPlug communication.
NOTE: PFCI and OFCI will prevent fires that presently occur in the presence of circuit breaker, AFCI and GFCI protection. The PFCI and OFCI protection is needed in a structural wiring system - protection does not presently exist for these faults. PFCI will prevent the super-heating of loose wire junctions inside wire nuts and screw connections that cause fires. PFCI will also protect against voltages up to 200-220 VAC across 120 VAC rated electrical devices caused by "floating neutral" conditions. OFCI will prevent against excess-current heating in the small wires (18, 20, 22, 24 gauge) inside electrical

devices caused by poor maintenance, damage, abuse, improper designs, and poor quality manufacturing. OFCI also limits current through each 120 VAC outlet to a cumulative maximum of 15 amps or (as rated for the outlet type) to prevent distribution wiring from overheating due to overloads allowed by improper size fuse or circuit breaker replacement (presently the company has not completed the designs for a 20A outlets - only 15A versions exist at the time of this writing).

Additionally, 2D2C, Inc. has invented complimentary shock safety technology to the Ground Fault Circuit Interrupter (GFCI). The GFCI prevents electrocutions from line-to-ground leakage paths. The Shock Fault Circuit Interrupter (SFCI) prevents shocks through the normal line-to-line paths. To accomplish this, the SFCI keeps electricity off at unused receptacles and only delivers electricity to tagged electrical plugs.

Please approve proposals 18-11, 18-12, and 18-13. Make this technology part of the 2008 Code. If the PFCI and OFCI technology had been installed in homes in our community where I serve as Fire Marshal, a number of fires would never have started. Please help me to save lives by requiring the use of PFCI and OFCI in the electrical outlets in residential wiring systems.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-175 Log #1370 NEC-P02 **Final Action: Reject (210.13)**

Submitter: John F. Bitzer, ABARTA, Inc.
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: Products incorporating Overload Fault Circuit Interrupter technologies can significantly reduce or eliminate household electrical fires and electrocutions. These technologies are easy to use and implement. They can be installed in existing homes without replacing any of the existing electrical distribution system. There are thousands of severe household electrical fires each year, which claim hundreds of lives. In addition to this tragic loss of life, there are thousands of severe burn injuries. These fires also cause billions of dollars in damages. I urge you to reconsider your position on this proposal.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-176 Log #1481 NEC-P02 **Final Action: Reject (210.13)**

Submitter: Charles Houston, Alamo, CA
Comment on Proposal No: 2-154
Recommendation: Revise as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: Over the past 30 years, I have been involved in the building trades in one manner or another. I have seen numerous instances where the improper use of standard household branch circuits would have led to serious loss of property if not loss of life if not taken care of immediately. The majority of these situations involved an overloaded circuit as the result of using receptacle strips and extension cords. I have replaced burned out receptacles due to excessive heat damage that could have very easily started a fire had no one been at home to shut down the power. Many innocent homeowners and their families are unaware of the hazards they sometimes create in trying to enhance their life styles. I believe that it is imperative that the NEC be rewritten to mandate the use of a technically available “smart receptacles” that would sense and mitigate an overload situation before becoming a hazard. I sincerely hope that the NEC will act in favor of revising current text to include a life saving technology.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-177 Log #1616 NEC-P02 **Final Action: Reject (210.13)**

Submitter: Steve Montgomery, OFI Inc.
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter protection.

Substantiation: Thank you for considering the Overload Fault Circuit Interrupter (OFCI) located in an electrical outlet for fire protection of structures. In these comments, I have tried to respond to your concerns as stated:

1) There is insufficient information provided to determine if the proposed protective device would have prevented the incidents sited in the substantiation.

2) The proposed device should be independently evaluated to determine that it will perform the intended function and that there will be no unintended consequences such as false tripping of the device.

3) The submitter’s use of the term “should not” could be interpreted as not being mandatory language and may not satisfy the submitter’s original intent.

My comments are as follows:

1) I cannot accurately state what percentage of electrically-ignited fires would have been prevented by the use of OFCI. It is impossible for anyone without the forensic evidence to accurately analyze the fire examples listed in Proposal 2-154. However, the OFCI covers many of the previous gaps in electrical fire protection.

As I am sure you know, the surveys that the NFPA conducts are mostly based upon Fire Marshal Reports. I am a member of the International Fire Marshals Association (IFMA) and have spoken to a number of Fire Marshals about the level of detail regarding their investigations. In addition to the fact that only about a third of the big fires leave enough evidence to trace back to the cause, very few of them have time or the forensic tools to dive in really deep to identify the specific cause. It is often an accomplishment for anyone to determine that an electrical fault, versus another ignition source, generated the fire, let alone what type of electrical fault caused it. The insurance company fire investigator gets more detail on cause, since they must try to indict one or more product manufacturers to assign the insurance payout burden away from the insurance company. But the product liability defense forensic expert, hired to prove the product manufacturer to be innocent, is the one with the best knowledge. He understands electricity very well, replicates ignition situations in his/her lab, and even X-rays burned electrical components (appliances, circuit breakers, etc.) to identify internal states to prove cause. Only these electrical forensic experts know the detailed fire cause facts, but rarely can they share them since the evidence is associated with a court case or simply held as confidential by the electrical appliance or device manufacturer.

To identify how many of electrically ignited fires would be prevented by OFCI, we interviewed several of these expert forensic electrical fire investigators including the following persons:

- Dr. Vyto Babrauskas, Fire Science and Technology, 9000 300th Place SE, Issaquah, WA 98027, (fire researcher, forensic investigator, expert witness, author of the book “Ignition Handbook,” ISBM 0-9728111-3-3.
- Chris Korinek, P.E., Synergy Technologies LLC, N144 W6466 Pioneer Road, Cedarburg, WI 53012, expert witness, electrical forensic investigator, author, contributor to Chapter 10 “Electrical Causes of Fire” of “Kirk’s Fire Investigation” 5th and 6th editions, by John DeHaan, ISBN 0-13-171922-X.
- Jim Finneran, ElectroTek Consultants Inc., 18925 SR 1, Spencerville, IN 46788, fire researcher, electrical forensic investigator, expert witness, co-author of “Fire Findings.”
- John S. Robison, Robison Consulting LLC, PO Box 680854, Prattville, AL 36068-0854, electrical forensic investigator, expert witness, ex Fire Marshal.

The general consensus is that the three primary electrical causes of fires consist of the following in order of prevalence:

1. High current flowing through high resistance connections
2. Excess voltage across electrical device loads, and
3. Excess current flowing through electrical device loads

None of these experts wanted to commit to percentages of specific electrical fire cause. All of them feel that high current through a high resistance connection is the most common electrical ignition source. Most estimated high resistance connections as causing 50 to 80 percent of all electrically induced fires. Most suggested that floating neutral problems (excess voltage across loads) are the next biggest cause of fires. Third, would be excess current draw through extension cords, lamps, appliances, electronics and other loads. The cause of excess current in a load device represents reduced impedance. Some causes of reduced load impedance include the following:

- Improper device use (e.g., oversized light bulbs)
- Poor product manufacturing quality (flaws)
- Poor product design
- Insulation breakdown and leakage through carbonization (age and fatigue)
- Locked motor rotors (worn bearings, dirt)

Other electrical fire causes, such as induction, are extremely rare. The experts’ general opinion is that arcing from line to ground is usually a result of a fire, not the cause of a fire.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: The panel agrees that this device, if properly listed, could be used without specifically being described in the NEC. Since this device, an overload fault circuit interrupter protection for personne, is not currently described in any product standard, the panel is concerned that there are no national standards that set the parameters for the operation of the system. If the intent is to further protect flexible cords, such as those used as supply cords for appliances or as extension cord sets, 240.5(B)(1) and (B)(3) already state that these cords shall be considered to be protected when applied within the applicable listing requirements.

If proposals are submitted in the future, Code-Making Panel 2 would benefit from receiving further information regarding the development of the parameters needed to detect high-resistence connections across the variety of branch circuit configurations and lengths in wiring systems, in the form of a fact-finding investigation.

These listing requirements are developed by a technical panel that includes representation from many areas of industry such as third-party testing and listing organizations, cord manufacturers, inspectors, and others. Code-Making Panel 2 fully expects the technical committee of the product standard to address any safety issues associated within the listing requirements of these cords and that a requirement of this type is not necessary in the NEC.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

KING, D.: The presentation given by the Submitter of this Comment at the ROC meeting was compelling. The panel was given the opportunity to review the potential of this new device to mitigate if not completely eliminate many electrically oriented fires that occur in dwelling units. This technology is new; therefore, the Panel's request for more information is warranted. Further information as requested in the Panel Statement will provide a better opportunity for acceptance of this new life saving technology in future Code cycles.

WEBER, R.: I feel the panel acted responsibly in rejecting this comment and proposal at this time frame. However, this is new and emerging technology "OFCI, Overload Fault Circuit Interrupter Protection"; is a means to asdf prevent fire scenes. In review of the substantiation submitted and supporting data on tests and state of these fire prevention technology systems; it has a potential for significantly expanding the type of measures available to the user for increased safety. Its benefit for shock protection at the outlet and ability to compliment the accepted uses of AFCI protection schemes can only have a positive effect for the end user. It is now and continues to be under the technological advancements and component reconfiguration to ease its acceptance for use by the general public. I encourage the submitter to continue the effort for OFCI acceptance in future versions of the code.

2-178 Log #1664 NEC-P02 **Final Action: Reject (210.13)**

Submitter: Julie Wagner, Waukehsa, WI
Comment on Proposal No: 2-154
Recommendation: Revise as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: I recently saw a demonstration for the Overload Fault Circuit Interrupter and am very interested in seeing this become part of the required building code for the following reasons:

My parents are elderly and live in a mobile home park in Florida. They live on a fixed income and try to scrimp and save wherever they can. I have seen them overload sockets and extension cords in their home. They have even used their stove as a heat source. I have pointed out to them the safety issues involved but they won't buy another cord because "they don't want to spend the money" and say "don't worry, we'll keep an eye on it." If I buy them a new cord, they'll simply "save it to use when the old one wears out". The Overload Fault Circuit Interrupter would certainly give me some peace of mind.

I think of the statistics put out by the U.S. Fire Administration: December is the most dangerous month for electrical fires because of the increase in lighting, heating, and appliance use. The USFA also says that most electrical fires result from problems with "fixed wiring" and that 33 percent of residential fires are electrical in origin. Mobile homes have a fire death rate that is nearly twice the average of other dwellings.

My parents are only getting older. They are getting very forgetful. I do not live near them. I know they will be using space heaters soon. There are thousands of other elderly Americans just like them. USFA statistics say that 485 Americans die each year from electrical fires and injure 2,305 more. I do not want my parents to become one of those statistics.

Please give careful consideration to requiring the Oveload Fault Circuit Interrupter in the building code.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-179 Log #1665 NEC-P02 **Final Action: Reject (210.13)**

Submitter: Keith York, Granite Bay, CA
Comment on Proposal No: 2-154
Recommendation: Revise as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: It seems to me that we have seen too many deaths and destroyed lives because of fires. I read some place that a majority of deaths caused by fire is directly caused by faulty electrical wiring systems. It seems to me that we have the technology to prevent these deaths - so why aren't we?

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-180 Log #1701 NEC-P02 **Final Action: Reject (210.13)**

Submitter: Jack Maclead, San Marino, CA
Comment on Proposal No: 2-154
Recommendation: Revise as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: I strongly recommend mandating installation of the Overload Fault Circuit Interrupter (OFCI) in new and remodeled construction, particularly residential. I attended a demonstration of the OFCI and witnessed successful overload and shock fault preventing. I am a retired CEO of a construction company and have been a commissioner of San Marino City for the past six years. This and other experiences have convinced me that electrical shock faults cause many unnecessary fires and deaths and any device such as the proven OFCI should be mandated.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-181 Log #1776 NEC-P02 **Final Action: Reject (210.13)**

Submitter: Dieter Kays, Faithlife Financial
Comment on Proposal No: 2-154
Recommendation: All 125-volt single phase receptacles shall have Overload Fault Interrupter protection for personnel.

Substantiation: I just received a demonstration of the fire and shock prevention capabilities of the SafePlug product line. As CEO and President of Faithful Financial (previously known as Lutheran Life Insurance), we want to encourage systems and practices that save as many lives as possible from accidental death and extend life where possible.

The Overload Fault Circuit Interrupter and Shock Fault Circuit Interrupter technology, if it is found to work effectively, could be a useful technology in preventing some deaths that are caused by certain fires.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-182 Log #2226 NEC-P02 **Final Action: Reject (210.13)**

Submitter: Dieter Kays, Faithlife Financial
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for personnel.

Substantiation: I just received a demonstration of the fire and shock prevention capabilities of the SafePlug product line. As CEO and President of Faithlife Financial (previously known as Lutheran Life Insurance), we want to encourage systems and practices that save as many lives as possible from accidental death and extend life where possible.

The Overload Fault Circuit Interrupter and Shock Fault Circuit Interrupter technology, if it is found to work effectively, could be a useful technology in preventing some deaths that are caused by certain fires.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-183 Log #2236 NEC-P02 **Final Action: Reject (210.13)**

Submitter: Greg Baker, 2D2C, Inc.
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:

All 125-volt phase receptacles shall incorporate Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: I am the president of 2D2C, Inc. My company has developed products that implement Overload Fault Circuit Interrupter technology that would satisfy Proposals 2-154 and 2-155 (as well as 18-11, 12, and 13). These products are, and will be commercially available regardless of your actions for the 2008 NEC.

One of our products was listed by CSA in late 2005. We have sold some of this product without any marketing push. Our other OFCI product was recently listed. Now that we know that our high quality products exceed industry accepted safety standards, in addition to internal quality tests, we will commercially launch both products in the first quarter of 2007. While we strongly believe that this technology should be part of the NEC, our products do not need a change to the NEC to be used. Therefore, we will get the products into the marketplace to prevent fires and save lives.

We have established manufacturing capabilities to support the significant demand that we expect for these products. We have included in our manufacturing plans, contingencies for additional production capacity if you choose to include this technology in the 2008 NEC. We are working with several companies that will provide additional sources of products utilizing OFCI technology through both licensing and brand labeling agreements.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-184 Log #2237 NEC-P02 **Final Action: Reject (210.13)**

Submitter: John S. Robison, Robison Consulting, LLC
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter protection.

Substantiation: I sincerely request that you accept the proposed technology described in Proposals 2-154 and 2-155. A company called 2D2C, Inc. (www.2d2c.com) has developed a simple approach to protecting against incorrect sizing of light bulbs to fixtures. The technology is called Overload Fault Circuit Interrupter (OFCI). I witnessed this technology in operation at an NFPA Expo, evaluated it and found that it works as described. Based upon my expertise, OFCI would eliminate most fires caused by improperly sized light bulbs if it was installed. From my experience, the only way to ensure that this OFCI technology prevents these fires, is to require its usage. If it is optional, it will not get used and these fires will continue.

Simply stated, OFCI is effectively a resettable fast-trip breaker located in the outlet or in a light fixture. The light fixture version of OFCI has a fixed trip-current level that matches the light fixture rating. If the wrong size light bulb is installed in the fixture, the OFCI disconnects electricity to the bulb and will toggle power to the light with a very low duty cycle until it detects a current draw below its trip threshold and then resets itself.

The OFCI electrical outlet version has 14 different trip-current levels and automatically matches its trip level to the device rating plugged into each receptacle independently. Outlet OFCI reads this trip level from RightPlug safety encoding inside the plug (www.RightPlug.com). The RightPlug encoding embeds a wireless memory stick inside the plug that contains information about the appliance such as its maximum current draw and power rating. Therefore, a 60 Watt, 120V lamp will have a RightPlug hold current of 0.5 Amp. When the plug is inserted in the OFCI outlet, the RightPlug reader inside the outlet reads the appliance rating and sets it trip level accordingly. If a 100 Watt light bulb is inserted in the fixture, the OFCI outlet will disconnect electricity after a few seconds to give instant feedback to the operator that an oversized light bulb has been inserted in the light fixture. On the OFCI outlet, the breaker is reset by removing the plug and reinserting it in the socket. If the correct sized bulb has been installed, the OFCI outlet will turn on power to the outlet and operate the same as any standard outlet. If an oversized bulb remains in the fixture, the OFCI outlet will trip again and disconnect electricity to the lamp cord. A red indicator light flashes adjacent to the overloaded receptacle to ease troubleshooting.

I presently act as an expert investigator for fire cause and am a retired fire marshal. As such, I have personal experience with identifying the cause of thousands of fires. On several occasions, the use of light bulbs of a higher rating than the fixture in which they were used has resulted in fires. The NFPA 101 Life Safety Code requires apartment building owners to provide annual information to tenants regarding safety procedures in the event of fire or the sounding of a fire alarm. I believe a portion of that information should include the proper use of correct wattage bulbs in light fixtures. Unfortunately, this safety practice does not normally occur nor is it practical to regulate. OFCI is a practical solution to this fire cause.

Some examples of fires that OFCI would have prevented include the following:

A fatal apartment house fire where 100 watt bulbs were routinely installed in both interior and exterior fixtures, although the fixtures carry warnings regarding the use of bulbs in excess of 60 watts.

Several interior lamp fires where bulbs in excess of 60 watts were used overheating combustible shades.

Warnings regarding this improper practice of over-sizing bulbs in fixtures and lamps are displayed on websites of nationally recognized safety organizations, however, the practice continues and fires do likewise.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-185 Log #2262 NEC-P02 **Final Action: Reject (210.13)**

Submitter: Herbert Naito, NorthStar Consulting Services
Comment on Proposal No: 2-154
Recommendation: Revise text to read as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter protection.

Substantiation:

According to U.S. Consumer Product Safety Commission (CPSC) staff, there are over 960,000 electrical fires each year in the United States, which cost society over $2.2 billion annually. The National Fire Protection Association (NFPA) stated that over 41,500 U.S. home fires are caused by electrical distribution equipment. The alarming facts indicate that (1) children die in home fires more than two times the U.S. national average, (2) senior citizens have a home fire death rate of more than twice the U.S. national average (most likely to be either a pre-school child or an adult over 65 years old), (3) the American households can anticipate to average one fire injury per lifetime.

According to the CPSC, NEPA, U.S. Fire Administration (USFA), and many other organizations they have data to indicate that the U.S. has one of the worst residential fire safety records in the industrialized world. Mechanical, electrical failure and malfunction have the greatest number of recorded fires. According to the U.S. Consumer Products Safety Commission, about 180 individuals die of electrocution in and around their homes each year. Over 3,500 injuries are related to electrical receptacle outlets and the persons need hospital help because young children inserted metal objects into the outlets. Hundred of thousands of less severe electrical shock victims go unreported each year.

It is clear that current outlet protection devices do not work because the Temple University study shows: (1) 47% of the 4-year olds could remove the round, flat face (2-prong) protectors or the 3/16" thick oval face with tapered sides and (2) 100% of the 2-and 4-year olds could remove the 1/16" thick oval face protectors.

It is time that we carefully analyze the poor outcomes with today's electrical protection devices and look for better ways to protect our citizens from electrical shocks, burns, and fires. With today's advancing technology, we need to focus on new approaches in protecting individuals in our society. For example, the data on single-phase receptacles that have overload fault circuit interrupter is impressive and should be considered for adoption as a new standard for homes and commercial buildings. This system will move us from the dark ages to the new state-of-the-art simple, cost-effective device to truly help reduce the alarming and significant electrical injuries and fires that occur in the U.S. each year.

Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-177.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-186 Log #2128 NEC-P02 **Final Action: Reject (210.15)**

Submitter: Michael Moulton, Farmington, NH
Comment on Proposal No: 2-157
Recommendation: None given.
Substantiation: I believe this is a good way to keep fire protection and life safety to a specific standard method of wiring. With it being on a dedicated fire safety circuit, it has a far less chance of being mistakenly disabled or shutdown, due to an overloaded circuit that has been tripped.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any recommendation as required by 4.4.5(c) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-187 Log #439 NEC-P02 **Final Action: Reject (210.18)**

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-158
Recommendation: Accept revised:

Add "dormitories" before "guest" in the heading and text.

Substantiation: Dormitories in colleges, recreational camps, and penal institutions are as much or more akin to dwelling units than most hotel or motel rooms. The addition of "dormitories" was accepted in Proposal 2-242 for 210.60(A).

Panel Meeting Action: Reject
Panel Statement: The term "dormitories" is too broad to be included in 210.18. This can include prison dorms, military barracks, as well as many other occupancies described in local building codes.

The limited revision in 210.60 is related only to the required receptacles and receptacle placement.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

KING, D.: The Panel has not addressed the submitter's concerns that there are inconsistencies in the minimum branch circuit requirements in these types of occupancies that are similar to and function as dwelling units. The same minimum branch circuit installation requirements should apply to these types occupancies. Section 210.60(A) requires receptacles in Dormitories to be installed to the minimum standard of dwelling units. These receptacles should be supplied by branch circuits that meet the minimum requirements of dwelling units. I disagree with the Panel that "the term 'dormitories' is too broad to be included in 210. 18." The term could have been more clearly defined by describing the types of Dormitories where the requirements of Section 210.18 should apply. This could have been accomplished by accepting in principal this Comment with the submitter's text revised to read as follows:
"and in dormitories in colleges, penal institutions, recreational camps, etc." after "Hotels" in the text and heading.
The revised text above would have satisfied the submitter's intent.

WEBER, R.: The panel action should have been to accept this comment or accept in principle at best and included the term "sleeping rooms and areas in educational dormitories". When reviewing the building codes Residential Group R this type of use and similar area is defined or classified by the terms, "For sleeping accommodations such as apartment houses, convents, dormitories, fraternities and sororities in part." The comments made in the negative vote in Comment 2-140 are valid here as well. The panel needs to recognize and review the actual uses in the field; that these are living units and although some may not legally allow provisions for cooking, many do and they should have a requirement in the code to have branch circuits installed to meet the rules for dwelling units. Many AHJs are forced to make that call on experience and the 90.4 authority to accomplish the submitter's recommendation. If the normal use is there, the code should address it, and if the units do not have those provisions, then it does not apply. At the time of construction is the time to provide the needed circuitry. The designers, installers, inspection community and user need this positive code text.

17-1 Log #19 NEC-P17 **Final Action: Accept (210.19(3))**

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 2-162
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 17 for action within Article 422.

This action will be considered by Code-Making Panel 17 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to consider Proposal 2-162. The panel rejects Proposal 2-162.
The submitter of Proposal 2-162 has not provided substantiation to show that household electric ranges, wall-mounted ovens, and counter-mounted cooking equipment have created a loss of property or life to justify the additional requirements for GFCI protection. These appliances are inherently designed to handle heat. Other household cooking equipment should already be protected by GFCI-protected kitchen countertop receptacles per 210.8(A)(6).
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9
Ballot Not Returned: 1 Gill, C.

2-188 Log #1900 NEC-P02 **Final Action: Accept in Principle in Part (210.19(A)(1))**

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-166
Recommendation: Either reject the proposal, OR revise the final paragraph of Annex D, Example D3(a) to read as follows:

"~~Although~~ Because the neutral runs between the main switchboard and the building panelboard, likely terminating on a busbar at both locations, ~~the busbar connections are part of listed devices and not "separately installed pressure devices."~~ and not on overcurrent devices, the effects of continuous loading can be disregarded in evaluating its terminations [see 215.2(A)(1) Exception No. 2]. ~~Therefore 110.14(C)(2) does not apply, and the normal termination temperature limits apply. In addition, the listing requirement to gain exemption from the additional sizing allowance under continuous loading (see 215.3 Exception) covers of just the overcurrent protective device, but its entire assembly as well. Therefore, since the lighting load is continuous, the minimum conductor size is based on 1.25 x~~ That calculation is (11,600 VA ÷ 277V) = ~~52~~ 42 amperes, to be evaluated under the 75°C column of Table 310.16. The minimum size of the neutral ~~is 6 AWG~~ might seem to be 8 AWG, but that size would not be sufficient to be depended upon in the event of a line-to-neutral short circuit [see 215.2(A)(1), second paragraph]. ~~This size is also the minimum size required by 215.2(A)(1), because~~ Therefore, since the minimum size equipment grounding conductor for a 150 ampere circuit, as covered in Table 250.122, is 6 AWG, that is the minimum neutral size required for this feeder.
Substantiation: The present wording of Example D3(a) substantiates rejecting this proposal. However, assuming CMP 2 has decided to rethink the technical merits involved, then the wording of Example D3(a) must be adjusted accordingly. This comment puts both options on the table for the panel to consider.
Panel Meeting Action: Accept in Principle in Part

Revise the last paragraph in Annex D Example D3(a) as follows:
~~Although~~ Because the neutral runs between the main switchboard and the building panelboard, likely terminating on a busbar at both locations, ~~the busbar connections are part of listed devices and are not "separately installed pressure devices".~~ and not on overcurrent devices, the effects of continuous loading can be disregarded in evaluating its terminations (see 215.2(A)(1) Exception No.2). ~~Therefore, 110.14(C)(2) does not apply, and the normal termination temperature limits apply. In addition, the listing requirement to gain exemption from the additional sizing allowance as well. Therefore, since the lighting load is continuous, the minimum conductor size is based on 1.25x~~ That calculation is (11,600 VA + 277V) = ~~52~~ 42 amperes, to be evaluated under the 75° column of Table 310.16. The minimum size of the neutral is ~~6 AWG~~ might seem to be 8 AWG, but that size would not be sufficient to be depended upon in the event of a line-to-neutral short circuit (see 215.2(A)(1), second paragraph). ~~This size is also the minimum size required by 215.2(A)(1), because~~ Therefore, since the minimum size equipment grounding conductor for a 150 ampere circuit, as covered in Table 250.122, is 6 AWG, that is the minimum neutral size required for this feeder.
Panel Statement: The panel accepts the revision to Annex D, but not the recommendation to reject the proposal. The word "are" as it appears in the original text is also being deleted in the first sentence.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-189 Log #1009 NEC-P02 **Final Action: Reject (210.19(A)(1), FPN 4)**

Submitter: David Shapiro, Accurate & Intriguing Writing & Editing
Comment on Proposal No: 2-168
Recommendation: Revise text to read as follows:

...and where the maximum total drop from nominal voltage ~~on feeders and branch circuits~~ to the farthest outlet...
Substantiation: The Panel Statement agrees that, "The fine print note... does not cover all possible causes for the voltage drop." I have had multiple conversations over a long period that demonstrated clearly that the texts presently listing two sources, feeders and branch circuits, is misleading to many. While FPNs are advisory, not mandatory, they constitute a de facto standard of good practice, relied on by specifiers, lawyers, and others. Deleting the two examples removes the misleading element. Adding language such as "from the sum of all upstream impedances" might emphasize the point, but may be gratuitous. Parsimonious language often is preferable-one reason I have no issue with the CMPs nixing my initial proposals addition of other sources. The reason that I suggest the additional wording, "from nominal voltage" is that the FPN is advising about proper operation of utilization equipment. This is effected not by what VD testers report-the drop from initially supplied voltage, in response to a simulated load-but by voltage significantly lower than its design voltage. Electricians have only partial control over this, but certainly more control than "feeders and branch circuits" implies.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree that the recommendation adds any clarity to the section. The text refers to feeders and branch circuits as they apply to Articles 210 and 215.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-190 Log #506 NEC-P02 **Final Action: Reject (210.19(A)(2))**

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-169
Recommendation: Accept proposal to include "outlets".

Substantiation: 210.20(B)(2)(3) includes "outlets". Proposal would harmonize these sections.
Panel Meeting Action: Reject
Panel Statement: Section 210.19(A)(2) requires that conductors have an ampacity of the branch circuit rating when more than one receptacle is supplied. Adding the word "outlets" changes the application of the section without substantiation, since lighting outlets would also be included if the change were made. There is no 210.20(B)(2)(3) as noted in the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-191 Log #2265 NEC-P02 **Final Action: Reject (210.21(A))**

Submitter: Michael Beanland, Vancouver, WA
Comment on Proposal No: 2-142
Recommendation: Add:
Manufacturers of AFCI devices shall make documentation on the reliability (ability to detect typical arc faults), selectivity (ability to distinguish between faults and non-fault activity) and security (ability to react to arc faults and not react to non-fault activity) for their AFCI devices available to users.
Substantiation: If AFCI devices are only "intended" to provide protection, documentation of performance should be required to verify manufacturer's success are meeting this "intention."
Panel Meeting Action: Reject
Panel Statement: The panel recognizes that the submitter is referencing 210.12 with this comment. The intended arc protection provided by AFCIs is well defined in UL 1699. Additional documentation is unnecessary.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

2-192 Log #433 NEC-P02 **Final Action: Reject (210.21(B)(2) and Table 210.21(B)(2))**

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-175
Recommendation: Accept proposal.
Substantiation: See substantiation for this proposal and Proposal 2-174. This section does not allow for large office areas or suites to have multiple outlets with special configuration receptacles such as twistlock types to provide power for floor polishers or carpet cleaners, which in effect limits the load to one utilization equipment and, therefore, meets the definition of individual circuit. Testing labs indicate a receptacle can carry its rated load. This requirement does not appear to relate to 90.1(A) and (B).
Panel Meeting Action: Reject
Panel Statement: The maximum loading values are part of the entire system of branch circuit safety requirements. The submitter has not substantiated deleting the section. Deletion of the section would simply allow equipment to run at continuous ratings up to the rating of the receptacle. This would remove a portion of the safety margin built into the system.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-193 Log #434 NEC-P02 **Final Action: Reject (210.21(B)(2) and Table 210.21(B)(2))**

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-175
Recommendation: Accept proposal.
Substantiation: This section is virtually unenforceable. Receptacles are tested and listed to supply a load up to their rating which suggests there is no safety hazard. 90.1 indicates the purpose of the code is safeguarding from hazards. What hazard is involved in a receptacle supplying its rated load current? This limitation appears intended to provide for additional or future current use for other outlets which is not in accordance with 90.1(B).
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-192.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-194 Log #774 NEC-P02 **Final Action: Reject (210.21(B)(1))**

Submitter: William Riggenbach, Riggs Electric
Comment on Proposal No: 2-8
Recommendation: Revise text to read as follows:
Single ~~receptacle~~ device on an individual branch circuit. A single ~~receptacle~~ device installed on an individual branch circuit shall have an ampere rating not less than that of the branch circuit.
Substantiation: A single 15 amp duplex receptacle is allowed on a 20 amp circuit under 210.21(B)(3) i.e., "...two or more receptacles...and Table 210.21(B)(3). This limits the receptacle load to 12 amps per Table 210.21(B)(2). It also creates a fire hazard should an equipment using 16 amps if connected to the receptacle. This is a standard practice in the Atlanta, GA area. I have seen this situation on 20 amp circuits for microwave ovens, heaters, etc., including bathroom GFC and REC. Requiring a 20 amp rated receptacle (device) whether single or duplex would eliminate this problem.
Panel Meeting Action: Reject
Panel Statement: Allowing a 15 ampere receptacle on a 20 amp branch circuit does not pose a hazard since all 15 ampere receptacles are evaluated for 20 amperes of current through the entire assembly. The submitter's contention that a 16 ampere load could be connected to a single 15 ampere receptacle is incorrect, since that would require a 20 ampere cord cap on the equipment in accordance 210.21(B)(2).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-195 Log #773 NEC-P02 **Final Action: Reject (210.21(B)(3))**

Submitter: William Riggenbach, Riggs Electric
Comment on Proposal No: 2-8
Recommendation: Add new text to read as follows:
20 amp circuit conductors connected to a 15 amp receptacle must be made by means of splicing the conductors and bringing out a tap in accordance with Table 210.24.
Substantiation: Current practice allows using the 15 amp duplex receptacle(s) for continuity of the 20 amp circuit. Conductors generally are stabbed into the back of a residential grade 15 amp duplex receptacle. This includes both the feed conductors and the circuit continuation. This effectively inserts the equivalent of a short piece of 15 amp wire at each receptacle location. This creates a fire hazard. I have encountered at least 2 of these where arcing has resulted, and burning of the receptacle was in evidence. In one, active was occurring even as I was removing the receptacle to replace it. In this instance, a 1500 watt heater was plugged into the circuit downstream of this receptacle. This 1500 watt load, added to the existing half of table lamps, a large screen projection TV and surround sound system, caused a load in excess of 15 amps and began the burning process.
As well as being a licensed electrician since 1975, I am also a retired Miami (FL) fire captain. I can tell you this is a very real fire hazard. It was not allowed in South Florida, but goes on routinely here in Georgia.
Note: Supporting Material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The substantiation provided by the submitter is incorrect. Since 15 ampere receptacles are evaluated for 20 amps of "feed through" current, a splice/tap arrangement is not technically substantiated. The panel also notes that relative to the submitter's drawing, the "quick wire" holes that are referenced are, by the UL standard, limited to #14 AWG wire and as such a 15 ampere circuit maximum. Receptacles are not permitted to have #12 AWG inserted into the backs of receptacles for a feed through, "quick wire" connection.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-197 Log #20 NEC-P02 **Final Action: Accept (210.52)**

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 2-190
Recommendation: It was the action of the Technical Correlating Committee that consideration be given to using a list format as recommended in 2.1.5.1, 3.3.1.2, and 3.3.2 of the NEC Style Manual.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 2-198.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-198 Log #843 NEC-P02 **Final Action: Accept (210.52)**

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 2-190
Recommendation: Revise the first paragraph of 210.52 to read as follows:
210.52 Dwelling Unit Receptacle Outlets. This section provides requirements for 125-volt, 15- and 20-ampere receptacle outlets. The receptacles required by this section shall be in addition to any receptacle that is:

(1) Part of a luminaire (lighting fixture) or appliance, or ~~is~~
(2) Controlled by a wall switch in accordance with 210.70(A)(1) Exception No. 1, or ~~is~~
(3) Located within cabinets or cupboards, or ~~is~~
(4) Located more than 1.7 m (5 1⁄2 ft) above the floor

Substantiation: This comment simply reorganizes the first paragraph into a list format as recommended by the TCC note for Proposal 2-190.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-199 Log #1135 NEC-P02 **Final Action: Reject**
(210.52)

Submitter: Steven Roncourt, Roncourt Enterprises Inc / Rep. Electrical Contractors Business Association
Comment on Proposal No: 2-142
Recommendation: This proposal should be rejected.
Substantiation: While as an organization we are always concerned about safety and any new technology that may contribute to this, we feel that you must balance the implementation of new technology with the effectiveness and reliability when a product is first introduced into the market. We are well aware that with any new product, besides the original testing, the only way to gain this knowledge is to actually use it, as is with any new computer software. This being said we feel that there still needs to be further testing and development with AFCIs and their testing equipment, before trying to implement them in such a dramatic fashion.

Some of the concerns that we have at this point in time is that there are no combination type AFCIs (series and parallel fault type) devices on the market. Manufacturers have had years to produce a product for sale that meets these requirements for commercial use and testing since the original inception of AFCIs and to date have not.

To install this AFCI protection using the existing technology would not be in the public's best interest. They would only be getting an AFCI with series protection instead of a combination type protection (series and parallel). Many areas where this device can be helpful are on older parallel wiring circuits, especially knob and tube wiring and it would be much easier to implement if they would have an AFCI receptacle available as well to deal with any issues that may not allow a breaker to be installed.

Even though this may be a step in the right direction, with the existing technology still in its infancy, this board should require that additional testing be done under the existing NEC code, before having consumers spend BILLIONS of dollars on installing AFCI protection that will be changing or advancing by the 2011 code cycle. It is in the consumer's best interest to only have to pay once for this to be done and not a second time after the manufacturers finally make advances to meet the code requirements.

There is not enough data to support any possible issues that may arise with the use of AFCIs in conjunction with GFCIs which are common throughout dwelling unit living areas. This is of grave concern to the industry because there have been issues with AFCIs that are not always reported. The contractor will simply return what seems to be the defective product and install a new one until it works. The reasons for this is because when you call the supplier or manufacturer they do not always have a reason why you are having issues. This was very common with GFCIs when they first came out and is true of any new product. Until additional equipment is available, you may not be able to meet the requirement of the proposed code for eery application that may arise. This, again will add to the cost to implement them as proposed, above and beyond the cost of the breaker.

Most AFCIs over the last 2 years have been installed in new dwelling units which on a normal basis do not have any problems with these arc faults for quite a few years to come if at all, unless there was an installation error. This alone wold make the data and research results supplied by the manufacturers unreliable and appear as though the product was actually making more of a difference than they actually are or if they were never installed. There must be more time allowed to evaluate the true safety factor that these provide before requiring them to be installed so widespread.

I would like to take a minute to tell you of a couple of experiences that I have come across since the code change. I had installed AFCIs in many new residences as I had been doing since the code change. Occasionally, I would get different test results on a house but with no consistency to determine what the cause or issue may be and sometimes with the issue clearing up by itself. I had made sure to purchase a new AFCI tester so that there would not be any issues.

On this one particular house I had one AFCI out of 4 that would not trip, I spent a lot of time trouble shooting the problem out of concern that the owners would not be properly protected. I did all the obvious trouble shooting methods. First checking my circuit for any faults, checking to see if the breaker was wired wrong, then changing the breaker. After changing the breaker a couple of times it didn't make sense to me that I could have 3-4 defective breakers. What was confusing about the matter was that if I moved the position of the breaker to a different phase within the panel all of the breakers that I thought were defective would work. If I moved any of the other breakers to the phase that this particular breaker was on they would now not work. I tested, retested and tested again to no avail. At this point and time I had no idea why this was happening. After going through 9 AFCI breakers, I finally found one that tested out with my tester. After talking to another electrician, I decided to try another tester, a much more expensive one, with the bad breakers for my own piece of mind. The cost of a tester shouldn't matter if they are being sold and marketed as a UL listed tester.

What I found is that with the new tester the 9 breakers that I had tried all seemed to work or test out properly. Now I understand that you may get a defective tester or maybe even one might go bad, so I didn't think too much of it at that point other than possibly my tester was defective, but why did my original tester work on the other 3 breakers if it was defective? Please keep in mind that I used the same manufacturer for panels and breakers on a normal basis and have for almost 20 years.

Not too long afterwards I came across a situation where I had to add a subpanel and wanted to keep the equipment the same in the original house. Again, I had the same issues with a different manufacturer's product but with the new more expensive tester. But the breakers did test out properly with the older less expensive tester. These results just did not make sense to me and I still have not been able to get an explanation from either manufacturer. I apologize for the length of the story, but I felt it was necessary to show the inconsistencies that still exist with the product on an everyday basis.

This inconsistency causes grave concern among installers and our organization. Do we really know how many times this may have happened? Do the manufacturers actually have real feed back from the installers in the field or just from their own statistics. How many breakers have been returned as defective? Have they considered this in their substantiation? How many installers did not report anything and just changed the breaker until it worked? We all know that you do not get much of a response from a manufacturer with regards to any concerns over product even if you do go through the proper channels to report it. I explained this to both of the manufacturer's reps/ suppliers and asked them to pass it on to the manufacturers, with not one call back to check the issue out. Not every installer will have the initiative to find out why this situation may have occurred. Mostly because all of this trouble shooting is done at our own expense. We cannot bill the customer or contractor for it, it is not their fault. And the manufacturer is not going to do anything but give us a new product. So what happens in the real world? Most of these things just don't get reported. Why would two different testers from two different manufacturers being used on two different types of breakers, give different testing results. We should really try to address these issues, which I might add are probably typical with a new product. I recall having the same problem when GFCIs were first introduced.

Let the manufacturers produce a combination type AFCI and let's put them to test under the NEC code we have now and give us a few more years to test and correct the issues before mandating them to be installed throughout a dwelling, with no exceptions. When you get results like I have there is no way to tell if we are installing a defective breaker or it is something else causing the issue or if the breaker will function properly at all.

Combine this info with the fact that as stated before, most new dwelling units do not usually have problems with arc faults issues due to the newness of the installation. We believe that the substantiation is not completely accurate. With over 800 pages of ROP it is difficult to address them all and research them all with enough detail by the deadline required. Please allow the manufacturers and installers the time to combine efforts and actual results to get it right the first time and then look at this proposal again in the future.

As an organization made up of electrical contractors and associate members consisting of many suppliers within the area we hope that you will take the time to consider these issues before making a decision. We thank you for your time in hearing our comments and look forward to working with you in the future.

Panel Meeting Action: Reject
Panel Statement: The panel understands that the submitter is referring to 210.12. The submitter's substantiation is anecdotal in nature and lacks the necessary technical data to support his recommendation. Product malfunction, if there is an issue, should be addressed to the manufacturers. The panel notes that the acceptance of Proposal 2-142 is based on the commercial availability of combination-type AFCI devices by January 2008. The panel maintains its position that it has reviewed sufficient technical data that warrant the use of AFCI protection in dwelling units. The use of A
FCI indicators is not an indication of AFCI performance. The AFCI test button should be used to verify that AFCI devices are functioning. The submitter has not substantiated that listed combination-type AFCI devices are not compatible with listed GFCI devices.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

BROWN, L.: Please see NAHB's Ballot Comment on Comments 2-79 and 2-95.

NENNINGER, B.: See my explanation of negative vote on Comment 2-72.

2-200 Log #1300 NEC-P02 **Final Action: Reject**
(210.52)

Submitter: Steven Roncourt, Roncourt Enterprises Inc
Comment on Proposal No: 2-190
Recommendation: Please consider the remarks below before making a decision on this proposal.
Substantiation: 1. It is unclear to me whether or not the language proposed by the panel is in favor or against having a half switched receptacle with 2 outlets in this location to meet this requirement. With 20 years experience in the residential industry, I believe that a half switched receptacle as stated above does not pose a safety condition. I have been installing them for over 20 years and have never had a complaint from a customer concerning this. I do not believe in installing a receptacle that is completely controlled by a wall switch, this does create a condition for a possible safety hazard. A half switched receptacle should be allowed if this proposal is approved.

2. That being said, I disagree with the submitter's substantiation with concerns to the switch being left in the off position if this is not changed. It has been my experience that it is just the opposite. The switch is left in the on position to allow access to the receptacle, therefore, not causing the issue described in the substantiation, but creating an issue with 210.70(A)(1). Why would someone completely disable a receptacle instead of just leaving it on to utilize it? These remarks in my opinion are completely wrong and there was no supporting documentation with any technical information.

3. It is also my experience with my 20 plus years in the electrical industry that the NEC has provided for sufficient receptacle placement under 210.52 and that on average the majority of people in a bedroom because of 210.52, do not have more than 1 device plugged into a receptacle at one time.

4. If this proposal does not allow for a half switched receptacle, you will now have to install a quad receptacle with one of them being switched or an additional receptacle with two outlets directly adjacent to the one required under 210.70(A)(1). This seems like this would only cause more confusion on the part of the consumer. I hope that the panel will consider these issues when making your decision.
Panel Meeting Action: Reject
Panel Statement: The submitter's recommendation is unclear and does not provide specific text. Regarding the points in the submitter's substantiation, the comment about leaving the switch on is exactly the issue that is being resolved. Section 210.70(A)(1) requires a switch-controlled lighting outlet, which could be a receptacle in accordance with Exception No. 1. If the switch is left in the "on" position, the requirement for a switched lighting outlet is defeated. Subsequently, a duplex receptacle that is only 1/2 switched would meet the requirements of both 210.70 and 210.52.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-201 Log #2013 NEC-P02 **Final Action: Reject**
(210.52)

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-189
Recommendation: Reject the proposed change.
Substantiation: The proposed change, developed by the Panel, referring to 210.70(A)(1) Exception No. 1, should not be accepted. The other modification to this section of deleting the word "outlets" is correct in the application of the NEC and should be accepted. The intent of 210.70(A)(1) is to provide "switch-controlled lighting" for habitable rooms. The exception to this rule is to allow a design feature of a switched receptacle to be used in lieu of a switched lighting outlet in the ceiling or wall. It is a matter of design. There is no basis, nor was any supporting documentation presented, to support the submitter's belief that it is a "common" practice to "leave the switch" controlling a duplex outlet "permanently in the closed position." Nor, is there any substantiation to support the "switch will either be left in the "ON" position [defeating the purpose of 210.70(A)(1), or (perhaps more likely) an extension cord will be run across a traveled area from a receptacle not controlled by the switch." The receptacle required by 210.70(A)(1) is a receptacle that could easily be used for a lighting fixture for the room whether or not the receptacle is switched. This design feature of convenience should not be penalized as a basis to require additional general lighting wall receptacles.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 2-200.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-202 Log #2020 NEC-P02 **Final Action: Reject**
(210.52)

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-190
Recommendation: Reject the proposed change.
Substantiation: The proposed change, developed by the Panel, referring to Section 210.70(A)(1), Exception No. 1, should not be accepted. The other modifications to this section of deleting the word "outlets" is correct in the application of the NEC and should be accepted. The intent of Section 210.70(A)(1) is to provide "switch-controlled lighting" for habitable rooms. The exception to this rule is to allow a design feature of a switched receptacle to be used in lieu of a switched lighting outlet in the ceiling or wall. It is a matter of design. There is no basis, nor was any supporting documentation presented, the support the submitter's belief that it is a "common" practice to "leave the switch" controlling a duplex outlet "permanently in the closed position." Nor is there any substantiation to support the "switch will either be left in the "ON" position [defeating the purpose of Section 210.70(A)(1)], or (perhaps more likely) an extension cord will be run across a traveled area from a receptacle not controlled by the switch." The receptacle required by Section 210.70(A)(1) is a receptacle that could be easily used for a lighting fixture for the room whether or not the receptacle is switched. This design feature of convenience should not be penalized as a basis to require additional general lighting wall receptacles.
Panel Meeting Action: Reject
Panel Statement: The panel agrees that Proposal 2-190 provides substantiation demonstrating that using a completely switched receptacle can defeat the intent of either 210.52 or 210.70. The revision accepted provides a reasonable way to comply with both by switching only 1/2 of the duplex receptacle. See panel statement on Comment 2-200.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-203 Log #2151 NEC-P02 **Final Action: Reject**
(210.52(4)(4))

Submitter: David H. Kendall, Carlon
Comment on Proposal No: 2-198
Recommendation: Proposal 2-198 should be an "Accept in Principle" with the revised proposed text for 210.52(A)(4) to read as follows:

(1) Receptacle outlets in floors shall not be counted as part of the required number of receptacle outlets unless located within 450 mm (18 in.) of the wall.

(2) A receptacle outlet in a listed floor box shall be installed at least 1.8 m (6 ft) from the wall in rooms other than basements, kitchens, bathrooms, garages and swimming pool rooms that are 60 m2 (625 ft2) in area or greater and where one wall is not less than 900 mm (3 ft) from the center of the room. A receptacle outlet in a listed floor box shall be installed for each 60 m2 (625 ft2) in area in a room.
Substantiation: This proposal should be Accepted in Principle. Panel 2 discussed how cord lengths have been shortened from 6 ft to 5 ft. As stated in the original proposal: "The lack of a sufficient number of available receptacle outlets leads the homeowner to use extension cords. The NEC has long recognized the hazards presented by the use of extension cords, especially where extension cords are used in place of permanent wiring. With the proliferation of cord connected home entertainment systems, computer equipment, electronic games, multiple TVs, appliances, etc., it is evident that the number of receptacles required 50 years ago is no longer adequate for today's home. The addition of floor receptacles as recommended in this proposal will help to ensure that there are an adequate number of receptacles available for connection of the large number of cord connected appliances now being used in the typical dwelling." When floor boxes are installed in large rooms then the number of extension cords used will be reduced.

The location for the floor box was increased to a minimum 1.8 m (6 ft) per Ray Weber's negative comment.
Panel Meeting Action: Reject
Panel Statement: Requiring the placement of receptacles in the floors of dwelling unit areas of 625 sq. ft. or more, located at least 6 ft. from the wall, in areas that may have no furniture or other provisions for interior design specifications, is not practical and has not been substantiated. If a floor receptacle were required in such areas, it could still end up underneath furniture which, if still used by the homeowner, would be a hazard in itself.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

KING, D.: This Comment should have been accepted. I disagree with the Panel that this is a design consideration. This is a minimum installation requirement that allows for the safe and practical use of electricity in an area where it is commonly required by the end user. Requiring a floor receptacle to be installed in rooms with an area of 625 sq ft or larger will reduce the use of extension cords that are commonly used today. Without the requirement for a floor receptacle the homeowner would have to resort to running extension cords across walkways and under carpets to supply electrical appliances that are utilized in open areas and do not have safe access to wall receptacle outlets. I disagree with the Panel that this proposed requirement has not been substantiated. The potential shock and fire hazard that exist with the use of extension cords that are routed across walkways and concealed under carpeting is well documented and should not require any further substantiation.

WEBER, R.: The panel should have accepted in principle the comment the submitter in offering "at least 1.8 m (6 ft) from the wall", in large room areas of over 60 m square (625 sq ft), does address a need that should have positive code text to provide mandatory requirements; it could be restated in the text to allow it to be located anywhere in the room provided it is greater than 1.8 m (6 ft) from the wall. In the panel statement, the interior furniture layout is a design feature and a true statement, but at least one receptacle would have to be installed and then the coordination of its location is up to the designer, electrical installer and owner as to where it should be placed. As we review building trends going to larger size dwelling units, with rooms over the indicated size; the use of extension cords are often times the only solution to deal with the electrical outlet needs of the owner. It is always repeated that the electrical code is not a design manual; it does start as a minimum base line for what must be done to electrical systems and by not addressing changes in building sizes and room uses as to needs of receptacle locations other than just the wall area is unfortunate and not in the public best interest. Thus, the minimum standard becomes the maximum requirement and many will not do any more than that to meet the code, irregardless of the increased safety factor. If there is positive code text, then the AHJ does not have to go back to 90.4 for developing a local code requirement or addition for a receptacle outlet in a listed floor box, to be installed.

2-205 Log #666 NEC-P02 **Final Action: Reject (210.52(A))**

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 2-195
Recommendation: This Proposal should have been Accepted in Principle in Part with the following action:

Add an additional phrase to the first sentence of 210.52(F) "in addition to the appliance receptacle outlet required in 210.50(C)" so the sentence reads as follows:

"In dwelling units, at least one receptacle outlet shall be installed for the laundry in addition to the appliance receptacle outlet required in 210.50(C)."
Substantiation: The additional phrase will make it clear that the appliance receptacle outlet required in 210.50(C) does not satisfy the requirement for the additional receptacle outlet required in 210.52(F). This change will not require any additional receptacles in the laundry area, but will add clarity to the requirements.
Panel Meeting Action: Reject
Panel Statement: The submitter is incorrect in that the appliance receptacle requirement for a washer or gas dryer, in order to meet 210.50(C), does not meet the requirement for 210.52(F). This proposed change would require an additional receptacle to be installed but does not provide substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-206 Log #667 NEC-P02 **Final Action: Reject (210.52(A))**

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 2-195
Recommendation: This Proposal should have been Accepted in Principle in Part with the following action:

Accept the addition of "foyer," in 210.52(A). The remainder of 210.52(A) should read as shown in the 2005 NEC.

Add immediately following 210.52(A)(2)(2):

Exception to (1) and (2): In foyers, a receptacle outlet shall not be required where the unbroken wall space is less than 1.2 m (4 ft) in width or less than 1.8 m (6 ft) from the opposite wall.
Substantiation: I agree with Mr. King's Explanation of Negative Vote.

In the foyer of a typical two-story, one-family home, there can be three doorways (front entry, closet, and basement stairs), three openings (living room, dining room, kitchen), and one stairway. There are several wall spaces that would be 5 ft or more in width and could easily accommodate a small cabinet, table, or desk with a lamp, or even a trophy cabinet, credenza or hutch with interior lighting. Where does the power come from? Lacking adequate receptacles in the foyer, the power will have to be provided most likely from one of the adjacent rooms through the use of extension cords laid on the floor through the opening or doorway or, possibly, under a rug or carpet. Not a very safe installation and, by not requiring additional outlets in the foyer, the NEC condones the practice.

This problem becomes magnified many times over in the newer larger McMansion homes (15,000 sq ft and up) where the foyer may be 30 ft long and all the NEC requires is "at least one receptacle outlet" if the hallway is longer than 10 ft.

A hallway has a different connotation than a foyer. A hallway is usually narrow and does not lend itself to locating furniture in the area, although second floor hallways can be wider than those on the first floor and would permit locating furniture in that area. A foyer may be quite wide in addition to being long and does provide adequate space to locate furniture in this area.

Consider a home that has an atrium foyer that is 15 - 20 ft sq with a two- or two and one-half story ceiling and a balcony surrounding the atrium opening on the second floor. One receptacle outlet located on either level would comply with the 2005 NEC.

It could be argued that the wording "or similar room or area of dwelling units" in 210.52(A) already covers foyers with the more stringent requirements for receptacle outlets than that being recommended in this Comment.

While the Accept in Principle of the "foyer" part of Proposal 2-195 does not require complete compliance with the receptacle requirements within rooms, it does provide more lenient and reasonable requirements that partially address the problem stated in the proposal's substantiation.
Panel Meeting Action: Reject
Panel Statement: The term "foyer" is not a clearly defined term in the NEC and could be interpreted to cover many types of spaces. The proposed exception is unclear as to what types of spaces are intended to be exempt.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

KING, D.: This Comment should have been accepted. The term "foyer" is clearly understood and does not need to be further defined as indicated in the Panel Statement. Most foyers are of sufficient size and have sufficient wall space to allow for the placement of furniture. Electrical appliances placed at these locations would require a receptacle outlet. Without a requirement for receptacles at these locations, extension cords would most likely be used which would have to be routed through doorways or entryways to reach the nearest available receptacle outlet. This would create a shock or fire hazard due to potential physical damage to these cords where they pass through the entryways and doorways. I disagree with the Panel that the proposed exception is unclear. The proposed exception outlined by the submitter is clear in its intent and would exempt this requirement where the wall space and or floor area is too small for the placement of furniture and electrical appliances. The Panel should give further consideration to this Comment.

WEBER, R.: The panel should have accepted in principle the comment, in the panel statement. "The term "foyer" is not a clearly defined term in the NEC" is used as part of the justification for rejecting the comment. Which may be true, however as we read section 210.52(A), Kitchen will now have a definition and the remaining rooms indicated do not have a definition in Article 100 either; but at present the AHJ often times is forced to make the call and tie in that (foyer) areas use to the last part of the sentence "or similar room or area of a dwelling unit" to solve the problem of receptacle requirements in that space. Hallways are not defined but requirements are indicated in 210.52(H), and a length is given but not a width; clearly if the area is (3 ft) or (4 ft) in width and functions as a passage way, that is its intended purpose and when (10 ft) or more the code requires a receptacle be installed. Foyers are something other than that in size and use, and can be of a considerable square footage in area. It often times has many pieces of furniture or other types of furnishings being placed in that space, that have lamps, decorative fixtures and uses in need of an outlet. If a receptacle is not provided as an option of the builder or installer, the owner will use a cord to meet the receptacle needs. As a panel, we need to think of the installer's perspective as well and provide enforceable text to meet in field problems and provide that area with wall spaces indicated in 210.52(A)(2) must be met.

2-207 Log #1308 NEC-P02 **Final Action: Accept (210.52(A)(1))**

Submitter: Joseph A. Hertel, Safety and Buildings
Comment on Proposal No: 2-197
Recommendation: I support the action on this proposal.
Substantiation: The submitter must realize that the NEC is by its own intent (Section 90.1(C)) is not a design specification. While agreement can be reached that additional receptacles may provide some degree of additional safety, they can always be added by exceeding the minimum requirements of the NEC. If as the explanation of one of the negative votes says that product standards have changed to allow the use of shorter cords it is these standards that should be modified to reflect the length needed for compliance with the NEC without the use of extensions.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:
KING, D.: See my explanation of negative on Comment 2-208.
Comment on Affirmative:
BROWN, L.: Please see my Ballot Comment on Comment 2-208. The NEC (NFPA 70) is a standard on the minimum provisions for safe electrical installations. It is not a standard for "electrical convenience".

2-208 Log #1348 NEC-P02 **Final Action: Reject (210.52(A)(1))**

Submitter: Donald M. King, Wilmington, DE
Comment on Proposal No: 2-197
Recommendation: Revise submitter's recommended text to read as follows:
210.52(A)(1) Spacing. Receptacles shall be installed so that no point measured horizontally along the floor line in any wall space is more than ~~1.8 m (6 ft)~~ 1.5 m (5 ft) from a receptacle outlet.
Substantiation: The submitter of this proposal has provided adequate substantiation to support the need for a change in the spacing receptacle spacing requirements described in 210.52(A)(1). Product standards addressing the minimum cord length of electrical appliances have been revised since the 6 foot requirement was added to 210.52 of the NEC. There are many listed appliances available today that have cord lengths that are less than 6 feet. For portable luminaries, UL 153, the cord must be a minimum 5 ft. For power tools, UL 45, it is also a 5 ft minimum, but there are some exceptions, like for hand circular saws, where it is a minimum of 6 ft. For cooking appliances, UL 1026, cooking appliances for kitchen countertop must be between 2 and 7 ft. The purpose of this section is to eliminate the use of extension cords in dwelling units, thus reducing the risk of fires. Changing the spacing requirement for receptacle outlets to be in line with the minimum cord length as defined in the most recent product standards will aid in the reduction of the number of extension cords used.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees with the suggestion that it is necessary to lessen the required 6 ft spacing to accommodate the manufacturer's decision to shorten their appliance cords to 5 ft.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
KING, D.: I disagree with the Panel that it is not necessary to lesson the 6 ft spacing requirement to 5 ft. Receptacle spacing should be coordinated with the product standards to reduce the number of extension cords used in dwelling units. The 6 ft spacing requirement in the NEC was initially implemented to be in line with the cord manufacturer's product standards. The intent of this revision is not to accommodate the product manufacturer's decision to shorten their cord length as stated by Panel 2 but rather to require a minimum standard for receptacle spacing to reduce the number of fires associated with the use of extension cords. Panel 2 should give this comment further consideration.
LAROCCA, R.: The present rule in Section 210.52(A)(1), that requires receptacles to be installed so that no point measured horizontally along the floor line is more than 6 ft from a receptacle outlet, has been in the NEC since the mid-1950's. Prior to that the length was 10 ft. The 6 feet distance corresponded to the minimum length at the time of power supply cords in product standards typical of appliances such as portable lamps, audio-video equipment, etc., that are commonly installed in fixed locations within the dwelling unit. In the mid-1970s, these product standards enacted temporary requirements that reduced this minimum cord length from 6 ft to 5 ft. This was done to address a growing concern over the shortage of copper and the need to conserve this nonrenewable resource. These temporary length requirements subsequently became permanent. The submitters comment on Proposal 2-197 to reduce this receptacle outlet spacing to 5 ft makes sense given these current cord lengths, and should reduce the likelihood of an extension cord set being used on a prolonged basis to reach the nearest outlet.
PAULEY, J.: See my Explanation of Negative Vote on Comment 2-209.
Comment on Affirmative:
BROWN, L.: Proposal 2-197 did not provide any relative and substantial study data to support a change to the 6-foot dimension for wall receptacles. The CPSC information did not equate the use of electrical extension cords to dwellings where the receptacles are installed to the current 6-foot dimension.
The cases could easily be located in dwellings constructed prior to the receptacle spacing. The 2006 figures released by NFPA shows the annual average between 1999-2003 to be 2,400 fires related to cord or plugs 2,400, with only 30 deaths, and 160 civilian injuries. Again, with no data to show the fires occurred in dwellings with the current required receptacle spacing. These figures are significantly lower then CPSC cited in the Proposal. But absolutely, the proposal change did not provide any means that would change any of the cited statistics by having a receptacle one-foot closer then is now required. The "Reason" for this Proposal is also flawed and one would be hard pressed to find any computer station where an extension to the wall or floor receptacle is not used to power all of the related equipment. As for the fixture cord length, the Committee Statement is correct. Perhaps the standards developed by the testing laboratories and underwriters should mandate a cord length that is usable for the situation in which the fixture is reasonably expected to be located.

2-209 Log #1410 NEC-P02 **Final Action: Reject (210.52(A)(1))**

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 2-197
Recommendation: The Panel should Accept in Principle and change the proposed text to read as follows:
210.52(A)(1) Spacing. Receptacles shall be installed so that no point measured horizontally along the floor line in any wall space is more than ~~1.8 m (6 ft)~~ 1.2 m (4 ft) from a receptacle.
Substantiation: Both the panel statement and the substantiation for this proposal noted that the 6 ft receptacle spacing is based on the standard length of the flexible cord used on an appliance or lamp. The substantiation also quoted earlier editions of the NEC handbook which stated, "This rule intends that an appliance or lamp with a flexible cord attached may be placed anywhere in the room and be within 6 ft of a receptacle". However, many UL standards for portable electric products, such as the Standard for Portable Electric Lamps UL 153, now require a cord length of 1.5 m (5 ft).
This comment revises the current receptacle spacing from 6 ft to 4 ft. The 4 ft spacing accommodates the likelihood that a table lamp or other cord connected appliance will be located on a table top or similar raised surface which effectively reduces the distance that flexible cord will reach along the wall to the receptacle. The 4 ft spacing also takes into account locating a receptacle at the standard stud spacing in typical residential construction.
The NEC requirement for the 6 ft receptacle spacing has not been changed in at lest 50 years. In the least 50 years there has been a significant increase in the capacity of the service for dwellings. It is common today to have a service rated for 150, 200 amps or greater compared to a rating of 60 amps in the 1950's. These higher ratings are due not only to the larger size of homes but also to the increased demands of the electrical equipment used in a typical residence. Although not all of the increase is due to cord connected electrical equipment, there are cord connected electrical products in use today that were not envisioned 50 years ago. Cord connected products such as home entertainment systems, multiple televisions, electronic gaming systems, transformers, air purifiers, air fresheners, etc., all require connection to a receptacle. If a sufficient quantity of receptacles is not provided at convenient spacing than it is likely that extension cords will be used. This proposal is intended to reduce the use of extension cords. The original proposal substantiation cited the CPSC report that documents the death and injury incidents associated with the use of extension cords.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 2-208.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
KING, D.: This Comment should have been accepted in principal with a revised spacing maximum spacing of 5 ft. A maximum spacing of 5 ft. aligns the cord manufacturer's product standard with the spacing requirement in the NEC. See my explanation of negative on Comment 2-208.
PAULEY, J.: The revision in the product standards that allowed appliance cords to be reduced to 5 feet in length is sufficient substantiation to make the change to the receptacle spacing. The reduced cord length can result in more use of extension cords in order to reach a receptacle.
Comment on Affirmative:
BROWN, L.: Please see my Ballot Comment on Comment 2-208. The NEC (NFPA 70) is a standard on the minimum provisions for safe electrical installations. It is not a standard for "electrical convenience".

2-210 Log #1454 NEC-P02 **Final Action: Reject (210.52(A)(1))**

Submitter: James O'Driscoll, IBEW Local #98
Comment on Proposal No: 2-197
Recommendation: I agree with the submitter, D. King, and J. Pauley.
Substantiation: The submitter's substantiation gives this panel very staggering statistics. Given the fact that appliance cords are mostly 4 to 5 ft, I feel receptacle spacing requirements should be reduced.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 2-208.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
KING, D.: See my explanation of negative on Comment 2-208.
PAULEY, J.: See my Explanation of Negative Vote on Comment 2-209.
Comment on Affirmative:
BROWN, L.: Please see my Ballot Comment on Comment 2-208. The NEC (NFPA 70) is a standard on the minimum provisions for safe electrical installations. It is not a standard for "electrical convenience".

2-211 Log #2150 NEC-P02 **Final Action: Reject (210.52(A)(1))**

Submitter: David H. Kendall, Carlon
Comment on Proposal No: 2-197
Recommendation: Proposal 2-197 should be an "Accept in Principle" with the revised proposed text for 210.52(A)(1) to read as follows:

210.52(A)(1) Spacing. Receptacles shall be installed so that no point measured horizontally along the floor line in any wall space is more than ~~1.8 m (6 ft)~~ 1.2 m (4 ft) from a receptacle outlet.

Substantiation: I agree with the substantiations submitted with the NEMA Proposal and Comment. I agree with the 4 ft spacing because when using 16 in. stud spacing the outlet would be located right on the stud installed 48 in. away. The current 6 ft requirements puts the outlet between the 64 in. and 80 in. studs. To be code compliant, without installing another stud, the outlet would be located on the 64 in. stud (5.33 ft) away.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 2-208.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

KING, D.: This Comment should have been accepted in principal with a revised spacing maximum spacing of 5 ft. A maximum spacing of 5 ft. aligns the cord manufacturer's product standard with the spacing requirement in the NEC. See my explanation of negative on Comment 2-208.

PAULEY, J.: See my Explanation of Negative Vote on Comment 2-209.
Comment on Affirmative:

BROWN, L.: Please see my Ballot Comment on Comment 2-208. The NEC (NFPA 70) is a standard on the minimum provisions for safe electrical installations. It is not a standard for "electrical convenience".

2-212 Log #1309 NEC-P02 **Final Action: Accept (210.52(A)(4))**

Submitter: Joseph A. Hertel, Safety and Buildings
Comment on Proposal No: 2-198
Recommendation: I support the panel action.
Substantiation: The submitter must realize that the NEC is by its own intent (Section 90.1(C)) is not a design specification. While agreement can be reached that additional receptacles may provide some degree of additional safety, they can always be added by exceeding the minimum requirements of the NEC.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

KING, D.: See my explanation of negative on Comment 2-203.

2-213 Log #2246 NEC-P02 **Final Action: Reject (210.52(B)(1))**

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 2-201
Recommendation: The proposed language should be accepted.
Substantiation: The panel should reconsider and accept this change. The panel statement said that the word "covered" was used in place of the word "required" in an attempt to make it clear that all of the receptacles installed in the kitchen, pantry, breakfast room, dinning room, or similar area of a dwelling unit be supplied by the two or more small appliance branch circuits. Based on the debates of this issue, both in the field and in the online code forums, this attempt was not successful. The code language in this proposal would make the panel's intent completely clear and enforceable.
Panel Meeting Action: Reject
Panel Statement: The panel agrees that this submitter has not provided adequate substantiation in order to change the use of these terms.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-214 Log #2021 NEC-P02 **Final Action: Reject (210.52(B)(1) Exception No. 2)**

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-199
Recommendation: Accept the proposed change.
Substantiation: It should be noted that Section 210.52(B)(1) Exception No. 3 already allows the receptacle outlet for refrigeration equipment to be on an individual branch circuit of 15 amperes or greater. I see no reason to limit individual circuits for these types of permanently installed appliances, such as the disposer and dishwasher, that would not require a circuit rated greater than 15 amperes. I believe the panel statement is somewhat misleading in its assertion that Section 210.52(B)(1) and the proposed text relate only to the countertop receptacles that are covered in Section 210.52(B)(3) and 210.52(C). In other words, I do not believe the panel statement is a good response to the submitter's substantiation. If the Panel believes these appliances are already allowed to be on a circuit(s) that do not supply the receptacles as outlined in Section 210.52(B)(1), it should be acknowledged.
Panel Meeting Action: Reject
Panel Statement: The panel agrees that this change is not necessary. The only reason there is an exception for refrigeration equipment is that refrigeration equipment is specifically required to be on the small-appliance branch circuit. The current Code does not prohibit receptacles in the kitchen that are other than countertop (210.52(C)) or wall spaced (210.52(A)) to be on 15- or 20-ampere circuits appropriately rated for the equipment.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

BROWN, L.: The circuits for receptacles for permanently installed kitchen appliances, such as the disposer and dishwasher are not covered under Section 210.52(B)(1) (not allowed) and are to be on another circuit.

2-215 Log #21 NEC-P02 **Final Action: Accept (210.52(C))**

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 2-207
Recommendation: The Technical Correlating Committee directs that the Panel Action on this Proposal be correlated with Figure 210.52 by changing the title of the Figure to "Figure 210.52(C)(1)" to comply with 2.3.1 of the NEC Style Manual, and change the Table titles from "Sink or range…" to "Range, counter-mounted cooking unit or sink…" to correlate with Panel Actions on this Proposal and Proposals 2-211 and 2-218.

The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal as to the placement of the proposed text within 210.52(C).

This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Revise Figure 210.52 as follows:

The panel takes the following actions:

(1) Place the text of the recommendation in Proposal 2-207 as modified by the panel action text and make it a second paragraph to 210.52(C).

(2) The panel accepts changing the title of the figure to "Figure 210.52(C)(1) Determination of Area Behind a Range, Counter-Mounted Cooking Unit or Sink."

(3) The panel directs that the labels on the figures in the ROP Draft be changed to reflect the accepted panel change from Proposal 2-206a. This will change the words "Outlets not required.." to "Space exempt from wall line measurement."

(4) The captions for both figures should be changed from "Sink or range.." to "Range, counter-mounted cooking unit or sink.." to be consistent with the text of the Exception to 210.52(C)(1).
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action. The panel has also made the appropriate changes to the labels within the figures to match the text accepted in Proposal 2-206a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-216 Log #973 NEC-P02 **Final Action: Accept in Principle (210.52(C))**

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 2-207
Recommendation: Change "counter" in the subsection to "countertop" to be consistent throughout the section as follows:

210.52 Dwelling Unit Receptacle Outlets

(C) Countertops. In kitchens and dining rooms of dwelling units, receptacle outlets for counter<u>top</u> spaces shall be installed in accordance with 210.52(C)(1) through (C)(5). Where a range, counter-mounted cooking unit, or sink is installed in an island or peninsular countertop and the width of the counter behind the range, counter-mounted cooking unit, or sink is less than 300 mm (12 in.), the range, counter-mounted cooking unit, or sink is considered to divide the countertop into two separate countertop spaces as defined in 210.52(C)(4). Each separate countertop space shall comply with the applicable requirements in 210.52(C).

(1) Wall Countertop Spaces. A receptacle outlet shall be installed at each wall countertop space that is 300 mm (12 in.) or wider. Receptacle outlets shall be installed so that no point along the wall line is more than 600 mm (24 in.) measured horizontally from a receptacle outlet in that space.

Exception: Receptacle outlets shall not be required on a wall directly behind a range or sink in the installation described in Figure 210.52.

(2) Island Countertop Spaces. At least one receptacle shall be installed at each island countertop space with a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater. Where a rangetop or sink is installed in an island countertop and the width of the countertop behind the rangetop or sink is less than 300 mm (12 in.), the rangetop or sink is considered to divide the island into two separate countertop spaces as defined in 210.52(C)(4).

(3) Peninsular Countertop Spaces At least one receptacle outlet shall be installed at each peninsular countertop space with a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater. A peninsular countertop is measured from the connecting edge.

Substantiation: Make changes throughout 210.52(C) to ensure the same terminology use of "countertop" spaces.

Panel Meeting Action: Accept in Principle

Revise 210.52(C), (C)(1), (C)(2), and (C)(3) as follows:

The panel agrees to change the words "Counter" to "Countertop" throughout the text in 210.52(C), (C)(1), (C)(2) and (C)(3).

Panel Statement: The panel agrees with the concept but accepted the comment in principle because the submitter included language in the subsections that does not take into account other changes that were made in the ROP.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-217 Log #1010 NEC-P02 **Final Action: Accept in Principle (210.52(C))**

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education

Comment on Proposal No: 2-205

Recommendation: Accept Mr. Eugene Swisher's proposal.

Substantiation: I am with Messrs. King and Weber. It makes sense to define "kitchen" in terms of having both permanent food-preparation facilities and a sink; the sink creates the need for GFCI protection. However, neither the circuiting requirement nor the receptacle-spacing requirement at a food-preparation countertop is related to the presence of a sink and thus to satisfying the definition of "kitchen". I was called in recently to discuss bringing the wiring up to date in a single-family residence's basement. It had a food-preparation countertop, including a built-in range, but no sink. Dishes were carried upstairs to the dishwasher. The nearest 120 volt receptacle was several feet away from the countertop. This was an extreme case, but it underscores the fact that countertops in food-preparation areas should fulfill the same requirements for both circuiting and spacing as those in kitchens.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 2-218.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-218 Log #1365 NEC-P02 **Final Action: Accept in Principle (210.52(C))**

Submitter: Eugene Swisher, City of Tampa / Rep. IBEW Local 915 & IAEI Suncoast Division

Comment on Proposal No: 2-205

Recommendation: Revise text to read as follows:

In kitchens and dining rooms, breakfast rooms, pantries, and similar areas of dwelling units. Receptacle outlets ~~for~~ serving counter spaces shall be installed in accordance with 210.52(C)(1) through (C)(5).

Substantiation: I concur with the comments of D. King and R. Weber. This proposal would solve a serious enforcement problem for inspectors. Although 210.52(B)(1) may demand that these areas are supplied by branch circuits required by 210.11(C)(1), failure to specify them in 210.52(C) makes proper (safe) spacing, difficult to enforce.

Panel Meeting Action: Accept in Principle

Revise the first sentence in 210.52(C) to read as follows:

"In kitchens, pantries, breakfast rooms, dining rooms, and similar areas of dwelling units, receptacle outlets for countertop spaces shall be installed in accordance with 210.52(C)(1) through (C)(5)."

Panel Statement: The panel has accepted the submitter's concept but has rearranged the description of the areas to be consistent with the arrangement of the same areas in 210.52(B).

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-219 Log #2324 NEC-P02 **Final Action: Accept in Principle (210.52(C))**

Submitter: Ken Brewer, Tampa JATC / Rep. IBEW 915

Comment on Proposal No: 2-205

Recommendation: The panel should Accept this Proposal.

Substantiation: The panel's recognition that receptacles installed for counter tops in the additional proposed areas are served by the 20 amp small appliance branch circuits per 210.52 (B)(1) does not take into consideration the spacing and location requirements of 210.52 (C)(1) through (5). The current requirements seem to indicate that counter tops in the proposed areas could be served by receptacles located beneath the counter tops and be exempt from the horizontal spacing requirements of 210.52 (C)(1) through (5). The proposed requirements insure that receptacles are correctly placed so as to prevent the need to drape cords over the edge of, and/or extend for excess lengths, along counter top areas.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 2-218.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-220 Log #22 NEC-P02 **Final Action: Accept (210.52(C)(2))**

Submitter: Technical Correlating Committee on National Electrical Code®,

Comment on Proposal No: 2-216

Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 2-207.

This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel rejects Proposal 2-216.

Panel Statement: The panel accepts the direction of the Technical Correlating Committee to reconsider Proposal 2-216 and correlate with the action on Proposal 2-207. By rejecting Proposal 2-216, the text has been standardized as "range" through the panel action on Comment 2-215 to Proposal 2-207.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-221 Log #593 NEC-P02 **Final Action: Accept in Principle (210.52(C)(3))**

Submitter: Henry A. Jenkins, Wake County, Inspections Development / Rep. N.C. Ellis Cannady Chapter of I.A.E.I

Comment on Proposal No: 2-118

Recommendation: We support the panel's action. We recommend the Technical Correlating Committee correlate this proposal with Proposal 2-207.

Substantiation: None given.

Panel Meeting Action: Accept in Principle

Delete the 3rd sentence of 210.52(C)(3) that appears in the ROP Draft text to read as follows:

(3) Peninsular Counter Spaces. At least one receptacle outlet shall be installed at each peninsular countertop space with a long dimension of 600 mm (24 in.) or greater and a short dimension of 300 mm (12 in.) or greater. A peninsular countertop is measured from the connecting edge. ~~Where arange, counter-mounted cooking unit, or sink is installed ina peninsular counter and the width of the counter behind the range, counter-mounted cooking unit, or sink is less than 300 mm (12 in.), the range, counter-mounted cooking unit, or sink is considered to divide the peninsular counter space into two separate countertop spaces as defined in 210.52(C)(4).~~

Panel Statement: The text related to the dividing of both island and peninsular countertops was moved to the parent portion of 210.52(C) through the action on Proposal 2-207. The text should have been deleted from both 210.52(C)(2) and (C)(3), but it was only picked up in (C)(2) of the draft.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-222 Log #1201 NEC-P02 **Final Action: Accept in Principle (210.52(C)(3))**

Submitter: James W. Carpenter, International Association of Electrical Inspectors

Comment on Proposal No: 2-218

Recommendation: We support the panel's action of Accepting in Principle the Proposal.

Substantiation: Changing the word "rangetop" to "range, counter-mounted cooking unit or.." will add clarity to the original proposal.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 2-221.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-223 Log #1011 NEC-P02 **Final Action: Reject**
(210.52(C)(4))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 2-220
Recommendation: Revise text to read as follows:
(4) Separate Spaces. Countertop spaces separated by appliance garages or other permanently-installed accessories, where these extend from the back of the countertop to within less than 300 mm (1 ft) of the front, or by rangetops, refrigerators, or sinks shall be considered as separate countertop spaces in applying the requirements of 210.52(C)(1), (C)(2), and (C)(3).
Substantiation: The CMP's comment that appliance garages may not split countertops, because there is room for (foreign) appliances in front of them, should be addressed by this emendation. Much the same concern seems to be at issue with Proposal 2-215, so my proposed revision attempts to address that as well.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree that any improvement in safety or receptacle spacing is gained by allowing the appliance garage to split the countertop space.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-224 Log #2022 NEC-P02 **Final Action: Accept**
(210.52(D))

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-224
Recommendation: Accept the proposed change.
Substantiation: Contrary to the committee statement, the current exception is actually a rule. Reading both the section text and the exception text, the required receptacle can be located either in a wall or partition, or on the side or face of the basin. What is the exception? This would also apply to Section 210.5(C)(5). In this day and age of providing greater accessibility to those who are disabled, of limited ability, and the 50+ population, the Panel should not consider accessibility to electrical receptacle outlets an exception to the rule.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-225 Log #1336 NEC-P02 **Final Action: Accept in Principle**
(Table 210.52(E))

TCC Action: The Technical Correlating Committee understands the panel action on this comment changes the text in 210.52(E)(1) in the panel action on Proposal 2-229.
Submitter: Kevin McCall, Local Union #98 IBEW
Comment on Proposal No: 2-231
Recommendation: Revise text as follows:
For a one-family dwelling each unit of a two-family dwelling that is at grade level, at least one receptacle outlet accessible while standing at grade level and not more than 2.0 m (6 1/2 ft) above grade shall be installed at the front and back of the dwelling. When the dwelling unit is located at grade level and provided with individual exterior entrance/egress, at least one receptacle outlet accessible. While standing from a grade level and not more than 2.0 m (6 1/2 ft) above grade shall be installed.
Substantiation: I agree with Mr. Weber, in the panel should have accepted this language revision due the full range of persons using the code. Simplified language allows for easier understanding of the code requirements and decrease the slight discrepancies between what the code language is actually stated.
Panel Meeting Action: Accept in Principle
Revise the wording in 210.52(E)(1) in the ROP text to read as follows:
"(1) One-Family and Two-Family Dwellings. For a one-family dwelling and each unit of a two-family dwelling that is at grade level, at least one receptacle outlet accessible while standing at grade level and located not more than 2.0 m (6 1/2 ft) above grade shall be installed at the front and back of the dwelling."
Panel Statement: The revised wording meets the intent of the submitter and provides clarity.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-226 Log #1342 NEC-P02 **Final Action: Accept in Principle**
(210.52(E))

Submitter: Janet D. Skipper, Ocoee, FL
Comment on Proposal No: 2-229
Recommendation: Continue to accept this proposal in principal using the panel recommended text.
Substantiation: The submitter of this proposal has identified an unsafe condition that currently exists in many dwelling units. Without the addition of the proposed text, electrical cords will be passed through doorways to access available receptacle outlets installed indoors to supply power to lighting and equipment located on balconies, desks and porches. This practice increases the risk of damage to cords, thus, increasing the risk of fires. The proposed text will provide a safe means of electrical power that is accessible at these locations.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 2-227.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
BROWN, L.: See my Ballot Comment on Public Comment 2-230.
In addition "readily accessible"?

2-227 Log #1411 NEC-P02 **Final Action: Accept in Principle in Part**
(210.52(E))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 2-229
Recommendation: Continue to Accept in Principle and revise the text as follows:
(E) Outdoor Outlets. Outdoor receptacle outlets shall be installed in accordance with (E)(1) through (E)(3).
(1) One-Family and Two-Family Dwellings. For a one-family dwelling and each unit of a two-family dwelling that is at grade, at least one receptacle outlet accessible at grade level and not more than 2.0m (6 1/2 ft) above grade shall be installed at the front and back of the dwelling.
(2) Multifamily Dwellings. For each dwelling unit of a multifamily dwelling where the dwelling unit is located at grade level and provided with individual exterior entrance/egress, at least one receptacle outlet accessible from grade level and not more than 2.0 m (6 1/2 ft) above grade shall be installed.
(3) Balconies, Decks and Porches. Balconies, decks and porches that are attached to the dwelling unit and are accessible from inside the dwelling shall have at least one receptacle outlet installed that is readily accessible while ~~from~~ on the balcony, deck or porch.
Substantiation: Adding the terms "readily accessible" and "on" will insure that the receptacle can be easily reached by a person standing on the balcony, deck or porch. Use of the terms "readily accessible" and "on" should also prevent considering a receptacle that is located inside the building that can be reached through a door or window as being considered the receptacle that meets this requirement.
Panel Meeting Action: Accept in Principle in Part
Revise the (E)(3) wording from Proposal 2-229 to read:
"(3) Balconies, Decks, and Porches. Balconies, decks, and porches that are accessible from inside the dwelling unit shall have at least one receptacle outlet installed within the perimeter of the balcony, deck, or porch. The receptacle shall not be located more than 2.0 m (6 ½ ft) above the balcony, deck, or porch surface."
Panel Statement: The panel agrees with the submitter's request to provide clarity to the location of the balcony, deck, or porch receptacle and offers revised text to accomplish this. The panel does not agree that "readily accessible" is a better word choice than "accessible" when considering the definitions of these terms from Article 100.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
BROWN, L.: See my Ballot Comment on Public Comment 2-230.
In addition "readily accessible"?

2-228 Log #1448 NEC-P02 **Final Action: Accept in Principle**
(210.52(E))

Submitter: Larry Cross, IBEW Local 98
Comment on Proposal No: 2-231
Recommendation: I agree with R. Weber. The Panel should have accepted this proposal as submitted.
Substantiation: . None.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel statement on Comment 2-225.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-229 Log #1452 NEC-P02 **Final Action: Accept in Principle (210.52(E))**

Submitter: James O'Driscoll, IBEW Local #98
Comment on Proposal No: 2-231
Recommendation: I agree with the submitter and Mr. R. Weber.
Substantiation: Mr.R. Weber makes it very clear why this proposal should have been accepted as submitted. "While Standing" should be added to this section.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel statement on Comment 2-225.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-230 Log #2023 NEC-P02 **Final Action: Accept in Principle (210.52(E))**

TCC Action: The Technical Correlating Committee directs that "20 sq. ft" be revised to read "1.86 m2 (20 ft2)" in compliance with the NEC Style Manual Units of Measurement.
Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-229
Recommendation: Reject the proposed change until additional study of the typical porch, deck or ornamental railing space configurations can be related to the proposed change.
Substantiation: Concerning new 210.52(E)(3): It would be more appropriate for there to be a minimum size balcony, deck, or porch for the application of this new provision. As was discussed at the ROP meeting, some members would consider exterior area in front of a door used for solely ventilation a "balcony", just because there is the installation of a protective guard (railing) to prevent falls. In reality there is no actual floor space. Also, many designs of high-rise multifamily buildings include a very small standing area, perhaps 3 feet by 6 feet, to allow for fresh air and a place to have a smoke and not contaminate the interior environment. There is barely room for a single chair. The Panel should consider the use of the deck area relative to the need for a receptacle. For a floor space large enough to allow outdoor cook (electric grill) or sunbathing (radio) the installation of a receptacle may be appropriate. For a floor space that is a result of a designed ventilation opening, a receptacle would be of no practical use.

It should also be noted that for all multifamily construction the guards are required to be a minimum of 42 inches in height above the deck surface. For the small deck areas the guard usually is attached to the building directly adjacent to the door frame. This provides no wall surface with the guard to instal a receptacle. If the receptacle was to be installed it would be located approximately 46 inches above the deck surface, and due to structural framing around the door would be located 12 or more inches outside the deck area.

The installation of a receptacle for usable deck areas would seem appropriate, and is usually already included in the design of the unit as a convenience for using outdoor appliances. The contention that that outlet is needed, in the event holiday lighting is installed is not the basis for requiring a receptacle. If you require a receptacle for holiday lighting on the deck, why not one for all of the gutters and rake boards? As with any use of holiday or other decorative lighting, this is a use and design consideration of the user. Not one of minimum electric safety regulations. The use of holiday lighting cords and fixtures are already covered in the NEC and the product's listing.
Panel Meeting Action: Accept in Principle

Add the following Exception to 210.52(E)(3), :

"Exception to (3): Balconies, decks, or porches with a useable area of less than 20 sq ft are not required to have a receptacle installed."
Panel Statement: The panel continues to recognize the need for receptacles on most balconies, decks, or porches. However, the panel also understands it is not practical to install receptacles for all balconies, decks, or porches, especially those non-functioning spaces used for architectural or decorative purposes only.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

KING, D.: I disagree with the Panel that a minimum dimension of 20 sq ft should be a condition for this requirement. If a porch, deck or balcony is accessible and intended for use by occupants of the dwelling than a receptacle should be required regardless of the minimum dimension. The purpose of this section is to eliminate the use of cords through doorways to supply electrical equipment at these locations. Cords passed through doorways are a potential cause for electric shock and fire due to damage that can easily occur to the cord where it passes through the doorway. Acceptance of this Comment will allow this hazardous condition to continue to exist for porches, decks and balconies that are less than 20 sq. ft.
Comment on Affirmative:

BROWN, L.: The Panel's Action of adding an Exception for small landing, etc. is appropriate and important.

In fact, the 20 Square Foot dimension may be too small. As written, one could interpret that a single-step 5-foot by 5-foot (25 S.F.) "landing" at an exterior door is a "porch". Clearly, the landing is only there because it is required by the building code. It serves no other purpose than to provide easy entry and exit from a building, a screen door may swing over the landing, and there is no usable space on the landing. There are also the instances for upper-floor rooms where an extremely small exterior area in front of a door used for solely ventilation would be considered a "balcony", just because there is the installation of a protective guard (railing) to prevent falls. Without the Exception, these small landings and exterior shelves at ventilation doors would require a receptacle that would never be used.

In response to the Ballot Comment by Mr. King: You need to go back and review the original
proposals on this matter. No data was presented to show there is a correlation with extension
cords and the possibility of holiday lighting being located on a deck railing. For all we know,an
outside receptacle was available for all of these situations. Nor was any data provided to show extension cords are being run through exterior doorways.

(In all, see Comments 2-226 and 2-227.)

WEBER, R.: There is a need for a receptacle in this space; however in the ROP phase in Proposal 2-229, and panel discussion on the intent of the requirement area limits were discussed. Due to the varied uses a size limitation for an exception was not supported at that time; by accept in principle, of this comment the panel has now exempted area of "less than 20 sq ft" from having to have a receptacle. This is too large of an area and the panel should have retained the original text of Proposal 2-229, which addressed many other contingencies of use. By accepting this exception, the user has to use a cord through a door or window to provide an outlet in those smaller spaces in violation of 400.8(3). I do not want to lose this requirement in the code so I am voting in the affirmative, but wish to go on record that the exempted space is going to be used and a required receptacle should have been afforded in that space irregardless of size.

2-231 Log #2024 NEC-P02 **Final Action: Accept in Principle (210.52(E))**

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-228
Recommendation: Reject the proposed change until additional study of the typical porch, deck or ornamental railing space configurations can be related to the proposed change.
Substantiation: Concerning new 210.52(E)(3): It would be more appropriate for there to be a minimum size balcony, deck, or porch for the application of this new provision. As was discussed at the ROP meeting, some members would consider exterior area in front of a door used for solely ventilation a "balcony", just because there is the installation of a protective guard (railing) to prevent falls. In reality there is no actual floor space. Also, many designs of high-rise multifamily buildings include a very small standing area, perhaps 3 feet by 6 feet,
to allow for fresh air and a place to have a smoke and not contaminate the interior environment. There is barely room for a single chair. The Panel should consider the use of the deck area relative to the need for a receptacle. For a floor space large enough to allow outdoor cook (electric grill) or sunbathing (radio) the installation of a receptacle may be appropriate. For a floor space that is a result of a designed ventilation opening, a receptacle would be of no practical use.

It should also be noted that for all multifamily construction the guards are required to be a minimum of 42 inches in height above the deck surface. For the small deck areas the guard usually is attached to the building directly adjacent to the door frame. This provides no wall surface with the guard to instal a receptacle. If the receptacle was to be installed it would be located approximately 46 inches above the deck surface, and due to structural framing around the door would be located 12 or more inches outside the deck area.

The installation of a receptacle for usable deck areas would seem appropriate, and is usually already included in the design of the unit as a convenience for using outdoor appliances. The contention that that outlet is needed, in the event holiday lighting is installed is not the basis for requiring a receptacle. If you require a receptacle for holiday lighting on the deck, why not one for all of the gutters and rake boards? As with any use of holiday or other decorative lighting, this is a use and design consideration of the user. Not one of minimum electric safety regulations. The use of holiday lighting cords and fixtures are already covered in the NEC and the product's listing.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel statement on Comment 2-230.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

KING, D.: See my explanation of negative on Comment 2-230.
Comment on Affirmative:

BROWN, L.: See my Ballot Comment on Public Comment 2-230.

In addition "readily accessible"?

2-232 Log #2247 NEC-P02 **Final Action: Reject**
(210.52(E))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 2-233
Recommendation: This proposal should be accepted.
Substantiation: There were four proposals to change this section. All of them made the point that the required outside dwelling unit receptacles should be accessible "from grade" and not "at grade" as in the current code wording. There is no safety or any other logical case that can be made to show that a receptacle "accessible from grade" presents any type of problem. The design of many single family dwelling units makes compliance with the current wording impossible as they have porches or decks that cover the complete front or back of the dwelling unit.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its position that we intend to use the words "at grade" not "from grade". See panel statement on Comment 2-225 for further clarification.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-196 Log #1082 NEC-P02 **Final Action: Accept in Principle**
(210.52(E)(3))

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 2-229
Recommendation: Revise the 210.52(E)(3) from the ROP to read as follows:
(3) Balconies, Decks and Porches. Balconies, decks and porches that are attached to the dwelling unit and are accessible from inside the dwelling shall have at least one receptacle outlet installed that is readily accessible ~~from~~ on the balcony, deck or porch.
Substantiation: This revision is intended to remove the confusion about where an accessible receptacle can be located to meet this requirement. During the panel discussions, it was clear that the panel intended that a receptacle be installed so that you could utilize it while ON the balcony, deck or porch. The words "…accessible from the…" in the ROP accepted text implies that a receptacle that you could get to by walking down the steps from the balcony or deck would meet the requirements.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 2-227.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
BROWN, L.: Please see my Ballot Comment on Public Comment 2-230.

2-233 Log #1666 NEC-P02 **Final Action: Reject**
(210.52(E)(3))

Submitter: James Grant, Rochester, NH
Comment on Proposal No: 2-229
Recommendation: Revise as follows:
(3) Balconies, Decks and Porches. Balconies, decks and porches that are attached to the dwelling unit and are accessible through doorways from inside the dwelling shall have at least one receptacle outlet installed accessible from the balcony, deck or porch.
Substantiation: By adding this text, it will exclude balconies, whose only means of access is through a window, that are furnished solely for an area of refuge during a fire as permitted by NFPA 101.
Panel Meeting Action: Reject
Panel Statement: The panel notes space accessible only through a window is not a balcony, deck, or porch.
See the panel action and statement on Comment 2-227.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
BROWN, L.: See my Ballot Comment on Public Comment 2-230.
In addition "readily accessible"?

2-234 Log #1053 NEC-P02 **Final Action: Reject**
(210.52(F) Exception No. 3 (New))

Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 2-236
Recommendation: Accept proposal.
Substantiation: The panel comment for Proposal 2-95 indicates that the present requirement is a "minimum" but if the "minimum" for the equipment is 30 amperes why can't that be the accepted minimum? The 20 amp receptacle serves no purpose.
Also, please see comment on Proposal 2-96.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its position that the existing text provides for the minimum installation and may require an additional circuit for compact or stacked laundry equipment. See panel statement on Comment 2-67.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-204 Log #1995 NEC-P02 **Final Action: Accept in Principle**
(210.52(G))

Submitter: Lawrence Brown, National Association of Home Builders (NAHB)
Comment on Proposal No: 2-240
Recommendation: Reject the proposed change.
Substantiation: This is nonsense. The addition of the term "general-use" to describe a typical receptacle adds absolutely no additional clarification to these provisions. Looking at the 2005 NEC, this term is only used in Article 220 (Branch-Circuit, Feeder, and Service Calculations); 440.62(C) (Air-conditioning and refrigerating Equipment - Provisions for Room Air-Conditioners); and 552.46(B)(3) (Park Trailers - Branch Circuits - General Appliances). But, what is a "general-use" receptacle? There is no definition, as there is for "General-Use Switch", in the NEC. Regarding the submitter's substantiation, adding this term will provide no more enforcement of having a usable receptacle in these locations than the current language already provides. What would ever make someone think a single receptacle is not a "general-use" receptacle? If you really want to address the submitter's purported problem, make these receptacles in addition to any other receptacle used for equipment installed in those areas.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 2-237.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-235 Log #23 NEC-P02 **Final Action: Accept**
(210.52(G))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 2-240
Recommendation: It was the action of the Technical Correlating Committee that the panel reconsider the proposal relative to the grammar and the use of complete sentences. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has revised the text as Accepted in the panel action on Comment 2-237 to reflect the proper grammar.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-236 Log #1012 NEC-P02 **Final Action: Accept in Principle**
(210.52(G))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 2-240
Recommendation: Revise text to read as follows:
For a one-family dwelling, at least one ~~general use~~ receptacle outlet, in addition to any provided for the laundry equipment or for any fixed equipment, shall be installed in each basement and in each attached garage, and in each detached garage with electric power. See 210.8(A)(2) and (A)(5). Where a portion of a basement is finished into one or more habitable rooms, each separate unfinished portion shall have an additional receptacle outlet installed in accordance with this section.
Substantiation: The concern described in Mr. Mark Shapiro's substantiation was that these receptacles might be confounded with those serving fixed equipment. It seems better to state this explicitly rather than to introduce a term, as Mr. Lawrence Brown notes.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 2-237, as it meets the submitter's intent.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-237 Log #1083 NEC-P02 **Final Action: Accept in Principle in Part**
(210.52(G))

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 2-240
Recommendation: Revise the 210.52(G) from the ROP to read as follows:
(G) Basements and Garages. For a one-family dwelling, the following provisions shall apply:
(1) At least one ~~general-use~~ receptacle outlet, in addition to those for specific equipment, shall be installed in each basement and in each attached garage, and in each detached garage with electric power.

(2) ~~See 210.8(A)(2) and (A)(5).~~ Where a portion of the basement is finished into one or more habitable rooms, each separate unfinished portion shall have a ~~general-use~~ receptacle outlet installed in accordance with this section.
FPN: See 210.8(A)(2) and (A)(5) for GFCI requirements for these receptacles.
Substantiation: This comment is intended to address the concern from Mr. Brown associated with the user of the term "general use". The revision removes that term and now specifically states that the receptacle must be in addition to any provided for specific equipment. Examples of specific equipment would include laundry, fire alarms, pumps, etc.

In addition, the comment creates a list format to address the concern expressed in the TCC note. The provision associated with the reference to 210.8 has been moved to An FPN since it is merely calling attention to the provisions of another section. This will also address the concern in the TCC note relative to complete sentences.
Panel Meeting Action: Accept in Principle in Part
Revise the 210.52 (G) text to read:

"(G) Basements and Garages. For a one-family dwelling, the following provisions shall apply:

(1) At least one receptacle outlet, in addition to those for specific equipment, shall be installed in each basement, in each attached garage, and in each detached garage with electric power.

(2) Where a portion of the basement is finished into one or more habitable rooms, each separate unfinished portion shall have a receptacle outlet installed in accordance with this section."
Panel Statement: The panel accepts the submitter's text except for the FPN and a grammatical revision requested by the Technical Correlating Committee. The FPN is not needed, as the requirements of 210.8(A)(2) and (A)(5) already apply to 210.52.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-238 Log #1412 NEC-P02 **Final Action: Accept in Principle (210.52(G))**

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 2-240
Recommendation: NEMA agrees in Principle with the intent to require installation of at least one receptacle for general use. We recommend changing the rule as follows:

210.52(G) Basements and Garages. For a one-family dwelling, at least one general use receptacle outlet, in addition to any provided for specific purposes such as laundry equipment, sump pumps, HVAC equipment, garage door openers, shall be installed in each basement and in each attached garage, and in each detached garage with electric power. See 210.8(A)(2) and (A)(5). Where a portion of the basement is finished into one or more habitable rooms, each separate unfinished portion shall have a general use receptacle outlet installed in accordance with this section
Substantiation: The intent is to provide a receptacle available for general use other than those that are installed for a specific purpose. Since there is no definition for a "general use" receptacle in the code, including several examples of what is excluded would further clarify the intent and give the guidance to the AHJ.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel does not agree that listing additional types of equipment adds any clarity to the text.

See the panel action on Comment 2-237 as it meets the submitter's intent.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

BROWN, L.: Though I agree with this Panel's Comment and subsequent change and believe it is
appropriate, nonetheless, this change is meets the definition of a "Substantive Change" under the ANSI Essential Requirements. As such, it is required to receive "Due Process" by being presented for Public Comment, and consideration of any subsequent Public Comment by the Panel.

2-238a Log #CC200 NEC-P02 **Final Action: Accept (210.60(A))**

Submitter: Code-Making Panel 2,
Comment on Proposal No: 2-242
Recommendation: Change the title of 210.60 to read as follows:

"Guest Rooms, Guest Suites, Dormitories and Similar Occupancies."

Revise 210.60(A) to read as follows:

"(A) General. Guest rooms or guest suites in hotels, motels, sleeping rooms in dormitories, and similar occupancies shall have receptacle outlets installed in accordance with 210.52(A) and 210.52(D). Guest rooms or guest suites proved with permanent provisions for cooking shall have receptacle outlets installed in accordance with all of the applicable rules in 210.52."
Substantiation: The panel action clarifies the original intent of Proposal 2-242.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-239 Log #690 NEC-P02 **Final Action: Reject (210.60(A))**

Submitter: Timothy M. Croushore, Allegheny Power
Comment on Proposal No: 2-242
Recommendation: Please reject the original proposal.
Substantiation: The explanation of negative by Mr. Purvis is correct. Also, Mr. Brown's affirmative comment is also correct. Dormitories are engineered occupancies dependent on the individual housing wishes of the college or university. The dormitory occupancies can be designed with or without cooking, with or without bathrooms, showers and sinks.

No technical substantiation of any hazards or problems has been provided by either the submitter or the members of the code-making panel to add dormitories to the occupancies needing to comply with 210.60(A).
Panel Meeting Action: Reject
Panel Statement: The panel does not agree with the submitter's intent. See action taken on Panel Comment 2-238a (Log # CC200).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-240 Log #1901 NEC-P02 **Final Action: Reject (210.60(B))**

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-243
Recommendation: Accept the proposal.
Substantiation: The submitter experimented with more traditional text (e.g. "as required") and realized that the text in the proposal is exactly correct and enforceable. The receptacle spacing follows 210.52(A) rules as a default. Then one or more outlet locations can shift due to a permanent furniture layout. How much? Exactly "to the extent necessary to accommodate" the layout, and no more. This is not an academic question. We have been confronted with designers who didn't take this rule into account and then tried to add the additional outlet where it would minimize their costs. regardless of how useless the outlet would be.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its original statement on the proposal that use of the phrase "to the extent necessary to accommodate" is vague and unenforceable.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-241 Log #1625 NEC-P02 **Final Action: Reject (210.70)**

Submitter: Wally Harris, Atlantic Inland Inspections
Comment on Proposal No: 2-252
Recommendation: Revise the text of this Proposal to read as follows:

210.70 Lighting Outlets Required. Lighting outlets shall be installed where specified in 210.70(A), (B), and (C).

(A) Dwelling Units. In dwelling units, lighting outlets shall be installed in accordance with 210.70(A)(1), (2), and (3).

(1)Habitable Rooms. At least one wall switch-controlled lighting outlet shall be installed in every habitable room and bathroom, with switch control provided at each entrance to these rooms.

(2) Additional Locations. Additional lighting outlets shall be installed in accordance with (A)(2)(a), (A)(2)(b), and (A)(2)(c).

(a) At least one wall switch-controlled lighting outlet shall be installed in hallways, stairways, attached garages, and detached garages with electric power.

(b) For dwelling units, attached garages, and detached garages with electric power, at least one wall switch–controlled lighting outlet shall be installed to provide illumination on the exterior side of outdoor entrances or exits with grade level access. A vehicle door in a garage shall not be considered as an outdoor entrance or exit.

(c) Where one or more lighting outlet(s) are installed for interior stairways, there shall be a wall switch at each floor level, and landing level that includes an entry way, to control the lighting outlet(s) where the stairway between floor levels has six risers or more.

(d) Where lighting outlets are installed as specified in 210.70(A)(2)(a), (b), and (c) above switch control shall be provided at each entrance to these locations.
Substantiation: The original proposal in the ROP should be reconsidered, and accepted.

The Panel Statement in the ROP stated as follows, "The location and number of switches is a design requirement that is determined by the designer, user or installer."

I must respectfully disagree. If the location and number of switches is in fact a design requirement, then it would seem that the whole of 210.70(A)(2) is in fact moot and should not be included in the NEC. The problem cited in my substantiation in the ROP stems from any number of typical scenarios that can be imagined, but I will cite one from personal experience.

One evening during the summer months I was working in the yard after dinner. At the time my wife was away, and I decided to tackle about an hours

worth of yard work. I locked the house, and exited through the rear door on the first floor while it was still light at about 6:00 PM. Until about 7 PM or so, there is adequate light through my basement windows from outside to see in the basement, so I entered the basement from the outside door - which was open at the time to retrieve my gardening implements.

At about 7:00 PM my neighbor engaged me in a hearty conversation and a pleasant snack. Before too long it was nearing 9:00 PM and the daylight was for all intent and purposes gone. Not desiring to stumble through the basement because it was dark, and there was no switch at the rear basement entry door for the interior lights, I went to the first floor rear entrance to enter there. Much to my surprise I found that the door was inadvertently locked upon my exit. I had no other choice but to enter my house except through the dark basement, tripping on an upturned throw rug in the basement.

Had there been a switch at the rear basement entry for the interior lighting in the basement, perhaps my tripping (and bruised knee) could have been prevented. To quote the old adage; "An ounce of prevention is worth a pound of cure."

I would also take this opportunity to quote from the Commentary following 210.70(A)(2) in the National Electrical Code Handbook NINTH EDITION - Copyright 2002 National Fire Protection Association, Inc., which states in part; "adequate lighting and proper control and location of switching are as essential to the safety of occupants of dwelling units, hotels, motels, and so on, as are proper wiring requirements. Proper illumination ensures safe movement for persons of all ages, thus preventing many accidents."

Safety in and of itself is in fact a "design requirement" (to borrow a phrase from the Panel Statement in the ROP). Safety should be designed into each installation according to 90.1(B).

In an attempt to have the original proposal reconsidered, I have presented a personal experience and quoted from the esteemed authors of the industry benchmark National Electrical Code Handbook NINTH EDITION - Copyright 2002 National Fire Protection Association, Inc. I would also call the Panel's attention to Panel Member Mr. King's "Explanation of Negative" in the ROP.

In the interest of safety, I respectfully thank you for your important reconsideration of this proposal.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms that location and number of switches is a design requirement and determined by the designer, user, or installer.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

KING, D.: See my explanation of negative on Comment 2-242.

WEBER, R.: The panel should have accepted this comment and the Proposal 2-252 as well. The time has come to provide clear and positive code text and guidance to the designer and installers as to where switches or controls for lighting outlets are to be located. We often times hear that "it is a design issue" rose as to why there is not definitive direction as to switch or control location. At present, one could place a switch or lighting control in the further corner of a room or space and have the user proceed through a darkened space to turn on the lighting outlet. The panel needs to address an essential safety element for the use of electrical systems to provide switching and proper control locations in the code to ensure the safe movement of persons occupying those spaces. We address illumination requirement for emergency systems in 700.16 and switch locations in 700.21, but do not afford the same level of concern for the everyday use of structures or rooms, as to the need for illumination prior to traveling through that space to find a lighting switch or control. The building codes under the energy conservation requirements will specify type and location of controls for illumination; it should also be identified in the electrical code.

2-242 Log #1681 NEC-P02 **Final Action: Accept (210.70(A)(1))**

Submitter: Nicholas Thompson, Gregory C. Thompson & Sons

Comment on Proposal No: 2-258

Recommendation: Continue to Reject the proposal.

Substantiation: The code states that "at least one wall switch controlled lighting outlet shall be installed in every habitable room and bathroom. To install wall switches at every entrance to every habitable room would raise more controversy over wording and interpretation. The intent of the code is not design, to enforce electricians to install switches in every habitable room at every entrance would not be practical and unneeded. This revision should be rejected because it is purely a desire of design and not something code should cover because of the impracticality of some instances.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

KING, D.: The control of illumination at the entrance to habitable rooms is a safety issue and not a design consideration as stated by the submitter. Location and accessibility of switches is addressed in other sections of the NEC. Section 210.70(A)(3) requires at least one point of control for illumination of equipment and storage spaces to be at the usual entry point to these spaces. This is intended to provide control of illumination at a location that will allow for safe access to these spaces. The same level of safety should be required for occupants entering all habitable living spaces within a dwelling. The submitter has also not substantiated that this requirement would not be practical. Panel 2 should give further consideration to this Comment.

WEBER, R.: The panel should have rejected this comment. I do not agree with the submitter's substantiation statement on "controversy over wording and interpretation", clearly stated code text and requirements do not seem to be a problem for other parts of the code for the users. The "impracticality" concern is not a valid reason to reject the proposed change as well; if the space can be illuminated prior to entrance, the safety to occupants is enhanced. See my explanation of negative vote on Comment 2-241.

2-243 Log #1014 NEC-P02 **Final Action: Reject (210.70(A)(2) Exception No. 2)**

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education

Comment on Proposal No: 2-261

Recommendation: Designate the existing exception as Exception No. 1 and add a second exception as follows:

Exception No. 2 to (c): Where a stairway connects to an unfinished area with no other entryway, that by virtue of its dimensions or of permanently installed equipment cannot be converted to use as a sleeping area, the switch at the level of the unfinished area shall be permitted to be omitted.

Substantiation: I agree with Mr. Frederick Hartwell that there is little gain from having a switch at the end of a stairway. Moreover, there is an advantage to using SPSTs, with ON always being the Up position. Even if such a basement or attic has a certain amount of daylighting, the electricity cost associated with leaving the light on while working in such a space is compensated for by the owner's never having to question whether the light is on or off, versus needing a new light bulb or having an electrical problem.

Panel Meeting Action: Reject

Panel Statement: The panel disagrees with the submitter and notes that the additional switch does serve a purpose for stairwells having six or more treads.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

2-244 Log #1364 NEC-P02 **Final Action: Reject (210.70(A)(2)c.)**

Submitter: Eugene Swisher, City of Tampa / Rep. IBEW Local 915 & IAEI Suncoast Division

Comment on Proposal No: 2-262

Recommendation: Revise text to read as follows:

Where one or more lighting outlet(s) are installed for interior stairways, or exterior stairways that provide the sole means of access to the upper level of multilevel, single family residences. There shall be a wall switch at each floor or grade level that includes an entryway, to control the lighting outlet(s) where the stairway between floor level or grade and access level has six risers or more.

Substantiation: As the original submitter of this proposal, I was attempting to identify and rectify the problem that is inherent to a garage type apartment or mother-in-law suite located above the garage of a single family residence that has a detached structure, for garage and suite. This type of installation is very prevalent in this area and the codes does not dictate safe lighting control in this situation.

Panel Meeting Action: Reject

Panel Statement: The panel does support requiring switches at exterior locations, but this is not prohibited in the code.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

KING, D.: The submitter of this Comment is correct in stating that the same switching requirements for the interior stairways of a dwelling unit should apply to the exterior stairways of the dwelling unit. The same hazards exist from the absence of control of illumination whether the stairway is located indoors or outdoors. The Panel statement does not properly address the submitter's recommendation. The Panel needs to clarify in their statement why they do not support requiring switches at exterior locations. Accepting this Comment would provide for the consistent application of section 210.70(A)(2)(C) regardless of the location of the stairway at the dwelling unit and should be given further consideration.

WEBER, R.: The panel should have accepted in principle this comment and the original Proposal 2-262. The panel statement in the proposal phase is correct for the last sentence regarding multi-family applications, but the use of other control means could be allowed to make sure the user is not forced to utilize the stairway in darkness. Building codes mandate level of illumination on stairway areas; and the NEC should indicate where switches or lighting controls should be located at. The portion of the panel statement that indicates "but this is not prohibited in the code" is true, but we are once again back to the concept of the minimum requirement to pass inspection then becomes the maximum of what is normally done and no more beyond that point is provided to address a safety issue.

ARTICLE 215 — FEEDERS

2-245 Log #1757 NEC-P02 **Final Action: Reject**
(215.2)

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 2-275
Recommendation: Add the word "of" before the words "not less than" in the first and second sentence and add a hyphen in the word "noncontinuous." To read as follows:
215.2 Minimum Rating and Size.
(A) Feeders Not More Than 600 Volts.
(1) General. Feeder conductors shall have an ampacity of not less than required to supply the load as calculated in Parts III, IV, and V of Article 220. Feeder-circuit conductors that are connected to an overcurrent device assembly shall have a minimum allowable ampacity, before the application of any adjustment or correction factors, of not less than the non-continuous load plus 125 percent of the continuous load.
Substantiation: Corrections are for editorial purposes only.
Panel Meeting Action: Reject
Panel Statement: The submitter's revision does not add any clarity to the code.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-246 Log #442 NEC-P02 **Final Action: Reject**
(215.2(A)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-274
Recommendation: Accept proposal.
Substantiation: Please refer to proposal substantiation which postulated a feeder protected at 800 amperes with a grounded conductor load of 3 amperes which requires a 1/0 cu. or 3/0 al grounded conductor. Consider the same installation supplied by service conductors instead of a feeder. If the grounding electrode is a driven rod or concrete encased electrode the GEC can be a 6 AWG or 4 AWG. 230.42(C) permits the grounded conductor to be the minimum size permitted by 250.24(C)(1), not smaller than the GEC required in Table 250.66, modified by 250.66(A)(B) to permit a 6 AWG or 4 AWG where the 12-1/2 percent requirement of 250.24(C)(1) does not require a larger size. It is hard to understand why a service grounded conductor can be smaller than a feeder grounded conductor which has overcurrent protection where the load and conductors are the same. A 3-phase 3-wire feeder from a corner grounded transformer supplying a motor(s) may have overcurrent protection higher than the feeder ampacity and this rule could require the grounded conductor to be larger than the ungrounded conductors. There is no provision similar to 250.122(A) that limits the size. This section does not allow for reduced size tap conductors. It is faulty in that it doesn't address grounded conductors of other feeders or branch circuits installed in the same raceway where the conductor sizes and overcurrent protection may vary. If the largest feeder requires a 3/0 grounded conductor, does this size apply to other circuit grounded conductors in the same raceway regardless of the circuit rating?
Panel Meeting Action: Reject
Panel Statement: The panel was unable to establish the submitter's intent.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-247 Log #443 NEC-P02 **Final Action: Reject**
(215.2(A)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-274
Recommendation: Accept proposal.
Substantiation: The panel reference to 250.66 only indicates that a grounded service conductor shall not be smaller than the GEC specified in Table 250.66 (8 AWG) which relates to (unprotected) service grounded conductors not (protected) feeder grounded conductors. This section is flawed in that it apparently assumes or is based on feeders that are installed in dedicated raceways without other conductors. However, if a feeder is installed in a raceway or enclosure such as a wireway with other circuit conductors (branch circuits or feeders) of various sizes and overcurrent protection ratings, and a grounded conductor of a feeder or branch circuit (e.g., a 14, 12 or 10 AWG) short-circuits to a 500 kcmil ungrounded feeder conductor. This rule provides no protection or assurance that the smaller conductor will not burn open.
Panel Meeting Action: Reject
Panel Statement: The panel notes that 250.122 does address equipment grounded conductor sizing for multiple circuits run in the same raceway. The inclusion of an additional, smaller equipment grounded conductor, as sited in the submitter's example, is not prohibited but would constitute a poor design.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-248 Log #1013 NEC-P02 **Final Action: Reject**
(215.3(A)(3), FPN 2)

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 2-278
Recommendation: Revise text to read as follows:
...and where the maximum total ~~voltage~~ drop from nominal voltage ~~on feeders and branch circuits~~ to the farthest outlet...
Substantiation: While the Panel Statement says, "It is not necessary to define possible combinations of equipment to convey the intent of the FPN," its present wording specifies one single combination of equipment. This implies to many that they need not be concerned about the voltage reaching equipment so long as these two sources of impedance are addressed. I have had multiple conversations that demonstrated this. While FPNs are advisory, not mandatory, they constitute a de facto standard of good practice, relied on by specifiers, lawyers, and others. Deleting the two examples removes the misleading element. Adding language such as "from the sum of all upstream impedances" might emphasize the point, but may be gratuitous. Parsimonious language often is preferable-one reason I have no issue with the CMP's nixing my initial proposals addition of other sources. The reason that I suggest the additional wording, "from nominal voltage" is that the FPN is advising about proper operation of utilization equipment. This is effected not by what VD testers report-the drop from initially supplied voltage, in response to a simulated load-but by voltage significantly lower than its design voltage. Electricians and other users of the NEC have only partial control over this, but certainly more control than "feeders and branch circuits" implies.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree that the recommendation adds any clarity to the section. The text refers to feeders and branch circuits as they apply to Articles 210 and 215. Voltage drop is a design issue.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-249 Log #2248 NEC-P02 **Final Action: Reject**
(215.4)

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 2-280
Recommendation: This proposal should be accepted.
Substantiation: There is no prohibition on the use of a common neutral for multiple circuits to be found anywhere in the NEC. The use of the wording "shall be permitted" in 215.4 does not act as a prohibition on the use of common neutrals for other circuits. It is only a permission to use them in specific cases, however this permission does not prohibit the use of common neutrals in other cases. The NEC Manual of Style (3.1.2) says that the words "shall be permitted" are permissive in nature and that they are used to indicate optional or alternate installation methods. Unless there is a required installation method, the permission to use an alternate method has no meaning. Given that the NEC has no general prohibition against the use of common neutrals, the existing wording in 215.4(A) has no meaning and should be changed.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees with the submitter's statement that there is no limit regarding the numbers of feeders that can be run together, and clarifies the limits using revised wording. See the action and statement on Panel Comment 2-249a (Log #201).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-249a Log #CC201 NEC-P02 **Final Action: Accept**
(215.4(A))

Submitter: Code-Making Panel 2,
Comment on Proposal No: 2-281
Recommendation: Revise 215.4(A) to read as follows:
"215.4 (A) Feeders with Common Neutral. Up to three sets of 3-wire feeders or two sets of 4-wire or 5-wire feeders shall be permitted to utilize a common neutral."
Substantiation: The revised texts adds clarity in that it better defines the limits of feeders to be run with a common neutral.
Panel Meeting Action: Accept
Panel Statement: The revised texts adds clarity in that it better defines the limits of feeders to be run with a common neutral.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-250 Log #24 NEC-P02 **Final Action: Accept**
(215.6)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 2-283
Recommendation: It was the action of the Technical Correlating Committee that the panel reconsider this Proposal and correlate with the action taken on Proposal 5-119. This action will be considered by the panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise the text from the Proposal to read as follows:
"215.6 Feeder Equipment Grounding Conductor. Where a feeder supplies branch circuits in which equipment grounding conductors are required, the feeder shall include or provide an equipment grounding conductor in accordance with the provisions of 250.134, to which the equipment grounding conductors of the branch circuit shall be connected. Where the feeder supplies a separate building or structure, the requirements of Article 250.32 (B) shall apply."
Panel Statement: The revision meets the intent of the submitter.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-251 Log #1878 NEC-P02 **Final Action: Accept in Principle**
(215.6)

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 2-283
Recommendation: Continue to accept the proposal with the following change:
215.6 Feeder Conductor Equipment Grounding Conductor Means. Where a feeder supplies branch circuits in which equipment grounding conductors are required, the feeder shall include or provide an equipment grounding conductor a grounding ~~means~~, in accordance with the provisions of 250.134, to which the equipment grounding conductors of the branch circuits shall be connected.
Exception: Where the feeder to a separate building or structure is installed in accordance with 250.32(B)(1) Exception, an equipment grounding conductor shall not be installed.
Substantiation: This comment is simply a correlation with the accepted Proposal 5-119. The accepted proposal to 215.6 should have the reference changed from 250.32(B)(2) to 250.32(B)(1) Exception. This proposal should only be accepted if 5-119 continues to be accepted.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 2-250.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-252 Log #1888 NEC-P02 **Final Action: Reject**
(215.9(A) and (B))

Submitter: Paul S. Hamer, Richmond, CA
Comment on Proposal No: 2-285
Recommendation: This proposal (and its companion Proposals 2-6, 2-88, 11-48 and 11-49 - Comments submitted separately) should be accepted. Add to the end of the proposed wording: This requirement shall become effective January 1, 2011. This aligns with Mr. Weber's Explanation of Negative for Proposal 2-88 regarding the development of new, life-saving concepts. The Proposal wording, and its included phrase "shall be permitted," is important so the GFCIS-3Ph is identified as a specific permitted alternative. The Panel Statement "the panel notes that the system recommended by the proposal is currently not prohibited" avoids the reality that unless a permitted concept is identified in the NEC, it will not be applied. Adding the delayed effective date would provide the incentive and the necessary time for the Three-Phase Ground-Fault Circuit-Interrupter System (GFCIS-3Ph) to be further developed and commercialized.
Substantiation: The Panel Statement of Proposal 2-88 (referred to in this Proposal's Panel Statement includes "...The submitter's substantiation notes that the hazard is when unqualified persons work on equipment without taking the appropriate precautions to deenergize the circuit and verify that circuit is disconnected...". There are numerous instances where unqualified persons were electrocuted by faulty or defective equipment (see the supporting material submitted with the proposals), and these people may have been protected from electrocution by the proposed GFCIS-3Ph. See also the Explanation of Negatives of Mr. King and Mr. Weber for Proposal 2-88. The patent applications are pending for the GFCIS-3Ph as of this date, but further field measurements made since the Proposal submittal date indicate that the distributed phase capacitances on an actual installed three-phase 480 volt power system are balanced enough to permit the sensitivity described in the proposals.
Panel Meeting Action: Reject
Panel Statement: The panel notes that the system recommended by the submitter is not prohibited. See panel action and statement on Comment 2-62.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KING, D.: See explanation on comment 2-62.

2-253 Log #405 NEC-P02 **Final Action: Reject**
(215.12(C))

Submitter: Daniel Leaf, Seneca, SC
Comment on Proposal No: 2-294
Recommendation: Accept proposal revised:
Where the premises wiring system has feeders supplied from more than one ~~nominal voltage~~ system with different characteristics such as voltage, frequency, phases. Ac or dc, or supplied from different services or separately derived systems, each ungrounded conductor of a feeder ~~where accessible~~ shall be identified by system at all terminations, connections, and supply points. The means of identification shall be permitted to be by different color coding, marking tape, or other approved means. The means of identification shall be posted at the point where the feeder receives its supply.
Exception No. 1: Conductors for fire alarm circuits.
Exception No. 2: Conductors for emergency systems.
Exception No. 3: The enclosures for busway conductors shall be identified in an approved manner.
Exception No. 4: Associated control and signal conductors installed in the same raceway, cable or enclosure with the feeder conductors.
Exception No. 5: Where the authority having jurisdiction determines that a system is sufficiently limited or separated from other systems, identification shall not be required.
Substantiation: This section only applies to different voltage systems interconnection or misconnection of conductors with differences other than voltage, such as ac and dc, frequencies, grounded and ungrounded, separately derived, can be hazardous mixtures of such systems with the same voltage may be in the same raceway, enclosure or cable tray, which merit identification. The proposed exceptions are covered elsewhere or proposed for practicality.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-19.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-254 Log #1898 NEC-P02 **Final Action: Accept in Principle**
(215.12(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 2-292
Recommendation: I. Rephrase the additional text as "phase or line and". II. Split the second sentence into two sentences, revised to read as follows: The means of identification shall be permitted to be by separate color coding, marking tape, tagging, or other approved means. the method utilized for conductors originating within each feeder panelboard or similar feeder distribution equipment shall be permanently posted on the equipment.
Substantiation: I. The rule will also apply to single-phase distributions, where both ungrounded conductors are of the same phase but with a potential difference between them. The panel action incorrectly implies that these conductors are of differing phases, which is not the case. This wording makes the rule technically correct.
II. At every seminar I give on the 2005 NEC, someone and usually more than one, asks whether the panelboard labeling rule covers the conductors originating at that panel, or whether the rule is a reciprocal rule requiring every panel to list every identification scheme for every system in the building. The words in the NEC will support both interpretations. When I raised this at the Eastern Section IAEI meeting, the speakers had no idea either, and suggested I address it with a comment. This wording supposes the intent is the former; if I guessed wrong, then please put contrary wording in the book. It does seem that when you get a number of systems you would need a huge amount of real estate to list all the options, so I hope I guessed correctly.
Panel Meeting Action: Accept in Principle
The panel accepts the submitter's revision to change "phase and" to "phase or line and".
Revise the last sentence of 215.12(C) of the ROP text to read as follows:
"The method utilized for conductors originating within each feeder panelboard or similar feeder distribution equipment shall be documented in a manner that is readily available or shall be permanently posted at each feeder panelboard or similar feeder distribution equipment."

Panel Statement: The panel has accepted the addition of the words that apply to phase or line conductors. The panel agrees with the intent of the submitter that the identification is required to identify the conductors that originate at that panelboard. To accomplish that intent, the panel has revised the words from the ROP to state that the identification (whether documentation or posting) be for the conductors at that panelboard.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 220 — BRANCH-CIRCUIT, FEEDER, SERVICE CALCULATIONS

2-255 Log #1310 NEC-P02 **Final Action: Reject**
(220.10)

Submitter: Joseph A. Hertel, Safety and Buildings
Comment on Proposal No: 2-300
Recommendation: None.
Substantiation: I can agree with the CMP in that current requirements of 220.10 are not in conflict with energy codes. They provide for values that are significantly larger for lighting than energy codes allow. This as the panel response indicates requires services and feeders that will provide more than adequate capacity. My question would be why should we provide adequate capacity for something we cannot use?
Panel Meeting Action: Reject
Panel Statement: No specific recommendation has been made. The comment does not comply with Section 4.3.3(c) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-256 Log #594 NEC-P02 **Final Action: Accept**
(220.14(K)(1))

Submitter: Henry A. Jenkins, Wake County, Inspections Development / Rep. N.C. Ellis Cannady Chapter of I.A.E.I
Comment on Proposal No: 2-305
Recommendation: We support the panel's action.
Substantiation: None given.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-257 Log #1202 NEC-P02 **Final Action: Accept**
(220.14(K)(1))

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 2-305
Recommendation: We support the panel's action in Accepting this Proposal as written.
Substantiation: None.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-258 Log #1311 NEC-P02 **Final Action: Reject**
(220.20)

Submitter: Joseph A. Hertel, Safety and Buildings
Comment on Proposal No: 2-307
Recommendation: I can agree with the CMP in that current requirements of 220.40 are not in conflict with energy codes. They provide for values that are significantly larger for lighting than energy codes allow. This, as the panel response indicates, requires services and feeders that will provide more than adequate capacity. My question would be why should we provide adequate capacity for something we cannot use?
Substantiation: As an example: A major retailer routinely specifies a 4000 Ampere service for their identical facilities when by historical data the need does not exceed 1200 Amperes for operation. They have reduced the service size to 3000 amperes which provides more than adequate amperage.
Panel Meeting Action: Reject
Panel Statement: No specific recommendation has been made. The comment does not comply with Section 4.3.3(c) of the NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-259 Log #2227 NEC-P02 **Final Action: Reject**
(220.50)

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 2-329
Recommendation: This Proposal should be Accepted, changed as follows:
220.50 Motors. Motor loads shall be calculated in accordance with 430.24, 430.25, and 430.26 and with ~~440.6~~ 440.31, 440.32, 440.33, 440.34, and 440.35 for hermetic refrigerant motor compressors.
Substantiation: This section is intended to clarify whether the A/C is to be calculated at 100 percent or 125 percent. It also refers the code user to more prescise sections of Article 440, similar to the references to Article 430 in this section.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree that adding references to 440.31, 440.32, 440.33, and 440.35 would provide clarity for determining motor loads. In addition, 440.6 should remain, as it addresses motor ratings.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-260 Log #2135 NEC-P02 **Final Action: Reject**
(220.51, FPN (New))

Submitter: Sheldon Monson, Wadena, MN
Comment on Proposal No: 2-314
Recommendation: Add a Fine Print Note: The purpose of this section is for determining a load contribution from electric space heaters used in determining the overall feeder and service load. Services or feeders that are solely supplying electric heat loads shall be sized accordingly to 230.42 and 215.2.
Substantiation: I find that many installers misapply this section when sizing feeders or services that solely supply electric heat loads. This has been problematic with all the structures that have dedicated services or feeders that only feed heating loads. Adding a fine print note would clarify the intended purpose of 220.51.
Panel Meeting Action: Reject
Panel Statement: The submitter's proposed FPN does not add any clarity to the intent in 220.5. In addition, fine print notes should not be written in mandatory language.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-261 Log #537 NEC-P02 **Final Action: Reject**
(220.54)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-324
Recommendation: Accept in Part:
"208-volt and 240-volt"
Substantiation: The requirement should specifically apply only to such dryers. The laundry branch circuit covers 120-volt dryers.
Panel Meeting Action: Reject
Panel Statement: Section 220.54 addresses the loads assigned to electric clothes dryers regardless of voltage.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-262 Log #1756 NEC-P02 **Final Action: Accept**
(220.54)

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 2-325
Recommendation: Change "under this section" in the last sentence to "in this section" as follows:
220.54 Electric Clothes Dryers — Dwelling Unit(s). The load for household electric clothes dryers in a dwelling unit(s) shall be either 5000 watts (volt-amperes) or the nameplate rating, whichever is larger, for each dryer served. The use of the demand factors in Table 220.54 shall be permitted. Where two or more single-phase dryers are supplied by a 3-phase, 4-wire feeder or service, the total load shall be calculated on the basis of twice the maximum number connected between any two phases. Kilovolt-amperes (kVA) shall be considered equivalent to kilowatts (kW) for loads calculated In ~~under~~ this section.
Substantiation: This change is editorial since the calculation is "in this section" not "under this section."
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-263 Log #848 NEC-P02 **Final Action: Reject**
(Table 220.55)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 2-326
Recommendation: The panel is encouraged to continue to Reject Proposal 2-326.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Reject
Panel Statement: The panel notes that Proposal 2-326 was accepted. The substantiation does not support the comment. The comment does not comply with 4.3.3(c) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-264 Log #499 NEC-P02 **Final Action: Reject**
(220.60)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-330
Recommendation: Accept as revised:
Where it is unlikely that two or more noncoincident loads will be in use simultaneously or where a means is provided to prevent simultaneous use of two or more loads, it shall be permitted to use only the largest load that will be used at one time for calculating the ~~total~~ branch circuit, feeder, and service load.
FPN: A selector switch is one means to prevent simultaneous use.
Substantiation: The text of this section is applicable to feeders and services but the heading "Noncoincident Loads" is general and encompasses branch circuits. 422.12, Exception No. 2 permits dissimilar loads on the same branch circuit and the proposal would allow this section to apply to that exception. Such branch circuits would be governed by all applicable rules. Present wording literally permits the largest branch circuit to comprise the total load for the feeder and service.
Panel Meeting Action: Reject
Panel Statement: The submitter's proposed wording does not add any clarification to 220.60.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-265 Log #1879 NEC-P02 **Final Action: Accept in Principle**
(220.61(C)(1))

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 2-336
Recommendation: Continue to accept this proposal, with the following changes:
Any portion of a 3-wire circuit consisting of ~~2-phase~~ ungrounded conductors and the neutral conductor of a 4-wire, 3-phase, wye-connected system.
Substantiation: This comment is being made simply to provide more consistency throughout the Code.
Panel Meeting Action: Accept in Principle
Revise the wording 220.61(C)(1) to read as follows:
"Any portion of a 3-wire circuit consisting of 2 ungrounded conductors and the neutral conductors of a 4-wire, 3 phase, wye-connected system."
Panel Statement: The panel agrees with changing the word "phase" to "ungrounded".
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-266 Log #514 NEC-P02 **Final Action: Reject**
(220.82(B) and (C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-338
Recommendation: Accept in part (B)(2) as revised:
~~1500~~ 3000 volt-amperes for ~~each~~ the two or more 2-wire 20 ampere small appliance branch circuits and 1500 volt amperes for each laundry branch circuit covered in 210.11(C)(1) and (C)(2).
Substantiation: The word "each" was not intended in the proposal. The 3000 volt amperes was intended to apply to two or more small appliance branch circuits. Substantiation is the same as in the proposal.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its statement that each small appliance branch circuit be calculated at 1500 VA.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-267 Log #595 NEC-P02 **Final Action: Accept**
(220.82(C)(2))

Submitter: Henry A. Jenkins, Wake County, Inspections Development / Rep. N.C. Ellis Cannady Chapter of I.A.E.I
Comment on Proposal No: 2-343
Recommendation: We support the panel's action.
Substantiation: None given.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-268 Log #1204 NEC-P02 **Final Action: Accept**
(220.82(C)(2))

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 2-343
Recommendation: We support the panel's action of Accepting in Principle the Proposal.
Substantiation: Moving existing 3 to 6 and making the items for heat pump requirements sequential will make this section easier to understand.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-269 Log #469 NEC-P02 **Final Action: Reject**
(220.83(B)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 2-344
Recommendation: Accept in Part (B)(2) revised:
~~1500~~ 3000 volt-amperes for ~~each~~ the two or more 2-wire 20-ampere small appliance branch circuits and 1500 volt amperes for each laundry branch circuit covered in 210.11(C)(1) and (C)(2).
Substantiation: The word "each" was intended to be deleted in the proposal. The 3000 voltamperes was intended to apply to two or more small appliance branch circuits. Substantiation is the same as in the proposal.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 2-266.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

2-270 Log #1803 NEC-P02 **Final Action: Reject**
(220.89)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 2-356
Recommendation: Add text to read as follows:
220.89 Optional Calculations - New Petroleum and Chemical Processing Plants.
(A) Applicability - New petroleum and chemical processing plants must comply with the following criteria in order to apply the optional calculations permitted in 220.89 in lieu of part III of this article.
(1) Exist for the primary purpose of manufacturing, refining and/or processing petroleum and chemical products.
(2) Qualify as a plant within a Supervised Industrial Installation as defined in article 240.2.

(3) Have measured demand data obtained in accordance with article 220.87 (1) from at least two existing petroleum or chemical processing plants using similar process technology in the manufacture of the same product(s).

(B) Demand Factor - For services and feeders in Petroleum and Chemical Processing Plants, calculation of load shall be permitted to be the product of the total connected load and a demand factor. The applied demand factor shall meet the following requirements:

(1) Be calculated and applied under engineering supervision.

(2) Yield a sufficient ampacity capable of serving the actual operating load.

(3) Not be less than 50% of the connected load

(4) Not be less than 125% times the highest maximum demand determined for two similar plants as measured per article 220.87(1).

Substantiation: The alternate proposed text offered in B. Nenninger's Explanation of the Negative should be accepted: (See Code Text Above)
The NEC does not specifically recognize the use of demand factors in the determination of loads in industrial installations. As a result, the NEC determined loads for these installations are overly conservative and require distribution systems with higher than needed ratings at a significant cost to owners. Further, this approach is inconsistent with the historical experience found in both utilities and industry. Utilities have been successfully sizing and operating supplies using a demand-based approach for many years. Industry has also had success a
pplying a demand-based approach in calculating loads when allowed by the authority having jurisdiction. The NEC recognizes this as an issue and partially addresses it in Article 220 by allowing sixteen optional methods that make use of demand factors for determining particular types of loads. However, none of these optional methods address industrial installations. The proposed text is considerably more restrictive than past remedy's, focusing specifically on petroleum and chemical process facilities and offering specific, enforceable provisions for this industry segment. Additionally, the requirement that the petroleum or chemical plant qualify as being within a Supervised Industrial Installation per article 240.2 ensures only qualified persons monitor and service the system and that the plant is part of an overall system load exceeding 2500 kVA. Finally, requiring the use of measured maximum demand data per article 220.87 for two comparable plants in operation establishes a minimum demand based on actual data. In the case of the petroleum and chemical industry, it is difficult to gather comparable "one size fits all" load data as was done for the restaurant calculations. In order to achieve a similar approach, one would need to gather extensive data sets around a long list of specific process technologies such as Polyethylene, Chlor-alkali, Polycarbonate, Ethylene, etc. Even then, the core technologies used in these segments evolve impacting demand profiles.

Panel Meeting Action: Reject

Panel Statement: The panel believes that the submitter has taken the correct approach to narrow this comment to a specific industry segment, and requests that data be provided to compare the NEC calculated loading to the actual loading in the facilities. In addition, there is nothing in the present Code that would prohibit the user from working with the authority having jurisiction to obtain special permission to utilize alternative calculation methods.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

NENNINGER, B.: The optional demand calculation offered for "New Petroleum and Chemical Plants" should have been accepted for the reasons already articulated in the various proposals/comments submitted. However, the panel's request for data better substantiating the problem is understandable. It is encouraging to note the panel's willingness to reconsider the issue if concerns raised are substantiated with industry data. The issue should be revisited in the 2011 cycle given a successful effort to collect actual operating demand vs. NEC calculated demand for an assortment of industrial installations.

2-271 Log #704 NEC-P02 **Final Action: Reject**
(220.90)

Submitter: Timothy M. Croushore, Allegheny Power

Comment on Proposal No: 2-357

Recommendation: Please accept the proposed text as shown in Mr. Purvis' negative ballot statement as published on page 70-133 of the ROP.

Substantiation: The substantiation of the proposal is addressing essentially the same issues for commercial occupancies as also identified in Proposal 2-356 for industrial occupancies. The same exact load characteristic issue is addressed in ANSI/IEEE Std. 241 Recommended Practice for Electric Power Systems in Commercial buildings in Chapter 2. I agree with the substantiation of Dorothy Kellogg of the American Chemistry Council. I also agree with Mr. Purvis that this optional method should not apply to one- and two-family dwellings.

The proposed text by Mr. Purvis of Proposal 2-357 is much cleaner and can be applied to both commercial and industrial occupancies rather than just industrial occupancies as requested in Proposal 2-356. For chain commercial occupancies as indicated in the original proposal, actual metered electric loads are much more available by the electric utility industry and discussed as a valid method in the ANSI/IEEE 241 Std. The NEC recognizes or permits engineering judgment, evaluation, or supervision for the following requirements:

Ampacity calculation in 310.15(C)
Electrical enclosures in 110.70 and 110.71
Branch circuits over 600 volts in 210.19(B)(2)
Minimum size and rating of feeders over 600 Volts in 215.2(B)
Overcurrent protection of Part III of Article 240
Series Rating of overcurrent protection in 240.86
Short-circuit and ground fault protection in 240.92 and 240.100
Neutral Ampacity and size of neutral conductors in 250.184(A)(2) and 310.4 Exception No. 4
Ampacity of conductors rated 2001 to 35,000 volts in 310.60(B) and (D)
Ampacity of conductors in cable trays in 392.11(B)(3) exception
Instantaneous trip rating of a circuit breaker in 430.52(C)(3)
Hazardous location equipment evaluation in 500.8(A)(1)(3), 505.9(A)(3) and 506.9(A)(3)
Flexible cords in hazardous locations in 501.140(A)(2) and 505.17
Supervision of work in hazardous locations in 505.7(A)
In health care facilities, to prevent overloading of onsite emergency generation in 517.34(A) Exception
In garages, for ventilation calculations on engineered systems for electric vehicles in 625.29(D)(3)

The engineering judgment, evaluation, and supervision concept that is currently in the National Electrical Code does establish a minimum level of safety while providing flexibility for design criteria of the actual installation. The National Electrical Code already permits the engineer to calculate conductor ampacity and overcurrent protection for non-typical occupancies such as mentioned in the above sections. It is reasonable to allow the qualified registered professional engineer to calculate the actual load for such a facility as an optional method of load calculation.

Panel Meeting Action: Reject

Panel Statement: The panel is not willing to accept an open-ended approach to load calculations. Article 220 contains the minimum requirements for calculations.

For additional information, see the panel action and statement on Comment 2-270.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

PURVIS, R.: Comment 2-271 on Proposal 2-357 should be accepted. EEI disagrees that this is an open ended approach for calculating the feeder and service load. Rather it would make load calculation more nearly match the transformer size of the serving utility rather than be oversized based on present Article 220 load calculations. Acceptance of this comment would also include both commercial and industrial calculations as well as meeting the intent of Comment 2-270 on Proposal 2-356 for a new Section 220.89.

ARTICLE 225 — OUTSIDE BRANCH CIRCUITS AND FEEDERS

4-3 Log #1085 NEC-P04 **Final Action: Reject**
(225.1, FPN)

Submitter: Jim Pauley, Square D Company

Comment on Proposal No: 4-5

Recommendation: Accept the Proposal.

Substantiation: The submitter is correct. The FPN does add confusion when one considers that the NEC is an enforcement document that is adopted by practically all jurisdictions in the US.

The NESC does indeed contain provisions that are in conflict with the NEC. Should users decide to utilize the NESC for installations covered by the NEC, the conflicts place the AHJ in a very difficult position. Although the NESC may be useful for some engineering design information, its reference as a source from the NEC implies that it is capable of being used without interfering with the use of the NEC. The code loses nothing by deleting the reference, but has increased confusion/conflict with the reference included.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 4-4.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

Comment on Affirmative:

ROGERS, J.: This issue is one of great relevance to the electrical profession. The panel chair has appointed a task group to look at this issue and make recommendations to the TCC for the 2011 NEC cycle. These recommendations may include just those areas covered by CMP 4 and/or the recommendation to create a larger task group to review implications of NESC requirements throughout the NEC. Those that took the time to express their concerns relative to this issue in both the proposal and the comment stages should be commended as it is my opinion that these issues need to be addressed.

4-4 Log #2032 NEC-P04 **Final Action: Reject**
(225.1, FPN 2)

Submitter: Donald Cook, Shelby County Building Inspections
Comment on Proposal No: 4-5
Recommendation: Delete this FPN completely.
Substantiation: The panel statement indicates the FPN provides Code users with more information on high voltage installations. If that information is needed by designers and installers to make proper and safe installations, it should be included as mandatory text, not an informational FPN. As an AHJ with a significant number of installations that utilize systems greater than 600-volts, I can confirm the FPN currently adds to the confusion for requirements on installations above 600-volts. If adoption of two standards is required or needed for governmental bodies to regulate the installations, it seems the NEC should remove those installations from it's scope and remove the uncertainty of responsibility for these installations. If the NEC continues to claim responsibility for the installations, a complete set of requirements should be established and references to another document in FPN's should be removed. In the enforcement of the NEC, the NEC references to the NESC cause regular debate and challenge from designers that attempt to use the NEC for pole line distribution on the secondary of the service point. The purpose for this proposal and comment is not to change the requirements that govern the installations, but to clarify which code or standard is responsible for installations on the customer side of the service point. Confusion can not enhance safety. See CMP-1 action on Proposal 1-145.
Panel Meeting Action: Reject
Panel Statement: The original submitter and the commenter both raise legitimate issues relative to the functionality of the FPN. Even though there is no mandatory requirement, the reference to the NESC could provide further assistance where there are no specific NEC requirements. The purpose of this fine print note is to point out that more information on high-voltage installations is available by accessing the National Electrical Safety Code, which is sometimes adopted by government regulatory authorities.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:
ROGERS, J.: See my comment on Comment 4-3.

4-5 Log #1680 NEC-P04 **Final Action: Reject**
(225.4 Exception)

Submitter: Donald W. Zipse, Electrical Forensics, LLC
Comment on Proposal No: 4-6
Recommendation: Delete the following words from Section 225.4, Exception, "and grounded circuit conductors".
Substantiation: This proposal needs to be reconsidered in light of the acceptance of Code Making Panel No. 7 to stay with their decision to make the messenger a non-current carrying support cable.
Panel Meeting Action: Reject
Panel Statement: This exception is necessary, since it recognizes that an uninsulated grounded conductor is permitted to be bare or covered in other articles of the NEC. For example, Article 396 permits messenger-supported wiring to have an uninsulated or covered messenger wire to support insulated conductors. Another example of a wiring method permitting an uninsulated grounded conductor is found in 338.10(B)(2) Exception covering service entrance cable (Type SE or USE cable) where the grounded conductor is covered within the overall jacket of the cable but would not be considered as insulated. The grounded conductor is permitted by 250.32(B)(2) to be installed from one building or structure to another building or structure without the use of an equipment grounding conductor under certain considerations, with 396.10(A) permitting SE or USE cable to be used as messenger-supported wire. Millions of miles of overhead cables with uninsulated grounded conductors as messenger cables for service drops are installed by the utility companies without problems.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:
DEATON, R.: Grounded circuit conductors should be covered or insulated.

4-6 Log #1015 NEC-P04 **Final Action: Accept**
(225.10)

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 4-10
Recommendation: Revise text to read as follows:
225.10 Wiring on Buildings. The installation ~~off~~ of outside wiring
Substantiation: Typo.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-7 Log #1216 NEC-P04 **Final Action: Accept**
(225.18, 230.24(B), and 230.50)

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 4-4
Recommendation: The NEC TCC Grounding and Bonding Task Group recommends that CMP-4 continue to Accept in Principle for Sections 225.18, 230.24(B) and 230.50.
Substantiation: The NEC TCC Grounding and Bonding Task Group concurs with CMP-4 Panel Action to accept in Principle for Sections 225.18, 230.24(B) and 230.50 based on CMP-4's Panel actions on Proposals 4-12 and 4-40 to remove the word "ground" describing clearances.
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-8 Log #1312 NEC-P04 **Final Action: Hold**
(225.18(5) (New))

Submitter: Joseph A. Hertel, Safety and Buildings
Comment on Proposal No: 4-12
Recommendation: Add the following to 225.18 Clearance from Grade:
"(5) 7.5 m (24.5 ft) - over track rails of railroads."
Substantiation: There is currently no specified height for these conductors above a railroad. We have many industrial facilities where rail is used throughout the facility and the conductors are owned and maintained by the facility. The height requirements are from tables found in ANSI C2, National Electrical Safety Code, which we have used since there is no mention in the NEC.
Panel Meeting Action: Hold
Panel Statement: The comment offers new material that has not had public review and is being held for processing as a proposal for the next revision cycle in accordance with 4.4.6.2.2 of the Regulations Governing Committee Projects.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-9 Log #490 NEC-P04 **Final Action: Reject**
(225.22)

Submitter: Timothy P. McNeive, Thomas & Betts Corporation
Comment on Proposal No: 4-14
Recommendation: Change the panel action to Accept in Part. Revise 225.22 as follows:
225.22 Raceways on Exterior Surfaces of Buildings or Other Structures. Raceways on exteriors of buildings or other structures shall be arranged to drain and shall be ~~raintight~~ suitable for use in wet locations.
Exception: Flexible metal conduit, where permitted in 348.12(1), shall not be required to be ~~raintight~~ suitable for use in wet locations.
Substantiation: Product standards for "raceways" do not include tests for resistance to moisture ingress. This is because the appropriate NEC Article for each raceway deems the particular raceway suitable, or not, for use in "wet locations" by its intrinsic construction and the availability of fittings also listed for use in "wet locations". With respect to fittings used with raceways in services and elsewhere, the word "raintight" has either already been removed in favor of a reference to the requirement in 314.15(A), or proposals are being considered in the appropriate Articles.
The Technical Correlating Committee should consider the action by several Code-Making Panels during the 2005 and 2008 NEC cycles where the word "raintight" has been, or will be replaced by "wet location."
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comments 4-10 and 4-11. Panel 8 has accepted Proposals 8-26, 8-27, and 8-28 to delete the use of FMC in a wet location per 348.12(1), so Panel 4 has accepted Comments 4-10 and 4-11 to delete 225.22 Exception.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-10 Log #1848 NEC-P04 **Final Action: Accept**
(225.22)

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 4-14
Recommendation: Accept the Proposal as submitted.
Substantiation: With the acceptance of Proposal 8-27, this proposal should be accepted for the sake of consistency.
Panel Meeting Action: Accept
Panel Statement: The submitter is correct that this exception is not necessary. Should flexible metal conduit be permitted to be installed in a particular location, the requirements found in Article 348 and the manufacturer's instructions will define the installation method. In addition, CMP 8 has accepted a change for the 2008 NEC that will prohibit installing flexible metal conduit in wet locations.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-11 Log #2152 NEC-P04 **Final Action: Accept**
(225.22)

Submitter: David H. Kendall, Carlon
Comment on Proposal No: 4-14
Recommendation: Panel 4 should reverse their action on Proposal 4-14 and should "Accept" this Proposal.
Substantiation: Panel 8 has the jurisdiction to determine which conduits are acceptable for "Wet Locations". Panel 8 "Accepted" Proposals 8-26, 8-27, and 8-28 to delete the use of FMC in a wet location per 348.12(1). The Exception found in 225.22 would only reference a "Uses Not Permitted" and would not change the rule.

The Technical Correlating Committee (TCC) should have addressed this proposal in their review. Also, see Panel Action on Proposal 4-58.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-12 Log #596 NEC-P04 **Final Action: Hold**
(225.30)

Submitter: Henry A. Jenkins, Wake County, Inspections Development / Rep. N.C. Ellis Cannady Chapter of I.A.E.I
Comment on Proposal No: 4-16
Recommendation: The Panel should have Accepted in Principle. We suggest the addition of a new second paragraph to read as follows:

"Where a branch circuit or feeder originates in these additional buildings or other structures, only one feeder circuit shall be permitted to supply power back to the original building or structure, unless permitted in 225.30(A) through (E)."

Insert it between the existing first sentence and the last sentence. Making the existing sentence into a separate third paragraph. The new text to read as follows:

225.30 Number of Supplies. Where more than one building or other structure is on the same property and under single management, each additional building or other structure that is served by a branch circuit or feeder on the load side of the service disconnecting means shall be supplied by only one feeder or branch circuit unless permitted in 225.30(A) through (E).

Where a branch circuit or feeder originates in these additional buildings or other structures, only one feeder or branch circuit shall be permitted to supply power back to the original building or structure, unless permitted in 225.30(A) through (E).
Substantiation: The existing text only covers one feeder or branch circuit to supplying an additional building or structure where there is more than one building on the same property and under single management. The text does not address bringing more than one feeder or branch circuit from one of these peripheral buildings back to the original building. The present text would permit an unlimited number of feeders or branch circuits to be brought back to the original building. For example, a generator could provide power for an emergency branch circuit panel in building No. 2 and any number of branch circuits could be fed from that emergency panel back to the original building to supply any number of emergency loads. The same would hold true for a feeder distribution panel.
Panel Meeting Action: Hold
Panel Statement: See panel action and statement on Comment 4-13.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-13 Log #1212 NEC-P04 **Final Action: Hold**
(225.30 (New))

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 4-16
Recommendation: Panel should have Accepted in Principle in Part. We suggest the adding of a new second paragraph to read as follows:

"Where a branch circuit or feeder originates in these additional buildings or other structures, only one feeder circuit shall be permitted to supply power back to the original building or structure, unless permitted in 225.30(A) through (E)." Insert it between the existing first sentence and the last sentence making the existing sentence into a separate third paragraph. The new text to read as follows:

225.30 Number of Supplies. Where more than one building or other structure is on the same property and under single management, each additional building or other structure that is served by a branch circuit or feeder on the load side of the service disconnecting means shall be supplied by only one feeder or branch circuit unless permitted in 225.30(A) through (E). Where a branch circuit or feeder originates in these additional buildings or other structures, only one feeder or branch circuit shall be permitted to supply power back to the original building or structure, unless permitted in 225.30(A) through (E).
Substantiation: The existing text only covers one feeder or branch circuit to supplying an additional building or structure where there is more than one building on the same property and under single management. The text does not address bringing more than one feeder or branch circuit from one of these peripheral buildings back to the original building. The present text would permit an unlimited number of feeders or branch circuits to be brought back to the original building.

For example, a generator could provide power for an emergency branch circuit panel in Building No. 2 and any number of branch circuits could be fed from that emergency panel back to the original building to supply any number of emergency loads. The same would hold true for a feeder distribution panel.
Panel Meeting Action: Hold
The panel action on this comment is to hold. The action on Proposal 4-16 is not affected by this action.
Panel Statement: The comment offers new material that has not had public review and is being held for processing as a proposal for the next revision cycle in accordance with 4.4.6.2.2 of the Regulations Governing Committee Projects.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-14 Log #505 NEC-P04 **Final Action: Reject**
(225.34(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-21
Recommendation: Accept the proposal.
Substantiation: Same as proposal. Note that the panel comment, third sentence, agrees the disconnects must be located sufficiently remote from ANY other system disconnects which is the thrust of the proposal.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any new substantiation to address the panel's concerns as stated in the panel statement in the proposal. The present Code wording is clear.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:

ROGERS, J.: I voted with the panel on this comment, however, the submitter is correct in his concern about this item. I would encourage the submitter to resubmit his concerns in a proposal to the 2011 NEC. The proliferations of onsite power production systems and the location of disconnecting means for these systems need to be reviewed. There is merit in separating these disconnects from those disconnects that may be installed for emergency and/or essential electrical systems in the buildings. Should there be a catastrophic failure in the disconnect for one of these onsite systems, there should be some assurance that the emergency supply disconnect is not compromised by this failure.

4-15 Log #412 NEC-P04 **Final Action: Reject**
(225.39)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-22
Recommendation: Accept proposal for (A) and (B).
Substantiation: If a 15-ampere circuit originating in one building supplies an overcurrent device (for example a 5 ampere fuse for motor, the 15 ampere circuit is a feeder, per definition and the 15 ampere minimum should apply. The literal wording in (B) requires one 2-wire circuit to have a disconnecting means rated not less than 30 amperes. Since "one" is "not mroe than two." An installation consisting of two 15 ampere multiwire circuits, or two 3-phase 15 ampere or less branch circuits is required by (D) to have a disconnect rated not less than 60 amperes although a 30 ampere rating is sufficient. Proposal did not advocate deletion of (C) and (D). Two 2-wire branch circuits (which may be 15 amperes or less) should only require a feeder disconnect means not less than 30 amperes if the feeder is 2-wire. A 15 ampere feeder disconnect rating is sufficient for a 3-wire feeder supplying two 15 ampere 2-wire branch circuits.
Panel Meeting Action: Reject
Panel Statement: In the first example given in the comment substantiation, the 15 amp circuit breaker supplying the motor with a 5 ampere fuse, as additional protection for the motor, would still be a single branch circuit and not a feeder. The purpose of 225.39(A) through (D) is to provide a minimum rating for feeder or branch circuit disconnecting means to ensure the disconnecting means ability to carry the loads. The submitter has not provided any technical substantiation that a problem exists with the existing text or that the present minimum rating for feeder and branch circuit disconnects is causing a problem.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

ARTICLE 230 — SERVICES

4-16 Log #329 NEC-P04 **Final Action: Accept**
(Figure 230.1)

Submitter: Joe Tedesco, Boston, MA
Comment on Proposal No: 5-61
Recommendation: Change "Grounding" to "Grounding and Bonding"
Substantiation: To reflect the change in the title of Article 250 made in the 2005 edition.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-17 Log #1217 NEC-P04 **Final Action: Accept**
(230.7 Exception No. 1)

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 4-4
Recommendation: The NEC TCC Grounding and Bonding Task Group agrees with CMP-4's Panel action to reject the proposed changes to 230.7 Exception No.1 in Proposal 4-4.
Substantiation: The NEC TCC Grounding and Bonding Task Group concurs with CMP-4 that the existing text in the 2005 NEC is adequate for 230.7 Exception No.1.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-18 Log #2278 NEC-P04 **Final Action: Reject**
(230.24 Exception No. 5 (New))

Submitter: Joseph Watson, Watson Electrical & Mechanical Corp.
Comment on Proposal No: 4-38
Recommendation: Revise to read:

Exception No. 5: Where voltage between conductors does not exceed 300, and there is no permanent access to roof, a reduction in clearance to 6 ft shall be permitted.

Substantiation: An 8 ft clearance above the roof places the NEC and the NESC in direct contradiction to each other. When an installation complies with one, it is in violation of the other. The 8 ft clearance is unsafe for the installing electrician and any line co. servicemen as it is an OSHA violation to have a ladder on a sloped roof. People do not spend much time on a sloped roof without permanent access.

This requirement is an OSHA violation, and a direct (unnecessary) conflict between two code giants - NEC and NESC, placing the installer in an impossible situation. (Here the power co. will not connect to an 8 ft mast).
Panel Meeting Action: Reject
Panel Statement: It appears to the panel that the commenter may have intended to refer to Proposals 4-37 and 4-39 rather than 4-38, which deals with an errata. When reviewing the clearance requirements in 234C3d(1) in the National Electrical Safety Code, it should be noticed that the exceptions concerning the suggested clearance requirements for service drops over roofs or balconies contain more text clarifying when a roof is considered to be accessible versus readily accessible and where a roof is not considered to be readily accessible. Taking just a small part of another standard without providing all of the accompanying qualifying text can change the intent of the requirement, as seems the case here.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:

ROGERS, J.: The panel is correct in rejecting this comment. The submitter has not submitted any technical substantiation for the change. However, this is one of the areas that the task group that has been appointed by the panel chair will be reviewing.

4-19 Log #415 NEC-P04 **Final Action: Reject**
(230.30(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-52a
Recommendation: In 230.50(A) add: "and service laterals" after "Underground Service-Entrance Conductors" in the heading and text, or alternatively delete "entrance."
Substantiation: Service laterals should be included. A service may be supplied by a service lateral with non-service-entrance conductors, per the FPN to definition of Service-Entrance Conductors, Underground System.
Panel Meeting Action: Reject
Panel Statement: Section 230.50 is located within Part IV of Article 230 specifically covering service-entrance conductors. Part III of Article 230 covers underground service lateral conductors. Adding "service lateral" to 230.50(A) would thus be inappropriate.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:

ROGERS, J.: The panel was correct in rejecting this comment in its present format. The task group will be reviewing these requirements as part of their review of the use of the term "Service Point". I recommend that the submitter resubmit a proposal for the 2011 NEC to be certain that his concerns are adequately addressed in that cycle. It is my opinion that the concerns raised by the submitter are legitimate and should be addressed.

4-20 Log #436 NEC-P04 **Final Action: Reject**
(230.34 (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-41
Recommendation: Accept proposal.
Substantiation: Same as proposal substantiation. See explanation of negative vote by Mr. J. Rogers.
Panel Meeting Action: Reject
Panel Statement: The proposal and the comment do not provide for all the wiring methods available for service laterals. In rejecting the comment, the panel recognizes that service lateral conductors and service drop conductors are under the exclusive control of the serving electric utility when they are installed on the utility side of the "Service Point" as defined in Article 100 and as established by the serving utility. The panel also recognizes that there are many times when these conductors are installed on the customer side of the Service Point as defined by the serving utility, and these installations are subject to the requirements of the National Electrical Code. This proposal seeks to define the wiring methods required when the installations are performed on the customer side of the Service Point as defined by the serving utility. This NEC requirement does not place any restrictions on these conductors when they are installed on the utility side of the Service Point as defined by the serving utility.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:

ROGERS, J.: See my comment on Comment 4-19.

4-21 Log #1618 NEC-P04 **Final Action: Reject**
(230.42(A))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 4-47
Recommendation: Another portion of this proposal should have been accepted in principal. The panel should accept the concept of the proposal that applies 125% (or 100% for rated overcurrent devices) only to conductors that connect to those overcurrent devices. The panel should either accept in principal additional wording from the original proposal or change the first sentence to read: "For service-entrance conductors directly connecting to overcurrent devices the ampacity ~~of the service entrance conductors~~ before the application of any correction or adjustment factors shall be not less than either (A)(1) or (A)(2)."
Substantiation: The panel statement objected to the proposed revision on the grounds that it would only apply to those conductors that directly connect to overcurrent devices. That is as it should be. By allowing 100% rather than 125% for OCDs rated at 100%, the existing language makes it clear that the only reason for increasing the ampacity of a conductor under the rule is that is connects to an overcurrent device. Ampacity is, by definition, the continuous current rating of a conductor, so the conductors that do not connect to OCDs only need to be sized per 310.15. Panel 2 has correctly clarified this point for both branch circuit conductors and feeder conductors. Panel 4 should also recognize the original reason for the 125% rule and clarify this point for service-entrance conductors. The proposed revised text will clarify application of the 125% rule and retain the reference to 310.15 for determining ampacity.
Panel Meeting Action: Reject
Panel Statement: The submitter's comment describes the requirements for "directly-connecting to overcurrent devices". The phrase "directly-connecting" is not clearly defined and interpretations of this phrase could cause misapplication of service entrance conductor sizing in field installations.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:
ODE, M.: As the Code is currently written, there are cases where the service conductors are required to be unnecessarily oversized by 25 percent. The proposal attempted to correct this, but would possibly have allowed undersized conductors in some situations. It may be appropriate to address this in the 2011 Code cycle. Further consideration should be given to the various types of equipment that may be used as service equipment, as well as the size of supply conductors mandated by the test requirements of the certification standards for each type of equipment.
ROGERS, J.: The submitters of both the proposal and the comment are correct in their concerns. There were two different although very similar submittals for the language change in this section, one in the proposal stage and one in the comment stage. I agree that this has technical merit and should be changed, however, I also agree with the panel that the language submitted was not sufficiently clear to address all installations and the language was not in a format that could be easily understood by all users of the NEC. The proposal should be resubmitted for the 2011 NEC with new language.

4-22 Log #535 NEC-P04 **Final Action: Reject**
(230.43(15) and (16))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-50
Recommendation: Accept as revised:
(15) One length of flexible metal conduit, or liquid tight flexible metal conduit, or liquidtight flexible nonmetallic conduit not over 1.8 m (6 ft) long between raceways specified in (3), (4), (5) and if metal (8) and (10), or between such raceways and service equipment.
Delete (16).
Substantiation: It appears the intent is to permit one length of flexible conduit, however, actual wording permits daisy chaining of the conduits (between raceways). Present wording permits LFMC and LFNC between nonmetallic raceways of (8), (10), (11), and (16) where the bonding requirements for outside the raceway serve no purpose since there is no grounding path and where inside the conduit no accessible connection points are available. The present (16) infers liquidtight flexible nonmetallic conduit, if used, must be for the entire length of service conductors since there is no 6 ft limitation, but doesn't prohibit or include short lengths for which no bonding requirements are stated.
Panel Meeting Action: Reject
Panel Statement: As long as the proper bonding jumpers are installed, there is no reason to restrict the various flexible wiring methods to one length. Deleting (16) and incorporating liquidtight flexible nonmetallic conduit into (15) does not add any clarity to the NEC.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-23 Log #597 NEC-P04 **Final Action: Accept**
(230.44)

Submitter: Henry A. Jenkins, Wake County, Inspections Development / Rep. N.C. Ellis Cannady Chapter of I.A.E.I
Comment on Proposal No: 4-52
Recommendation: We support the panel's action.
Substantiation: None given.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-24 Log #1213 NEC-P04 **Final Action: Accept**
(230.44)

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 4-52
Recommendation: We support the panel's action of Accepting in Principle the Proposal.
Substantiation: Breaking the original proposal up into two sentences changes nothing in the original proposal. Both changing this into two sentences and removing the words "or equivalent" adds clarity to the original proposal.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-25 Log #414 NEC-P04 **Final Action: Reject**
(230.44 and Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-51
Recommendation: Accept proposal as revised:
"Cable trays used to support (open individual) (single conductor) service conductors shall only contain service conductors."
Add to exception:
"or the conductors are installed in a raceway or metal covered cable."
Substantiation: Unless the service conductors are installed as single conductors what is the need for separation? While it may be construed that a solid barrier includes raceways and metal covered cables, that is not clear. Present wording indicates service conductors, even if in a raceway shall not be installed with other conductors. The panel statement that present text does not apply to service conductors in a cable assembly or raceway is not borne out by the wording.
Panel Meeting Action: Reject
Panel Statement: There is no technical substantiation to limit service conductors installed in a cable tray to just single conductor types since 392.9 permits multiconductor cables to be installed in cable trays. In the exception, the use of the word "conductors" is specific to conductors not installed in a raceway or a metal covered cable. The purpose of the main text is to permit service entrance conductors to be installed in cable trays with the exception to permit the same cable tray to be used where a proper fixed barrier is installed and proper marking labels are installed. If the cable tray is being used for support of raceways or metal-covered cables, the cable tray is simply a support mechanism and the separation is based on the raceways or metal-covered cables.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-26 Log #1376 NEC-P04 **Final Action: Accept in Principle**
(230.50(A))

Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 4-53
Recommendation: This Proposal should be Accepted as originally proposed.
230.50 Protection of Open Conductors and Cables Against Damage - Above Ground. Service-entrance conductors installed above ground shall be protected against physical damage as specified in 230.50(A) or (B).
(A) Service Cables. Service cables, where subject to physical damage, shall be protected by any of the following:
(1) Rigid metal conduit
(2) Intermediate metal conduit
(3) Schedule 80 rigid ~~nonmetallic~~ PVC conduit
(4) Electrical metallic tubing
(5) Other approved means

Substantiation: In accordance with CMP-8's action on Proposal 8-53, Article 352 will now apply only to "Rigid Polyvinyl Chloride Conduit: Type PVC" rather than "Rigid Nonmetallic Conduit: Type RNC." Therefore, it is necessary to revise the terminology used throughout the remainder of the NEC. As the only type of rigid nonmetallic conduit that is currently listed in Schedule 80 dimensions is rigid PVC conduit, the reference in 230.50(A) should be revised as noted above.
Panel Meeting Action: Accept in Principle
Revise comment to read: (3) Schedule 80 ~~rigid nonmetallic~~ PVC conduit
Panel Statement: After the definition in 352.2, the phrase used throughout Article 352 is "PVC conduit," with the word "rigid" not used.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-27 Log #489 NEC-P04 **Final Action: Accept**
(230.53)

Submitter: Timothy P. McNeive, Thomas & Betts Corporation
Comment on Proposal No: 4-57
Recommendation: Change the panel action to Accept.
Substantiation: The comment accompanying Mr. Young's negative vote should be considered by the CMP and their actin reconsidered. The Technical Correlating Committee should consider the action by several Code-Making Panels during the 2005 and 2008 NEC cycles where the word "raintight" has been, or will be replaced by "wet locations."
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-28 Log #2154 NEC-P04 **Final Action: Accept**
(230.53)

Submitter: David H. Kendall, Carlon
Comment on Proposal No: 4-58
Recommendation: Proposal 4-58 should continue to be "Accept" by Panel 4.
Substantiation: Panel 8 "Accepted" Proposals 8-26, 8-27, and 8-28 to delete the use of FMC in a wet location per 348.12(1). The Exception found in 230.53 would only reference a "Uses Not Permitted" and would not change the rule.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-29 Log #487 NEC-P04 **Final Action: Accept**
(230.54(A))

Submitter: Timothy P. McNeive, Thomas & Betts Corporation
Comment on Proposal No: 4-59
Recommendation: Change the panel action to Accept.
Substantiation: The comment accompanying Mr. Young's negative vote should be considered by the CMP and their action reconsidered. The Technical Correlating Committee should consider the action by several Code-Making Panels during the 2005 and 2008 NEC cycles where the word "raintight" has been, or will be replaced by "wet location."
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-30 Log #488 NEC-P04 **Final Action: Accept**
(230.54(B))

Submitter: Timothy P. McNeive, Thomas & Betts Corporation
Comment on Proposal No: 4-60
Recommendation: Change the panel action to Accept.
Substantiation: The comment accompanying Mr. Young's negative vote should be considered by the CMP and their action reconsidered. The Technical Correlating Committee should consider the action by several Code-Making Panels during the 2005 and 2008 NEC cycles where the word "raintight" has been, or will be replaced by "wet locations."
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-31 Log #1902 NEC-P04 **Final Action: Reject**
(230.70(A)(1))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-62
Recommendation: Accept the proposal.
Substantiation: The panel statement is not responsive to the proposal. The proposal does not require the service disconnect to be attached to building, although that is an option. It could also be "immediately adjacent thereto." This wording was chosen because CMP 4 did not want to use a prescriptive dimension, such as ten feet. The proposal also does not change anything with respect to the location of an inside service disconnect. What it does do is place a proximity limit on an outside disconnect. A service disconnect that is at a great distance or out of view from the building served is an unsafe situation.
Panel Meeting Action: Reject
Panel Statement: The proposal reference for this comment should be 4-63 rather than 4-62. The panel was very responsive to the proposal. There was absolutely no technical substantiation provided in either the proposal or the comment to require the service disconnecting means to be attached to or immediately adjacent to the building. In recent Code cycles, the panel has tried to develop a particular distance at which the service disconnecting means can be located outside the building or structure, but based on the architectural design of the building, problems with landscape and plant, and other premises problems, a reasonable distance could not be established. If the unprotected utility company conductors remain outside the building, there really is not a hazard associated with these conductors where properly maintained by the utility company. Where these unprotected conductors enter into a building, it is now necessary to terminate these conductors in a proper overcurrent protection device at a location nearest the point of entrance of these conductors into the building. Requiring the service disconnecting means to be located on the exterior of the building or immediately adjacent to the building or structure, instead of anywhere outside the building or structure, would be too restrictive and would result in too many exceptions. This concept has been acceptable, in one form or another, since the 1897 NEC and should remain as presently written.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-32 Log #813 NEC-P04 **Final Action: Accept in Principle**
(230.71)

Submitter: Timothy M. Croushore, Allegheny Power
Comment on Proposal No: 4-66
Recommendation: Revise the last sentence of 230.71(A) General to put in list format as follows:

For the purpose of this section, disconnecting means used solely for the following shall not be considered a service disconnecting means:
(1) Power monitoring equipment
(2) Surge protective device(s)
(3) Control circuit of the ground-fault protection system
(4) Power-operable service disconnection means, installed as part of listed equipment

Substantiation: The recommended revision is for clarity of the requirements of the last sentence in the original text. Typically, power monitoring equipment and surge protective devices are after-market items installed after the switchboard, panelboard or switchgear is manufactured. Occasionally, ground-fault protection is installed as an after-market item. However, GFP is typically installed by the original equipment manufacturer. As addressed in the original proposal, only Type 2 surge protective devices need to be installed as part of listed equipment as shown in 230.82(8).
Panel Meeting Action: Accept in Principle
Revise 230.71(A) General as follows:

For the purpose of this section, disconnecting means installed as part of listed equipment and used solely for the following shall not be considered a service disconnecting means:
(1) Power monitoring equipment
(2) Surge protective device(s)
(3) Control circuit of the ground-fault protection system
(4) Power-operable service disconnecting means

Panel Statement: The final phrase "installed as part of listed equipment" was originally inserted in 1987 as part of the exception for the control circuit of the ground-fault protection system to be installed as part of listed equipment. Section 230.82(8) also applies this same requirement to both ground-fault protection systems and transient voltage surge suppression systems. This layout will make it clear that these four systems must be installed as part of the listed equipment.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-32a Log #CC402 NEC-P04 **Final Action: Accept**
(230.71(B), FPN)

Submitter: Code-Making Panel 4,
Comment on Proposal No: 9-7c
Recommendation: Accept the recommendations in Proposal 9-7c.
Substantiation: CMP-9 has changed the categories of lighting and appliance branch circuit panel boards and power panel boards from Article 408 by its action on proposal 9-117.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-33 Log #55 NEC-P04 **Final Action: Accept**
(230.71(B), FPN)

TCC Action: The Technical Correlating Committee understands that the action on Proposal 9-7c occurs in Comment 4-32a.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 9-7c
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 4 for action. This action will be considered by Code-Making Panel 4 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-34 Log #515 NEC-P04 **Final Action: Reject**
(230.79(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-69
Recommendation: Accept proposal for (B):
TWO CIRCUIT INSTALLATION FOR installations consisting of ~~not more than~~ two 2-wire circuits the service disconnecting means for a 2-wire service shall have a rating of not less than 30 amperes. For installations consisting of two multiwire circuits or two 3-phase circuits, the service disconnecting means shall have a rating of not less than 30 amperes.
Substantiation: "Not more than two" literally includes only one 2-wire branch circuit which is permitted by (A) to be rated 15 amperes. Present wording requires two 15 ampere multiwire branch circuits or two 3-phase 15 ampere branch circuits to have a 60 ampere service disconnecting means which is 200 percent of the current rating of the branch circuits supplied.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any technical substantiation to justify permitting two multiwire circuits or two 3-phase circuits at a rating of not less than 30 amperes. Changing "consisting of not more than two 2-wire circuits" to "consisting of two 2-wire circuits," means it would apply to two 2-wire circuits and would no longer apply to one or two as it did before.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-35 Log #1086 NEC-P04 **Final Action: Accept in Principle in Part**
(230.82)

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 4-73
Recommendation: Accept the Proposal.
Substantiation: The submitter has provided a very reasonable rearrangement of this section and has introduced important and necessary requirements for meter disconnect switches.
The panel statement for rejection is somewhat disingenuous. First, if the issue was truly related to 90.2(B)(5), we would not need any text to deal with the meter disconnect switch. If utilities truly want "exclusive control" they need to purchase, install and maintain the disconnect. That is not what is happening. End users are being forced to purchase a disconnect (at the user expense) for the sole purpose of satisfying what is a utility company issue. The disconnect serves no purpose for the user. Utilities have also been emphatic that if the disconnect needs to be replaced, the user is required to make the replacement. If a fusible device is used and a fuse opens, utilities have also made it clear that the fuse must be replaced by the customer. Clearly these disconnects are not under the exclusive control of the utility.
The points made by the submitter relative to the disconnect needing to interrupt the load served and have an adequate short circuit current rating are both important safety issues. The panel statement says that the utility can open the service disconnect to remove the load. True, but that is not what actually happens. If the watt-hour meter needs to be replaced or tested, the meter-disconnect switch is opened, the meter removed, new meter inserted and the switch turned back on. If the device is not suitable for making or breaking the load, then it should be marked as an isolating switch along with DO NOT OPEN UNDER LOAD.
The last paragraph of the panel statement is of most concern. Allowing the utility company installation manuals to handle the issue is exactly what is creating major problems across the country today. Utilities are all taking different approaches and imposing different requirements on products. This reduces standardization (which is ironic, since one of the objectives we all have with the adoption of the NEC is to have more consistent installations). This reduction in standardization increases the costs for the end user.
The panel should either accept the proposal which will provide improved wording and requirements or they should delete the text all together.
Panel Meeting Action: Accept in Principle in Part
Accept only the following sentence from proposal 4-73.
"A meter disconnect shall be capable of interrupting the load served."
Add the word "switch" between the words "disconnect" and "shall", and insert the sentence at the end of 230.82(3): "A meter disconnect switch shall be capable of interrupting the load served."
Reject the balance of proposal 4-73.
Panel Statement: The panel agrees with the commenter that this switch must be capable of interrupting the load served.
The title in (A) is "Unswitched Equipment," so Items (1) through (7) would not apply if the equipment in (A) is installed on the load side of a meter disconnecting means since it would now be switched.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-36 Log #1903 NEC-P04 **Final Action: Accept in Principle in Part**
(230.82)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-73
Recommendation: Accept the proposal.
Substantiation: The panel statement is in serious error when it describes a meter disconnect as always subject to 90.2(B)(5). If the meter socket is on the load side of the service point (usually but not always the case), then the meter disconnect is premises wiring even if under utility seal, and even if it is installed pursuant to a utility mandate. The fact that a utility can unload a meter is irrelevant, since the existence of the disconnect usually means that the utility has requested it. The panel statement then goes on to complain about the short-circuit capability requirement for the switch, which is bizarre since CMP 4 already located this requirement in the NEC [at 230.82(3)] and this proposal merely retains the existing requirement. The proposal also carefully accommodates true service disconnects for meter stacks (not, in such cases, meter disconnects). The panel statement is not responsible to the merits of the proposal.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: See panel action and statement on Comment 4-35.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-37 Log #1904 NEC-P04 **Final Action: Accept in Principle in Part**
(230.82)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-73
Recommendation: Accept the proposal.
Substantiation: The panel statement is in serious error when it describes a meter disconnect as always subject to 90.2(B)(5). If the meter socket is on the load side of the service point (usually but not always the case), then the meter disconnect is premises wiring even if under utility seal, and even if it is installed pursuant to a utility mandate. The fact that a utility can unload a meter is irrelevant, since the existence of the disconnect usually means that the utility has requested it. The panel statement then goes on to complain about the short-circuit capability requirement for the switch, which is bizarre since CMP 4 already located this requirement in the NEC [at 230.82(3)] and this proposal merely retains the existing requirement. The proposal also carefully accommodates true service disconnects for meter stacks (not, in such cases, meter disconnects). The panel statement is not responsible to the merits of the proposal.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: See panel action and statement on Comment 4-35.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-38 Log #2241 NEC-P04 **Final Action: Reject**
(230.82)

Submitter: Wes Hoppler, American Power Technologies Inc.
Comment on Proposal No: 4-74
Recommendation: Adopt the proposal as submitted.
Substantiation: The issue here is a catch 22. UL 1008 is based on the NEC. 2 pole meter socket adapter transfer switches cannot reasonably provide a neutral disconnect to function as service equipment. They also use breakers (OCPDs) in the switching mechanism. They contain a ground-neutral bond and attach that lead to the grounded service conductor which is in turn bonded to the existing meter socket. No new multiple paths are created that would affect service conditions under normal utility supplied power service. Since they are then generally the first source of OCP, but have no neutral disconnect, and a ground neutral bond, complying with the marking requirements of UL 1008 is problematic. This proposed change would allow for a change in the UL 1008 language that would allow installation on the service-side without being labeled as service equipment but rather "suitable only for installation on the service side of the main disconnect." The exemption for these units to be installed "under the exclusive control of the serving utility" works in some instances such as critical municipal loads and others. However, it is not practical for typical residential homes. When the generators are needed, typically the utility has more pressing things to do such as the restoration of power in storm damaged areas. Obviously, the serving utility needs to approve any device that their meter plugs into. However, it seems better to modify the Code than to suppose that all customers with such devices are duly authorized agents acting on behalf of the serving utility.
Panel Meeting Action: Reject
Panel Statement: These devices are for use only under the exclusive control of the utility company in accordance with their listing, and therefore no NEC requirement is necessary in accordance with 90.2(B)(5).
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-39 Log #1218 NEC-P04 **Final Action: Reject**
(230.82(2) and 230.82(3))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 4-4
Recommendation: The CMP-4 Panel action item 4 should be to accept the original proposal for Sections 230.82(2) and 230.82(3).
Substantiation: The NEC TCC Grounding & Bonding Task Group does not agree that CMP-4's revised text of the proposal to 230.82(2) more accurately describes the specific parts for both grounding and bonding than does the original proposal. The CMP-4 made no change to the original proposed text for 230.82(3) as noted in the Panel's action.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Reject
Panel Statement: The panel's action in Proposal 4-4 covering 230.82(2) achieves the commenter's intent but uses clearer language. Grounding is covered under Part VII, and bonding under Part V. After reviewing the panel action on the proposal, the panel notes that the same changes were intended for 230.82(3) as were made to 230.82(2), as noted in item 4 of the panel statement.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-39a Log #CC403 NEC-P04 **Final Action: Accept**
(230.82(3))

Submitter: Code-Making Panel 4,
Comment on Proposal No:
Recommendation: Revise 230.82 (3) as follows:

230.82 (3) Meter disconnect switches nominally rated not in excess of 600 volts that have a short-circuit current rating equal to or greater than the available short circuit current, provided all metal housings and service enclosures are grounded in accordance with Part VII and bonded in accordance with Part V ~~and Part VII~~ of Article 250.
Substantiation: The panel changed the proposed text to 230.82 (2) to more clearly identify which Part of Article 250 applied to the grounding and which Part of Article 250 applied to the bonding. It was intended that the same changes be made to 230.82 (3). The panel meeting action clarifies that intent.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-40 Log #2240 NEC-P04 **Final Action: Reject**
(230.94)

Submitter: Wes Hoppler, American Power Technologies Inc.
Comment on Proposal No: 4-82
Recommendation: Adopt the proposal as submitted.
Substantiation: The issue here is a catch 22. UL 1008 is based on the NEC. 2 pole meter socket adapter transfer switches cannot reasonably provide a neutral disconnect to function as service equipment. They also use breakers (OCPDs) in the switching mechanism. They contain a ground-neutral bond and attach that lead to the grounded service conductor which is in turn bonded to the existing meter socket. No new multiple paths are created that would affect service conditions under normal utility supplied power service. Since they are then generally the first source of OCP, but have no neutral disconnect, and a ground neutral bond, complying with the marking requirements of UL 1008 is problematic. This proposed change would allow for a change in the UL 1008 language that would allow installation on the service -side without being labeled as service equipment but rather "suitable only for installation on the service side of the main disconnect." The exemption for these units to be installed "under the exclusive control of the serving utility" works in some instances such as critical municipal loads and others. However, it is not practical for typical residential homes. When the generators are needed, typically the utility has more pressing things to do such as the restoration of power in storm damaged areas. Obviously, the serving utility needs to approve any device that their meter plugs into. However, it seems better to modify the Code than to suppose that all customers with such devices are duly authorized agents acting on behalf of the serving utility.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 4-38.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-41 Log #1219 NEC-P04 **Final Action: Accept**
(230.95)

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 4-4
Recommendation: The NEC TCC Grounding and Bonding Task Group recommends that CMP-4 continue to Accept in Principle the proposed changes to 230.95 in Proposal 4-4.
Substantiation: The NEC TCC Grounding and Bonding Task Group concurs with the CMP-4 Panel action to Accept in Principle and statement for the change to the original proposal to 230.95 in Proposal 4-4.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-42 Log #2334 NEC-P04 **Final Action: Accept**
(230.95)

Submitter: Alan Manche, Square D Company
Comment on Proposal No: 4-83
Recommendation: Continue to Reject the Proposal.
Substantiation: This proposal is requesting a relaxation of the present safety parameters in the NEC without any substantiation to support such a reduction. The present language has been in the NEC for well over 30 years.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:

ROGERS, J.: I am voting with the panel on this comment but for different reasons than those stated in the original panel statement on Proposal 4-83. I do not agree with the assumption by the panel that in all cases it is easier to change a fuse than a rating plug. In many cases the opposite may be the case. In either event the panel should base its decision on factual technical language and not on a perceived ease of installation or change issue. I encourage the submitter to resubmit in the 2011 NEC cycle with further technical information.

4-43 Log #1184 NEC-P04 **Final Action: Reject**
(230.96 (New))

Submitter: Mark H. Sumrall, IBEW Local Union 527
Comment on Proposal No: 4-85
Recommendation: The Panel should accept this proposal.
Substantiation: The panel statement does not take into consideration the well documented, multi-injuries, multi-fatalities, associated with exposure to any arc flash or blast. While PPE should be considered the last stand on injury prevention, engineering hazards "out of the industry" should be considered the norm, with the knowledge base of the present day industry documentation. This should always be the first stand, when hazards are known, and not the exception. These hazards have been recognized since the early 1980's. Prior to this date, arc blast and flash were considered "the nature of the beast." Electricians "know the hazards" and must take "personal" steps in preventing their exposure to these hazards. This work practice is no longer acceptable. The field employees need all the help we can collect for prevention of these exposures.
Panel Meeting Action: Reject
Panel Statement: The panel recognizes the submitter's concerns, however the submitter of the proposal does not provide the method of installation for current-limiting fuses or circuit breakers at the "source of supply" for the service entrance conductors. For example, the service drop conductors connect to service entrance conductors at the weatherhead. These service entrance conductors are then installed in various types of wiring methods required by 230.40 to the service equipment, such as the meter socket and the service disconnecting means. The proposal appears to require an additional fusible disconnect at the point of connection between the service drop conductors and the connection point (commonly called the service point) for the service entrance conductors. Even if these devices were installed at this location, the installation would be a violation of 240.24(A) requiring overcurrent devices to be readily accessible.The addition of these devices would not eliminate the likelihood of injury. The only way to eliminate injury is to shut off the power.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-44 Log #1087 NEC-P04 **Final Action: Reject**
(230.200, FPN)

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 4-86
Recommendation: Accept the Proposal.
Substantiation: The submitter is correct. The FPN does add confusion when one considers that the NEC is an enforcement document that is adopted by practically all jurisdictions in the US.
The NESC does indeed contain provisions that are in conflict with the NEC. Should users decide to utilize the NESC for installations covered by the NEC, the conflicts place the AHJ in a very difficult position. Although the NESC may be useful for some engineering design information, its reference as a source from the NEC implies that it is capable of being used without interfering with the use of the NEC. The code loses nothing by deleting the reference, but has increased confusion/conflict with the reference included.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 4-4.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-45 Log #2033 NEC-P04 **Final Action: Reject**
(230.200, FPN)

Submitter: Donald Cook, Shelby County Building Inspections
Comment on Proposal No: 4-86
Recommendation: Delete this FPN completely.
Substantiation: The panel statement indicates the FPN provides NEC Code users with additional information for conductor clearances for utility company conductors on the line side of the service point. Utility conductors on the line side of the service point are not within the scope of the NEC. I fail to see the value of including that information in the NEC. While the NESC requirements certainly seem applicable to installations on the line side of the service point, they do not seem relevant to NEC installations. As an AHJ with a significant number of installations that utilize systems greater than 600-volts, I can confirm the FPN currently adds to the confusion for requirements on installations above 600-volts. If the NEC continues to claim responsibility for the installations, a complete set of requirements should be established and references to another document in FPN's should be removed. In the enforcement of the NEC, the NEC references to the NESC cause regular debate and challenge from designers that attempt to use the NEC for pole line distribution on the secondary of the service point. The purpose for this proposal and comment is not to change the requirements that govern the installations, but to clarify which code or standard is responsible for installations on the customer side of the service point. Confusion can not enhance safety. See CMP-1 action on Proposal 1-145.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 4-4.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-46 Log #411 NEC-P04 **Final Action: Reject**
(230.203)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 4-3
Recommendation: Accept proposal.
Substantiation: The Proposal was intended for 230.203. My home and many others have service lateral conductors installed underground by the electrical contractor from a utility owned pad-mounted transformer adjacent to the street.
Panel Meeting Action: Reject
Panel Statement: Neither the substantiation for the proposal nor the one for the comment has provided a technical reason for requiring that wiring methods be installed for service lateral conductors. It is already permissible to install these conductors in a wiring method of either the contractor or the utility company choice.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-47 Log #670 NEC-P04 **Final Action: Accept**
(230.203 (New))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 4-3
Recommendation: The Proposal should continue to be Rejected.
Substantiation: The proposal limits the types of wiring methods to those specifically listed in the proposal. There are numerous other wiring methods and multiconductor cables that are permitted to be used for service entrance and service laterals that have been omitted from the list with no technical substantiation.
The proposal is substantive since it introduces significant changes in the wiring methods permitted and is not simply editorial as stated.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10
Comment on Affirmative:
ODE, M.: See my explanation of affirmative vote on Comment 4-21.

4-48 Log #1150 NEC-P04 **Final Action: Accept**
(230.203 (New))

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 4-3
Recommendation: The Panel should continue to reject the proposal. It is also requested that the TCC form a Task Group, or take other appropriate action, to address the concerns and other issues expressed in the Affirmative Comments in the voting for this proposal and Proposals 4-1 and 4-41.
Substantiation: The TCC is correct that changing the definitions and related code rules to redefine what customer-owned conductors are called would require significant work that is beyond the scope of what can be accomplished in this Code cycle and allow for adequate public review.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-49 Log #2089 NEC-P04 **Final Action: Reject**
(230.203)

Submitter: James J. Rogers, Bay State Inspectional Agency
Comment on Proposal No: 4-3
Recommendation: This Proposal should be Accepted in Principle.
Substantiation: The panel action on this proposal should have been accept or accept in principle. The submitter has raised an issue that should be addressed relative to the lack of installation requirements for service lateral conductors. For some reason, the submitter only raised the issue with service laterals over 600 volts and I believe that the general requirements should also be addressed. I do not agree with the statement that all service laterals are under the control of the utility companies and the definition of "service point" supports my opinion. If the panel is not in agreement with this opinion, then a lot of work has to be done within Article 230 to define these conductors as underground service entrance conductors. The basic diagram that is found in 230.1 clearly exhibits that the conductors between a riser pole or underground street main are service lateral conductors up to the terminal box, meter or other enclosure. These conductors are routinely installed by private contractors all across the country. If the panel truly believes that these are not service lateral conductors, then a tremendous change in the basic understanding throughout the electrical

profession would have to be made. And, as I stated above technical changes within Article 230 would have to be made. I truly do not understand what the problem is. These conductors are service laterals, if they are installed and maintained by the utility then they are on the utility side of the service point, if they are installed and maintained by private contractors they are on the customer side of the service point. In either case, they are still service lateral conductors until such time as Article 230 is changed to define them differently.
Panel Meeting Action: Reject
Panel Statement: The submitter of the proposal and the submitter of this comment have not provided any technical substantiation to require specific wiring methods be installed for service lateral conductors.
See panel action and statement on Comment 4-48.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-50 Log #1220 NEC-P04 **Final Action: Accept**
(230.204(D))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 4-4
Recommendation: The NEC TCC Grounding and Bonding Task Group recommends that CMP-4 reconsider accepting the proposed changes in principle to 230.204(D) with the following alternative text changes.
230.204(D): Revise the title and section as follows:
(D) ~~Grounding~~ Connection to Ground. Isolating switches shall be provided with a means for readily connecting the load side conductors to a grounding electrode system, equipment ground bus bar, or grounded structural steel when disconnected from the source of supply. A means for grounding the load side conductors to a grounding electrode system, equipment grounding bus bar, or grounded structural steel shall not be required for any duplicate isolating switch installed and maintained by the electric supply company.
Substantiation: The NEC TCC Grounding & Bonding Task Group concludes this alternative change to 230.204(D) is more prescriptive and specific with respect to making a connection to ground on high voltage equipment for safe work practices. This connection is required to be a solid connection to a grounding electrode system, equipment grounding bus bar, or grounded structural steel that may or may not be specified in 250.52. These connections to ground are not made through potential equalizing grids or ground mats which are similar as defined in IEEE 80 to reduce step and touch voltage exposure to personnel. The IEEE 80-2000 definition for "ground mat is:
"**3.13 ground mat:**
A solid metallic plate or a system of closely spaced bare conductors that are connected to and often placed in shallow depths above a ground grid or elsewhere at the earth's surface, in order to obtain an extra protective measure minimizing the danger of the exposure to high step or touch voltages in a critical operating area or places that are frequently used by people. Grounded metal gratings, placed on or above the soil surface, or wire mesh placed directly under the surface material, are common forms of a ground mat."
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

4-51 Log #1905 NEC-P04 **Final Action: Reject**
(230.211)

TCC Action: The Technical Correlating Committee directs that Comment 4-51 be reported as Reject based on Code-Making Panel 9's action to Reject Proposal 9-158 on Comment 9-90, which was the basis for acceptance of Comment 4-51.
Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 4-89
Recommendation: Accept the proposal.
Substantiation: As the proposal substantiation clearly indicated, this was a companion proposal to one submitted to locate all the relevant requirements of this gear in Article 490. All technical content within Section 230.211 has been incorporated in Section 490.47 pursuant to Proposal 9-158. this section (490.46 in the 2005 NEC) now will contain an extensive array of construction requirements for this switchgear, and makes sense to bring all these requirements together.
Panel Meeting Action: Accept
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

ARTICLE 240 — OVERCURRENT PROTECTION

10-2 Log #64 NEC-P10 **Final Action: Accept**
(240.4(D))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 10-10
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal as it relates to 110.5. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Code-Making Panel 10 accepts the Technical Correlating Committee direction to clarify the panel action on Proposal 10-10 as it relates to 110.5. The following revisions have been made for increased clarity and usability:
(1) Use of the term "copper" is necessary for clarity and usability in a section that references both copper and aluminum conductors.
(2) The word "through" was editorially changed to "or" per Comment 10-3.
(3) The text accepted in the panel action on proposal 10-10 has been editorially revised to comply with the NEC Style Manual and to increase clarity and usability.
The text will now read as follows:
"(D) Small Conductors. Unless specifically permitted in 240.4(E) or (G), the overcurrent protection shall not exceed the following after any correction factors for ambient temperature and number of conductors have been applied.
(1) 18 AWG Copper. 7 amperes, provided all the following conditions are met:
(1) Continuous loads do not exceed 5.6 amperes.
(2) Overcurrent protection is provided by one of the following:
a. Branch circuit rated circuit breakers listed and marked for use with 18 AWG copper wire
b. Branch circuit rated fuses listed and marked for use with 18 AWG copper wire
c. Class CC, Class J, or Class T fuses
(2) 16 AWG Copper. 10 amperes, provided all of the following conditions are met:
(1) Continuous loads do not exceed 8 amperes
(2) Overcurrent protection is provided by one of the following:
a. Branch circuit rated circuit breakers listed and marked for use with 16 AWG copper wire
b. Branch circuit rated fuses listed and marked for use with 16 AWG copper wire
c. Class CC, Class J, or Class T fuses
(3) 14 AWG Copper. 15 amperes
(4) 12 AWG Aluminum and Copper-Clad Aluminum. 15 amperes
(5) 12 AWG Copper. 20 amperes
(6) 10 AWG Aluminum and Copper-Clad Aluminum. 25 amperes
(7) 10 AWG Copper. 30 amperes"
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-3 Log #1619 NEC-P10 **Final Action: Accept in Principle**
(240.4(D))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 10-10
Recommendation: Revise or clarify the part of the proposal that was accepted in principle. The existing text is incorrectly quoted, and although the portion that is incorrectly quoted is not part of the proposed change, it should be clarified. The existing text reads: "Unless specifically permitted in (E) ~~or~~ (G)..." not (E) ~~through~~ (G)" as stated in the proposal. The word "through" was change to "or" by ROP 10-23 for the 2005 cycle and this should not be inadvertently changed back without any substantiation.
Substantiation: The issue is fully explained in the comment.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 10-2.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-4 Log #516 NEC-P10 **Final Action: Reject**
(240.5(A) Exception (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 10-12
Recommendation: Accept the proposed new Exception for (A):
Exception: Where permitted elsewhere in this Code to be permanently connected as branch circuit or feeder conductors extra hard usage flexible cords and flexible cables not in contact with heated or heat-producing surfaces shall be permitted to be protected in accordance with 240.4(A), (B), and (G).
Substantiation: The provisions of (A), (B), and (G) do not apply to permanently connected cords and cables as they are excluded by the first sentence of 240.4 and 310.15 doesn't include them. Table 240.4(G) for example indicates such cords used for motor circuit conductors may be protected at greater than their ampacity in accordance with Article 430 but the first sentence of 240.4 precludes this by excluding flexible cords from (G). For example if a 3-phase motor rated 15.2 ampere could utilize a 12 AWG Type SO cord rated 20 amperes per 400.7(7)(9) for current requirements but if the motor overcurrent protection exceeds 20 amperes (usual case) the cord would be in violation of 240.5(A).
Panel Meeting Action: Reject
Panel Statement: The proposed exception does not increase clarity for users of the Code.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-5 Log #591 NEC-P10 **Final Action: Accept**
(240.5(B))

Submitter: Henry A. Jenkins, Wake County, Inspections Development / Rep. N.C. Ellis Cannady Chapter of I.A.E.I
Comment on Proposal No: 10-13
Recommendation: We support the panel's action.
Substantiation: None given.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-6 Log #1214 NEC-P10 **Final Action: Accept**
(240.5(B))

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 10-13
Recommendation: We support the panel's action in Accepting this Proposal as written.
Substantiation: None.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-7 Log #1624 NEC-P10 **Final Action: Reject**
(240.20(B)(1))

Submitter: Wally Harris, Atlantic Inland Inspections
Comment on Proposal No: 10-17
Recommendation: Revise the text of this Proposal to read as follows:
Multiwire Branch Circuit. Except where limited by 210.4(B), individual single-pole circuit breakers, with ~~or without~~ approved handle ties, shall be permitted as the protection for each ungrounded conductor of multiwire branch circuits that serve only single-phase line-to-neutral loads.
Substantiation: The original proposal in the ROP should be reconsidered, and accepted.
First, let us address the aspect of the grounded (neutral) conductor of a multi-wire circuit. The grounded conductor carries the unbalanced current in a multi-wire circuit. As an example:
120/240 volt circuit
Served by spaces 2 and 4 in a panel.
Assume space 2 - "Leg A" is a 20 ampere circuit - with a load of 12 amps.
Assume space 4 - "Leg B" is a 20 ampere circuit - with a load of 15 amps.
The current in the grounded conductor would be; 15 amps - 12 amps = 3 amps.
3 amperes is more than enough to cause injury or death.
Even if one leg is switched off in the above noted 120/240 volt circuit, the other leg would still carry current, as would the grounded conductor.
Secondly, let us address that which is noted in the ROP "Panel Statement" - the "automatic" opening of the overcurrent device, and the further statement of the Panel that a handle tie "...does not establish a common trip mechanism." I would respectfully disagree with the Panel by noting that an Approved Handle Tie is the most basic form of a "common trip mechanism".
The automatic opening of the overcurrent device is not so much the largest safety problem, nor is the unbalanced current in the grounded conductor addressed above. Another safety consideration is what is connected to the circuit in question.
Let us consider a hypothetical situation in a school, hospital, or commercial setting:
Duplex receptacle outlet:
● Top - served by "Leg A" - Serves an assumed Toaster
● Bottom - served by "Leg B" - Serves an assumed Coffee maker.
● Maintenance receives a call that the receptacle outlet in the Second Floor Kitchenette broke on the bottom when the toaster was unplugged.
● Maintenance person inserts polarity tester (A "weapon of choice" for many maintenance persons) in the TOP receptacle and flips breakers until the light goes out.
● Maintenance then goes to remove the receptacle and does not realize that the BOTTOM portion that broke is in fact still hot and is injured.
Considering this scenario the problem arises more so when the overucrrent device is serving as a circuit disconnect.
Many so called maintenance persons are ill trained in the industry today, due in part to budget cuts, and staffing cutbacks. All too often a so called maintenance person is no more than a "bulb changer", and is often times assigned tasks that they are not qualified to do.
This is a problem that needs to be addressed at some point in time, and hopefully it will be soon enough to prevent injury, death or other loss.
Panel Meeting Action: Reject
Panel Statement: The submitter is confusing common trip with common disconnect.
The panel reaffirms that handle ties ensure common ON/OFF switching but that handle ties do not ensure common tripping under overload. There is a difference between multipole common trip circuit breakers and handle tied individual circuit breakers, and this is discussed, for example, in the NFPA NEC 2005 Handbook on pages 165-167. With respect to single pole circuit breakers applied to multiwire branch circuits serving only single-phase line-to-neutral loads, tripping of the breaker in an ungrounded conductor will remove both current and voltage from that load in a safe manner. There could, indeed, still be current flow in the grounded neutral conductor, but this current will be flowing to a separate load.
The scenario relative to the duplex receptacle is covered in 210.4(B). Here, it is noted that 210.4(B) was expanded in the 2005 Code from dwelling units to also include general multiwire circuits. Thus, a multiwire branch circuit supplying more than one device or equipment on the same yoke shall be provided with a means to disconnect simultaneously all ungrounded conductors at the panel where the branch circuit originated. Individual single-pole circuit breakers would have to be handle tied in order to meet this requirement.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
FREDERICKS, C.: I support the panel action and statement, but I would like to comment that I agree with the idea to require common switching for multi-wire branch circuits. As I understand, there are pending changes in Article 210 to require this common switching. This should meet the commenter's intent, with no further action required in Article 240.
KIMBLIN, C.: The first sentence of the panel statement reads that handle ties do not ensure common tripping under overload. However, and more accurately, handle ties do not ensure common tripping under overcurrent conditions. Per the definition in Article 100, these include overload, short circuit or ground fault. The appropriate term in the first sentence of the panel statement is "overcurrent" rather than "overload."
KOVACIK, J.: In addition to the substantiation provided by the panel in support of the rejection of this comment, it is important to note that UL489, the Standard for circuit breakers, does not recognize a handle tie as a common trip mechanism in performance testing of circuit breakers.
OCKULY, G.: I vote to affirm the panel action with the following comment:
In the panel statement, second line, the word "overload" should read "overcurrent". Tie handles do not ensure common trip during overload, short-circuit, or ground fault conditions. Therefore, the word "overcurrent" is the correct term.

10-8 Log #1509 NEC-P10 **Final Action: Accept**
(240.20(B)(3))

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc.
Comment on Proposal No: 10-18
Recommendation: Technical Correlating Committee Task Group on the definition of "Neutral Conductor" concurs with the panel action on this proposal.
Substantiation: This comment was developed by the Technical Correlating Committee (TCC) Task Group (TG) on the definition of "Neutral Conductor." Task Group members were: Jeffrey Boksiner (Chair) (CMP 5, TCC), Paul Dobrowsky (CMP 5), Walter Skuggevig (CMP 5), Doug White (CMP 5), Michael Toman (CMP 2, TCC), Bob Wilkinson (CMP2), Jim Daly (CMP 6, CMP 7, TCC), Bill Laidler (CMP 6), and Oran Post (CMP 6). The TCC

directed that the action on this proposal be sent to the TG for review and comment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-9 Log #53 NEC-P10 **Final Action: Accept**
(240.21(B)(1), FPN)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 9-7a
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 10 for action. This action will be considered by Code-Making Panel 10 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: Code-Making Panel 10 agrees with the results of the action taken by Code-Making Panel 9. However, Code-Making Panel 10 recognizes that this type of correlation should have been handled by NFPA staff or by a public comment submitted by Code -Making Panel 9 to Code-Making Panel 10.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-10 Log #54 NEC-P10 **Final Action: Accept**
(240.21(C)(2), FPN)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 9-7b
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 10 for action. This action will be considered by Code-Making Panel 10 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: Code-Making Panel 10 agrees with the results of the action taken by Code-Making Panel 9. However, Code-Making Panel 10 recognizes that this type of correlation should have been handled by NFPA staff or by a public comment submitted by Code Making Panel 9 to Code-Making Panel 10.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-11 Log #65 NEC-P10 **Final Action: Accept**
(240.21(C)(2)(1)(c))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 10-27
Recommendation: The Technical Correlating Committee directs that the Code-Making Panel clarify the Panel Action on this Proposal with respect to the location of the added text. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel accepts the direction of the Technical Correlating Committee.
The panel action is to delete existing 240.21(C)(2)(1)(c) and create a new 240.21(C)(2)(4) to read:
"For field installations where the secondary conductors leave the enclosure or vault in which the supply connection is made, the rating of the overcurrent device protecting the primary of the transformer, multiplied by the primary to secondary transformer voltage ratio, shall not exceed 10 times the ampacity of the secondary conductor".
Panel Statement: The existing text in 240.21(C)(2)(1)(c), including the submitter's proposed text, has been revised and placed in a new 240.21(C)(2)(4), which is consistent with the structure and text found in 240.21(B)(1)(4).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-12 Log #608 NEC-P10 **Final Action: Accept in Principle**
(240.21(H) (New))

Submitter: Paul Guidry, Fluor Enterprises, Inc
Comment on Proposal No: 10-33
Recommendation: Accept the proposed wording in Mr. Frederick's comments in the ROP, except change the term "overload" to "overcurrent" in 240.21(H)(1). Also, assign a length to the conductors. If the panel disagrees with 25 ft as recommended in my proposal, then the panel should discuss the issue and decide on a suitable length.
Substantiation: The panel statement ("The panel disagrees with the substantiation that there are no restrictions.") is somewhat incorrect. In my substantiation I did not state that there are no restrictions on these installations. I stated that there are currently no restrictions on how far these unprotected conductors may be routed without an overcurrent device and that nothing specifically requires them to be physically protected. I still believe that to be true, and if it's not, I'd appreciate it if the panel would reference a section of the Code in the panel statement that indicates where running conductors from batteries with or without overcurrent and physical protection is acceptable.
There has to be some length of conductor from battery terminals to a breaker or set of fuses since the overcurrent protective device cannot be installed directly on the terminals. Mr. Kovacik's comments are unclear to me. Section 480.3 does indeed govern the installation and will continue to do so, and as such, the general requirements of the Code do too. However, I feel like the general requirements of the Code do not cover these conductors well enough. There are many installations today where the battery conductors are being installed in lengths of 50-100 ft, unprotected against short circuits, ground-faults, overcurrent and overloads, and some of them are not adequately protected from physical damage. Not only do I believe this to be unsafe to personnel, but a fire hazard as well.
I appreciate that the panel is concerned that this new text would apply only to industrial installations. That was my intent. The panel doesn't indicate whether they think this is a good idea or a bad idea. In my line of work, I'm only concerned about industrial installations, so if the panel feels the scope needs to be broadened it should have been accepted in principle, accepted in part, or accepted in principle in part and the panel could have added what was needed for other installations.
The reason I feel like 25 ft of conductor is reasonable is I've yet to see a battery installation where you can't install a fusible switch or breaker within 25 ft of the batteries. I'm sure that somewhere it is possible that 25 ft would not be sufficient, but I felt like I had to submit the proposal with a given length. Also, the 25 ft tap rule has existed in the Code for years and apparently has withstood the test of time. I don't know what better substantiation I can provide.
Last, I want to thank the panel for asking the Technical Correlating Committee to assign a task group to this issue. I believe this is something that needs to be addressed this cycle.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 10-13. That action meets the intent of the submitter.
The submitter's concern relative to the length limitations is also covered in the action taken on Comment 10-13. A specific length limitation, as proposed by the submitter, would not be appropriate for the full range of storage battery installations.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-13 Log #1846 NEC-P10 **Final Action: Accept in Principle**
(240.21(H) (New))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 10-33
Recommendation: Accept proposal 10-33 in part in principle, by adding new section 240.21(H) as follows:
(H) Battery Conductors. Conductors connected to storage battery terminals shall be permitted to be protected against overcurrent at a nonhazardous location as near as practical to the battery terminals.
Substantiation: ACC agrees with Mr. Fredericks' explanation of negative vote on proposal 10-33. The panel action was inconsistent in that it asserts the basic rule of 240.21 should apply to battery conductors, while at the same time acknowledging that allowing 25 feet to the first overcurrent device might not be enough for some larger installations.
The proposed text meets the same intent as the panel action and addresses this issue for general installations, while a companion comment proposes new text for Supervised Industrial Installations in 240.92, in accordance with the text provided with Mr. Fredericks' explanation of negative vote.
Panel Meeting Action: Accept in Principle
Revise the recommended wording in the comment to read as follows:
"(H) Battery Conductors. Overcurrent protection shall be permitted to be installed as close as practicable to the storage battery terminals in a non-hazardous location. Installation of the overcurrent protection within a hazardous location shall also be permitted."
Panel Statement: The intent of the submitter has been met. Furthermore, the installation should be consistent with the environment surrounding the overcurrent protective device where due consideration is given to characteristics of DC systems, including the risks caused by the potential of explosion of the batteries, or hazards caused by gases and/or vapors.
Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

10-14 Log #413 NEC-P10 **Final Action: Reject**
(240.24(D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 10-39
Recommendation: Accept proposal as applied to (E); the designation of (D) was either a misprint or error on my part.
Substantiation: Dormitories in recreational camps, colleges, and penal institutions, without cooking facilities, do not meet the definition of dwelling unit, and are not presently included.
Panel Meeting Action: Reject
Panel Statement: The submitter has presented no substantiation that prohibiting the location of overcurrent devices in dormitories will resolve an issue.

Furthermore, "Dormitory" is not defined in this Code.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-15 Log #267 NEC-P10 **Final Action: Accept in Principle**
(240.24(F))

Submitter: Stanley J. Folz, Morse Electric, Inc.
Comment on Proposal No: 10-40
Recommendation: Text to remain as presented in the ROP.
Substantiation: The Panel action on this proposal should have been to Accept. I am in agreement with the negative comment presented by Mr. Dollard. In addition, the panel statement "refer to CMP 1 for comment and switches are permitted over steps", was unresponsive to the submitter. Switches are not electrical equipment and do not come under the rules of 110.26. 110.26 does a good job of outlining clearances required for electrical equipment except it does not address a panelboard on a stairway, i.e., there is no provision in 110.26 for a level work area. This is one of those common sense things. We all know it's wrong. Let's say it.
Panel Meeting Action: Accept in Principle

Revise the recommended text in Proposal 10-40 to read as follows:

"240.24(F) Not located over Steps. Overcurrent devices shall not be located over steps of a stairway."
Panel Statement: The panel accepts the concept that overcurrent devices should not be installed over the riser sections of stairways. However, many stairways have horizontal landings that could prove suitable for installations where appropriate working space exists. The prohibition of installations over steps of a stairway satisfies the intent of Proposal 10-40 and Comment 10-15.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-16 Log #1099 NEC-P10 **Final Action: Accept in Principle**
(240.24(F))

Submitter: James Dollard, IBEW Local 98
Comment on Proposal No: 10-40
Recommendation: This proposal should be Accepted.
Substantiation: The submitter has identified a serious problem. The negative comments as written to this proposal should be further considered by CMP-10. It is important to note that CMP-1 has rejected proposal 1-115 to 110.26(A)(3). This proposal suggested adding the following text: "Stairs or stair treads shall not be permitted as the grade, floor, or platform as referred to in this section." This proposal was rejected 11 to 1. The panel statement read as follows: "The proposed requirement is restrictive and unnecessary. Qualified persons routinely work from various surface areas and conditions that may be within the workspace. If necessary, the qualified person working on the equipment can create a flat and level workspace. Generally, the height measurement would be from the lowest grade, floor, or platform surface. CMP-1 concludes that the proposal does not contain a clear statement of the problem or substantiation for the change. See the Regulations Governing Committee Projects, sections 4.3.3(b) and (d). "
It is the opinion of CMP-1 that overcurrent devices may be installed in a stairway and that persons maintaining overcurrent devices can "create a flat and level workspace." I disagree.
There is no practical reason to permit, or allude to a perceived permission to allow overcurrent protective devices to be installed in stairways.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 10-15.
Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

10-17 Log #1320 NEC-P10 **Final Action: Reject**
(240.30(C) (New))

Submitter: Vincent J. Saporita, Cooper Bussmann
Comment on Proposal No: 10-41
Recommendation: The original proposal has merit and can be improved with a change or two. The panel should accept this proposal when modified as follows:

(C) Marking. Enclosures containing service or feeder circuit overcurrent protective devices shall be field marked with the amount of available short-circuit current.
Substantiation: This modification limits the requirements to enclosures for service and feeder overcurrent protective devices where there is a greater likelihood that there may be a violation of 110.9. In order to meet 110.9, the installer already has to know the available short-circuit current, so why not mark it on the enclosure. It will make the field inspector's job of enforcing 110.9 easier by allowing them to easily compare the marked available short-circuit current with the installed overcurrent device interrupting ratings. This marking will have no affect on the plan check process. That must continue as it has in the past.
Panel Meeting Action: Reject
Panel Statement: The comment has not substantiated that a safety issue is being resolved by requiring such a field marking. The accuracy of the marking after initial inspection and installation may become an issue where systems are changed, particularly in industrial settings. It is advisable to request accurate information on the available fault current before adding equipment, revising a system, or performing any work on the electrical system.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-107 Log #66 NEC-P01 **Final Action: Accept**
(240.35)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 10-43
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 1 for action in Article 110. This action will be considered by Code-Making Panel 1 as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to take action on Proposal 10-43 that was originally sent to CMP-10 as a public proposal. The Panel rejects the proposal for the reasons expressed in the panel Statement on Proposal 1-85 as published in the A2007 ROP. See panel action and statement on Comment 1-57. The panel concludes that proposal 10-43 expands the requirements even further than rejected proposal 1-85, as published in the A2007 ROP, in that it would affect all enclosures containing overcurrent devices.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

STAUFFER, H.: I support the panel action, but am concerned that the action recorded in the Report on Comments isn't clear. CMP-1 was obligated to accept the direction of the TCC to take action on Proposal 10-43. The panel's action was "accept", but the panel statement explains that CMP-1 rejected Proposal 10-43. I am voting to affirm the panel's action on Public Comment 1-107, and understand that by doing this I am voting to reject Proposal 10-43.

10-18 Log #1510 NEC-P10 **Final Action: Accept**
(240.40(A)(2))

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc.
Comment on Proposal No: 10-45
Recommendation: Technical Correlating Committee Task Group on the definition of "Neutral Conductor" concurs with the panel action on this proposal.
Substantiation: This comment was developed by the Technical Correlating Committee (TCC) Task Group (TG) on the definition of "Neutral Conductor." Task Group members were: Jeffrey Boksiner (Chair) (CMP 5, TCC), Paul Dobrowsky (CMP 5), Walter Skuggevig (CMP 5), Doug White (CMP 5), Michael Toman (CMP 2, TCC), Bob Wilkinson (CMP2), Jim Daly (CMP 6, CMP 7, TCC), Bill Laidler (CMP 6), and Oran Post (CMP 6). The TCC directed that the action on this proposal be sent to the TG for review and comment.
Panel Meeting Action: Accept
Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

10-19 Log #379 NEC-P10 **Final Action: Reject**
(240.83(C), FPN (New))

Submitter: Robert Zachariason, Minnesota State Community and Technical College
Comment on Proposal No: 10-49
Recommendation: This proposal should have been accepted.
Substantiation: I agree with the proposal as submitted and believe the proposal should have been accepted. Although the NEC is not a maintenance agreement, many short circuits happen during remodeling or the first time a breaker is turned on. Electricians are not aware that a circuit breaker may not operate properly after a fault. Fine print Notes are for information only, and this information is absolutely necessary.
Panel Meeting Action: Reject
Panel Statement: The Code deals with correct installation rules and does not address how to resolve errors made in the installation that may be recognized during the commissioning process. Errors could impact any component in the electrical system. The panel reaffirms its position as stated in its action on Proposal 10-49.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

10-20 Log #1100 NEC-P10 **Final Action: Accept**
(240.86)

Submitter: James Dollard, IBEW Local 98
Comment on Proposal No: 10-50
Recommendation: Continue to Reject.
Substantiation: As noted in the panel statement, no new information is provided by the submitter. The additional text provided by CMP-10 in their action to develop and accept panel proposal 10-50a, will help to clarify the requirement for the licensed professional engineer.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
KIMBLIN, C.: NEMA opposes the panel action for the reason expressed with Comment 10-21.
KOVACIK, J.: Allowing the determination of acceptable series combinations under engineering supervision is technically counter to the experience and expertise of the manufacturers of the affected downstream products (circuit breakers). It is important for the panel to keep the history of series ratings in mind. Years ago, systems were "engineered" to try to accomplish exactly what is being proposed. Manufacturers learned through field and laboratory experience that the "engineering" methods employed were flawed and could result in problems with the application of products in the field. Since learning of those issues, extensive testing programs under strict third party supervision have been developed to determine appropriate safe combinations of overcurrent devices. That testing program is the only accepted means available to the industry today. The panel is assuming that a "licensed professional engineer" can determine what is needed to engineer a safe system. Circuit breaker manufacturers have licensed engineers that are engaged every day in circuit breaker design and application and those engineers have not been able to establish an acceptable "engineering" method that can consistently and coherently be applied. If an acceptable safe method were available, circuit breaker manufacturers would use it to avoid expensive testing associated with establishing series ratings between circuit breaker combinations and fuse/circuit breaker combinations. The bottom line is that the code panel is allowing a code rule to exist that permits a product to be used in a manner that is directly counter to the instructions issued by the manufacturer and the listing of the product.
We believe that CMP 10 has stepped outside of its scope in allowing engineering supervision as a means of series combination selection to remain. We believe that this attempts to redefine the safety performance of a product in a manner that is above and beyond it's rating, directly counter to the product standard and counter to NEC 110.3(B).

10-21 Log #1417 NEC-P10 **Final Action: Reject**
(240.86)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 10-50
Recommendation: NEMA recommends that Proposal 10-50 be Accepted as written.
Substantiation: By adding text to require the passivity of the downstream circuit breaker, which is one very important component in a calculated series rating, the panel has obviously recognized the challenge of engineering a series rating due to dynamic impedance. However, it must be noted that passivity must not only be demonstrated at the interrupting rating of the downstream circuit breaker but also through the entire amperage range up to the maximum available short circuit current (the series rating). How can an engineer demonstrate such performance? The only method known today in the industry is through testing.
Application information published by a fuse manufacturer states; "An appropriate analysis method has yet to be found for circuit breakers that clear in less than 1/2 cycle. It is possible, but a practical analysis method based on present available circuit breaker data is not yet feasible." This guidance is misleading because clearing is not the issue but rather contact opening. The technical challenge is understanding when the downstream circuit breaker contacts will begin to open, thus introducing dynamic impedance, not when the fault will actually be cleared. Passivity implies that the contacts remain closed until the line-side device clears the fault. Where does an engineer obtain this information?
It is well known that the current flow through a set of contacts will be constricted to a very small area of the contact (Circuit Interruption Theory and Techniques, edited by Thomas E Browne, Jr., Marcel Dekker, 1984, page 582). The current flow near the surface of the contacts results in a repulsion force, known as constriction force, that will attempt to blow the contacts open. Unless the current path in the downstream circuit breaker is of a blow-on design, which the engineer would not likely know, at some current level the contacts will blow open. The question is, will this level be below or above the current limiting level of the upstream overcurrent device?
Circuit breaker manufacturers do not publish the levels at which the contacts of their devices blow open. It may not be possible to even ask the question as the manufacturer may no longer be in business, may not have this information for obsolete designs or may be unwilling to release it for current designs for various legitimate reasons. The only means to understand these values across the amperage range is to test the overcurrent device.
In tested series ratings, the UL 489 standard requires intermediate level testing to determine the level of short circuit current at which only downstream circuit breaker opens and the level at which both devices open. This is to insure that the combination will safely operate at all fault levels. Determining this is not possible to do in the field or by calculations.
In summary, it is not possible with the information available for an engineer to calculate a series rating. The only means to understand if an overcurrent device will remain passive is to understand its characteristics across the entire amperage range. The safety implication of permitting such a rating without any industry supported engineering method places people and property at risk.
Panel Meeting Action: Reject
Panel Statement: In past panel statements, the merits as well as the limits of engineering of series rated systems have been discussed. In no case did the panel infer, state, or suggest that all circuit breakers can be applied in an engineered series rated system.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
KIMBLIN, C.: NEMA agrees that the additional wording in 240.86(A) dealing with circuit breaker passivity is a necessary caution for the application of engineered series ratings. However, NEMA considers the example, Comment 10-23, of an attempted engineered series rating by the engineering community as demonstrating that a series rating cannot be engineered. In fact, the only reason that the safety of the system was preserved, in this case, was due to "tested combinations". Without testing the combination in the equipment, it would not have been recognized that the integrity of the system would have been placed in jeopardy. NEMA reaffirms its position that testing is the only method to ensure the integrity of a series rating within an electrical system.
KOVACIK, J.: See my explanation of negative vote on Comment 10-20.

10-22 Log #348 NEC-P10 **Final Action: Accept in Principle**
(240.86(A))

Submitter: Code-Making Panel 1,
Comment on Proposal No: 10-52
Recommendation: CMP-1 agrees that markings are required for Engineered Series Combination systems (240.86(A)). However, the specifics of the marking should appear in 110.22 that already contains marking requirements for Tested Combinations (240.86(B)). CMP-1 has accepted Proposal 1-98 that deals with these added requirements in 110.22. CMP-1 considers that Proposal 1-98 meets the intent of 10-52 relative to specific markings associated with 240.86(A), however, CMP-1 also believes specific revisions need to be made to accepted Proposal 1-98 and to the accepted text of Proposal 10-52. For 240.86, it is suggested that a fine print note be added to 240.86 as follows:
FPN: See 110.22 for marking requirements for Series Combination Systems.
For 110.22, CMP-1 will submit a comment on Proposal 1-98, Section 110.22, that will divide the section into an (A), (B), (C) paragraph style section titled "110.22 Identification of Disconnecting Means," with the following subtitles "(A) General"; "(B) Engineered Series Combination Systems," and "(C) Tested Series Combination Systems." This revision is intended to separate and clarify the three main requirements in 110.22. In addition, both FPNs are being proposed for revision as follows:
Under subsection (B) - "FPN: See 240.86(A) for requirements for Engineered

Series Combination Systems." and under subsection (C) - "FPN: See 240.86(B) for requirements for Tested Series Combination Systems."

Substantiation: This comment was developed by a Task Group of CMP-1 members to address actions taken by CMP-10 on Proposal 10-52, which was referred to CMP-1 by CMP-10. Members of the Task group included Louis Barrios, Jr.; Kenneth Boyce; Mark Christian; Neil LaBrake; Lanny McMahill; Gill Moniz; and John Minick. Identification requirements for disconnecting means have been identified with 110.22 since the 1965 NEC edition and marking requirements for series combination systems have been associated with 110.22 since the 1990 NEC when such requirements for series combination systems first appeared. CMP-1 and CMP-10 both received similar proposals for marking requirements for Engineered Series Combination Systems that first appeared in the 2005 NEC edition. It is CMP-1's opinion that marking requirements for Series Combination Systems should remain in 110.22 and that technical requirements and descriptions of Series Combination Systems should remain in 240.86. In addition, such marking requirements for Series Combination Systems should not be separated into completely different NEC articles, as would be the case for the 2008 NEC if Proposal 10-52 is accepted by CMP-10.

This comment was balloted through CMP-1 with the following final ballot results:

12 Eligible to Vote
11 Affirmative
1 Not Returned (L. Barrios, Jr.)

Mr. P. Hickman voted affirmatively stating: "We are in general agreement with the content of the proposal including dividing the section into (A), (B), and (C). However, we feel the use of the word "requirements" is in violation of 3.1.3 of the NEC Style Manual.

Panel Meeting Action: Accept in Principle

Revise the first fine print note to read as follows:

"FPN: See 110.22 for marking of Series Combination Systems."

In the fine print notes in 110.22(B) and (C), remove the words " for requirements".

Panel Statement: The wording has been revised to comply with the NEC Style Manual.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

10-23 Log #886 NEC-P10 **Final Action: Reject**
(240.86(A))

Submitter: Ed Larsen, Square D Company

Comment on Proposal No: 10-50

Recommendation: The Panel should accept Proposal 10-50 to delete 240.86(A).

Substantiation: The present language in 240.86(A) permits the engineering of series ratings that may leave the electrical system unprotected. The Panel has wrestled with this topic for a number of cycles with the supporting discussion at the Panel meeting indicating "it has been done for years and there is no issue, please show me an example of where an engineered system has failed." The false assumption behind this argument is that there is no "real world" data to back this position. There is no operational data on the engineered overcurrent device systems that would support that they operate appropriately when called upon to perform. However, there is now a "real world" example of the electrical industry working together in a failed attempt to engineer a series rating.

The following is a "real world" example of why series ratings cannot be engineered in the field. The only reason this unsafe engineered series rated system is not in use today is because the design was tested before it was installed.

In early 2005, a developer in Seattle planned to add a second apartment building adjacent to an existing building already owned by the developer. The service entrance in the existing building is a bolted pressure switch with 1400A Class L fuses feeding group metering. The tenant main circuit breakers in the NEMA 1 meter centers are 100A 2-pole circuit breakers rated 42kAIR and the branch circuit breakers in the residential tenant load centers are rated 10kAIR.

A licensed professional engineer engaged primarily in the design of electrical installations was hired to design the electrical system for the new building. Originally, it was planned to use a new transformer located in the fault in the existing building to feed both buildings. The existing transformer is a 75kVA 26.4kV/208V unit. The proposed new design would have replaced this transformer with three 167.5 kVA 265.4kV/208V units. Replacing the existing transformer would have increased the available SCA from 47kA to 93kA per Seattle City Light. The fuse manufacturer stated that there was not a UL listed 100/42kA series rating with the existing tenant main circuit breakers, thus the desire to engineer a series rating for the circuit breakers in the original building.

With the 1400A fuses in the bolted pressure switch, the fuse manufacturer stated that the "up-over-down" method indicated the tenant main circuit breakers would be adequately protected as the let-through current would be 34kA at a perspective available SCA of 93kA. A flow chart from a second consulting engineer suggested that if the circuit breakers were not of a "blow-open" design, then a series rating could be engineered using the up-over-down method. The technical literature published by another fuse manufacturer confirmed this. A check with the circuit breaker manufacturer indicated that these circuit breakers had a "conventional" current path construction, not a "blow-open" design.

A short circuit study indicated that any panels located 40 feet or more from the meter center would have 10kA or less available, thus they would be fully rated. The plan was to replace any panel located less than 40 feet from the meter center with 22 kAIR fully rated circuit breakers. There were no interrupting rating issues with the equipment feeding the retail spaces in the original building.

The AHJ approved the plan in writing, indicating that documentation stamped by a licensed professional engineer in the State of Washington would be required, anticipating adoption of the 2005 NEC in Washington later in the year.

At the suggestion of the consulting engineer, the property owner engaged the services of the second consulting engineer previously referenced to help evaluate the proposed engineered series rating. In order to confirm the validity of the rating, the fuse manufacturer was requested to conduct a test in their lab. The test was not witnessed by UL but did follow the UL 489 series rating test procedure.

In actuality, five individual tests were conducted. Tests #1 and 2 were conducted at 100 kA at 240V single phase with a 1400A Class L fuse of the same type installed in the original building upstream and a 100A 2-pole 42kAIR circuit breaker of the same type installed in the original building downstream. The circuit breaker cases ruptured during these tests. The observed let-through current in both tests was 25kA.

Since Tests #1 and 2 were run at 240V and the service is act ually 208V, a third test was conducted to see if the lower voltage would improve the results. Test #3 was conducted at 93kA at 208V single phase with a more current limiting 1400A Class L fuse upstream and a 100A 2-pole 42kAIR circuit breaker of the same type installed in the original building downstream, housed in a NEMA 3R enclosure. After the test the circuit breaker could not be reset and the enclosure cover was bent.

At this point, use of Class T fuses was considered, however, Class T fuses could not be installed in the existing bolted pressure switch and are not available above 1200A, thus this was not an available option.

A new short circuit study was conducted to take into account the impedance of the utility's conductors within their vault, indicating that there would be only 77 kSCA available at the bolted pressure switch. With this new information, Test #4 was conducted using the same fuse and circuit breaker as in Test #3, except at 80kA 208V. Once again the circuit breaker failed.

Finally, Test #5 was conducted at 80kA at 208V single phase with the same 1400A Class L fuse upstream as was used in Test #3-4, except a 100A 2-pole 65kAIR circuit breaker from a different manufacturer was used downstream. This circuit breaker also failed during the test.

Increasing the length of the service conductors by 140 feet by wrapping them around the vault was considered as this would have reduced the available SCA below 42kA but this approach was unacceptable to Seattle City Light. The final solution was to build a vault in the new building to house a transformer to feed just the new building.

In his final letter to the City of Seattle Department of Planning and Development, the engineer stated, "The conclusion I have reached is that relying on the "up-over-down" let-through curves to determine the available fault current to downstream devices is not reliable, and if this method is used, I strongly suggest that the combination be tested." The engineer considers it fortunate that the developer was willing to pay for the short circuit testing, even though it is not required by 240.86(A), otherwise a potentially hazardous condition would have been created.

The last question that remains is the passivity of the downstream circuit breaker. There is no literature or technical documentation that discusses or explains how to ensure a device is passive. These engineers did not understand that impact of the dynamic operating characteristics of the circuit breaker, and even if they did, where would they have obtained that information? And how is an engineer supposed to address the equipment impact, such as the failure point of the bus structure or the enclosure as demonstrated in this example? Safety is being compromised in 240.86(A).

In summary, a few key points are apparent with this new information:

1) Two consulting engineers and a fuse manufacturer were involved in attempting to engineer a series rating with the circuit breakers in an existing building in accordance with 240.86(A).

2) Technical literature from two fuse manufacturers supported the failed engineering method used for this series rating.

3) Five series rating tests were conducted in the fuse manufacturer's short circuit test laboratory in accordance with the UL 489 test procedure. All five tests failed.

4) It should also be noted that the equipment enclosure was damaged as well, which is entirely ignored in the NEC, and there is no technical method

to address the impact of the higher current levels on the equipment without testing.

5) The service design was revised to ensure that appropriate NEC compliant ratings existed without utilizing the failed engineered series rating method.

This experience confirms that series ratings are being engineered in the field that comply with the NEC but result in unacceptable electrical hazards. This is the only supporting data that has been presented to the panel indicating the practical (or impractical in this case) validity of an engineered series rating. The panel has never been presented data that supports that engineered series ratings safely protect electrical systems, only that they are in place in electrical systems and that documents exist supporting such practice. 240.86(A) must be deleted to preserve safe electrical installations.

Panel Meeting Action: Reject

Panel Statement: The submitter's example is a verification that the existing Code text is appropriate (see Proposal 10-50a). In past panel statements, the merits as well as the limits of engineering of series rated systems have been discussed. In no case did the panel infer, state, or suggest that all circuit breakers can be applied in an engineered series rated system.

The statement that the up-over-and-down method used to determine available fault current is incorrect. Both fuse and circuit breaker let-through curves are accurate for determining let-through currents for comparison with all protective devices that are passive during the operating time of the current-limiting device.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

KIMBLIN, C.: NEMA opposes the panel action for the reason expressed with Comment 10-21.

KOVACIK, J.: See my explanation of negative vote on Comment 10-20.

10-24 Log #1101 NEC-P10 **Final Action: Accept**
(240.86(A))

Submitter: James Dollard, IBEW Local 98

Comment on Proposal No: 10-54

Recommendation: Continue to Reject.

Substantiation: As noted in the panel statement to reject proposal 10-50, no new information is provided by the submitter. The additional text provided by CMP-10 in their action to develop and accept panel proposal 10-50a, will help to clarify the requirement for the licensed professional engineer.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

KIMBLIN, C.: NEMA opposes the panel action for the reason expressed with Comment 10-21.

KOVACIK, J.: See my explanation of negative vote on Comment 10-20.

10-25 Log #1659 NEC-P10 **Final Action: Reject**
(240.87)

Submitter: Paul A. Keleher, Paul Keleher Electrical Services

Comment on Proposal No: 10-55

Recommendation: The Submitter asks the CMP to Accept-in-Principle the following Recommended Committee Action Text in lieu of originally submitted text.

Attached as supporting documentation is Recommended Committee Action Text for the proposed revision to UL 489, and substantiation for changes to the text.

NEC Section/Paragraph: Article 240.2.) Add new definition to **240.2**

Defined Instantaneous Trip (DIT) Circuit Breaker. A circuit breaker that opens within 1 cycle of being subjected to an overcurrent equal to 11 times its rated current or greater.

Revise 240.87 as follows:

240.87 Circuit Breakers Installed in Dwelling Units. 120/240-volt circuit breakers rated 50 amperes or less installed in dwelling units to meet the requirements of 210.20 shall be of the DIT type.

Exception No. 1: Use of non-DIT type circuit breakers in compliance with 240.4 shall be permissible at the discretion of the AHJ on circuits serving loads with high inrush current or motor starting loads where a DIT breaker can be shown to nuisance trip.

Exception No. 2: Where 240.3 or 240.4(G) applies.

Add new marking requirement (F) to read as follows:

240.83(F) Circuit breakers installed in accordance with 240.87 shall be marked with the letters "DIT" in accordance with 240.83(A).

Substantiation: Explanation:

A new definition in 240.2 defines a threshold current level at which an overcurrent on a 120/240-volt branch circuit is recognized by the circuit breaker installed per 210.20 as a fault condition as opposed to an overload condition. The threshold current level is specified as that level of overcurrent equal to 11 times the current rating of the circuit breaker or greater for engagement of a response mechanism that will open the circuit within1-cycle. A circuit breaker that meets these response requirements shall be known as a DIT circuit breaker. Proposed revision text for UL 489 specifying the additional tests required in Section 7 accompanies this proposal as a substantiating document. A new article 240.87 will limit the installation requirements of DIT breakers to dwelling units, with exceptions for certain hi-inrush loads, specific conductor applications and where other overcurrent protection articles apply. A labeling requirement will permit easy identification and differentiation from non-DIT breakers after installation.

CMP-10 REJECTION STATEMENT:

"The panel understands that the submitter's intent is to limit the energy delivered from a fault condition "that is capable of causing ignition" to the greatest extent possible in order to mitigate the risk of fire. The "DIT" concept was presented to the NEC during the development of the 1996 NEC and it was determined that such protection and technology would not provide the level of protection necessary. This is recognized by the submitter's substantiation that protection would be "the greatest extent possible". At that time the panel also took into consideration the UL Fact Finding Report E878837. The Arc-Fault Interrupter technology was accepted as an answer to address the protection sought from the 1993 proposal and is a technology that will more comprehensively address the concern of the submitter."

4.) **Substantiation for 240.87**:

Evidence exists that the level of nuisance tripping occurrences in the residential environment with magnetic trip settings at 11 times rated current is acceptable since at least two of the 5 major product lines have maintained this level for many years. The exceptions allow for practical considerations of specific circumstances of installation already recognized by the Code to continue to be recognized, and for exception to be made for specific appliances with exceptionally high inrush current. It should be noted 240.87 is intended to include ALL 120/240 circuit breakers rated 50A or less installed in dwelling units are included in the requirement, including AFCI and GFCI circuit breakers.

4.) **Substantiation for 240.83(F)**:

This labeling requirement will permit easy recognition after installation of a standard circuit breaker that meets the DIT performance requirement from one that does not.

4.) **Substantiation for 240.2 New Definition:**

By adding 250.4(A)(5) to the NEC in 2005, CMP-2 makes it clear that rapid response to ground-fault conditions is so important that the purpose of an Equipment Grounding Conductor (EGC) and the necessity for a low-impedance pathway to assure rapid breaker response are explained right in the article, not in a Fine Print Note customarily used for explanatory material. The submitter understands that the intention of 250.4(A)(5) is to trigger an instantaneous trip in a circuit breaker in the event of a ground-fault.

All standard circuit breakers of the type installed in dwelling units contain dual modes of operation: an instantaneous trip (typically called its magnetic response) is intended to provide an instantaneous trip (per the definition of a circuit breaker in Article 100) to the relatively high overcurrent that may be caused by a circuit damage condition, such as a short-circuit or ground-fault, and a thermal mechanism that is expected to provide an inverse-time response (per the same definition) to the relatively lower overcurrent conditions created by excessive appliance loads. A breaker responds to an overcurrent in thermal mode until the level of overcurrent rises to a level known as its "magnetic pick-up setting", at which point the magnetic response of the circuit breaker is triggered, and the breaker trips instantaneously ending any delay in response created by the inverse-time function.

Section 7 of UL 489, to which standard circuit breakers are listed, requires no timed response tests to the levels of fault current typically available at outlets on 15 or 20 Amp/120-volt branch circuits, typically between 100 and 1000 amperes. The magnetic trip threshold setting in a standard circuit breaker is a fixed current value determined at the discretion of each breaker manufacturer that determines how much fault current is required to trigger the magnetic response of the breaker. According to manufacturer's currently published trip curves, which are illustrated in a chart accompanying this comment, the magnetic trip in Product B in the chart will trigger with a minimum threshold current of 120 amps of fault current, while Product E may require 600 amps to trigger a magnetic response.

Despite an EGC installed in full compliance with Article 250, the intent of 250.4(A)(5) will not be met at any outlet where the available fault current is less than the threshold current setting required to trigger the magnetic trip of the circuit breaker protecting the outlet. All such outlets will never be protected by an instantaneous response; protection will be thermal (inverse-time) only. Depending on the fault current available at the outlet, an inverse-time response may take several seconds. Test data recently gathered from short-circuit tests conducted at 120-volt receptacle outlets in residences indicate several relevant characteristics:

·Just within the 1000 test sample, thermal (inverse-time) responses ranged as high as 3 seconds in response to a short-circuit current of 120 amperes. It must be noted here that if an uncontrolled short-circuit or ground-fault of 120 amperes is permitted 3 seconds to either heat up or arc, fire can ignite.

·The available fault current at 75% of the outlets tested is less than 300 Amps, which is insufficient to trigger the magnetic response in 1 manufacturer's 15 amp breakers according to current manufacturers' time/current curves.

·v% of all outlets tested were protected by a thermal-only breaker response

because the magnetic (instantaneous trip) function was ineffective in response to a short-circuit at the outlet tested.

For the intention of 250.4(A)(5) to be met consistently, both a low-impedance ground path and a predictable circuit breaker response to fault current are required. In the submitter's view, a thermal response by a circuit breaker to a ground-fault condition constitutes failure of an installation to fulfill the intent of 250.4(A)(5).

Such failures impact all users of the NEC who rely on the circuit breakers they install to protect installations from liabilities that may result from accidental ground-fault occurrences. CMP-10 must address this lack of coordination between product and installation requirements to ensure that the intention of 250.4(A)(5) is met. This proposal achieves that goal for the majority of outlets (65% in the test sample) by standardizing the magnetic response threshold current setting at 11-times handle-rating.

Presently, 4 of 5 major product lines are at or close to the proposed threshold requirement; one intent of this proposal is to ensure the user community that all circuit breakers installed in dwellings provide equivalent magnetic pick-up settings in response to branch circuit level overcurrent, and that these responses cannot be elevated above the proposed minimum requirement at some time in the future.

For outlets whose available fault current is below the threshold proposed, this submitter plans a follow-up proposal in the 2011 NEC revision cycle to limit impedance at the furthest outlet on a circuit to assure sufficient available fault to trigger a standardized instantaneous trip and meet the intent of 250.4(A)(5) at all installed outlets.

In its rejection, the CMP stated, "The panel understands that the submitter's intent is to limit the energy delivered from a fault condition … to mitigate the risk of fire." The CMP underestimates the submitter's intent, which is not only to reduce the risk of fire, but to reduce other risks inherent with fault level overcurrent as well such as (1) reduce damage to wire, circuit and equipment components and appliances that may be subjected to unnecessarily prolonged fault current from a thermal breaker response, (2) reduce risk of electrocution or exposure to arcing fault current that may be exposed to the exterior of an outlet or appliance, and (3) to assure that the intent of other NEC articles requiring rapid response to fault current from an OCPD are met, as discussed above. Indeed, given its mandate to maximize the safety of installations, the submitter challenges the CMP to provide any rationale whatsoever for permitting fault-level overcurrent to remain in any circuit longer than necessary.

The Panel also stated, "The 'DIT 'concept was presented to the NEC during the development of the 1996 NEC and it was determined that such protection and technology would not provide the level of protection necessary. This is recognized by the submitter's substantiation that protection would be 'the greatest extent possible.'…The Arc-Fault Interrupter technology was accepted as an answer to address the protection sought from the 1993 proposal." These statements make it clear that the CMP is confusing the purpose of overcurrent protection with that of circuit fault detection and monitoring technologies (such as AFCI and GFCI). The former is to mitigate the known hazards associated with fault-level overcurrent by all practical and effective means, while the latter is specifically designed to prevent fire, unrelated to current level. It is not appropriate to consider AFCI as "preferable" to DIT breaker response because they each address different hazards. The CMP is comparing apples to oranges. Proposal 10-55 should be seen as complementary to AFCI protection not as an alternative to it. The submitter respectfully cannot accept the Panel's statement that AFCI "is a technology that will more comprehensively address the concern of the submitter."

The submitter believes the reason why the CMP has determined that standardizing magnetic pick-up response thresholds "would not provide the level of protection necessary", is because an arc can develop sufficient resistance to cause the current level of a parallel arcing fault to fall below any acceptable magnetic response setting, causing a DIT circuit breaker to clear an arcing fault in thermal mode, and therefore to be ineffective in preventing fire. What limited fire research there is does indicate that non-arcing faults (called "glowing" connections) can ignite nearby combustibles before producing an arc. Unless and until an aggravated fault degenerates into a sustained and unrecognized arcing condition before it causes adjacent combustibles to begin smoldering, a listed AFCI responds exactly as a standard circuit breaker. It may be that in some cases ignition from a fault condition that does not arc, but may produce sufficient heat to ignite a fire if a thermal breaker response allows fault current to linger, could be averted by a magnetic breaker response clearing the fault current before heat has time to build up or degenerate into an arc.

Finally, the submitter asks the CMP, how it can continue to assert that a technology (AFCI) that is inherently incapable of detecting hazardous fault conditions that do not produce an arc, and 8 years after introduction still does not deliver the protection originally promised, "provide the level of protection necessary" and "address the concern of the submitter"?

Given all of the above arguments, the submitter respectfully requests the CMP to consider an ACCEPT-IN-PRINCIPLE vote to proposal 10-55 as a practical and inexpensive measure to satisfy other requirements of the Code, and improve overcurrent protection, in addition to pursuing the potential benefit of circuit monitoring technologies. It is a no-cost proposal that will improve branch circuit fault protection, which may save lives and improve safety.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The panel statement on Proposal 10-55 that appears in the ROP remains appropriate. Further, the requirements for North American circuit breakers appear in Safety Standard UL 489, "Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures". It is noted that, at the March 16, 2006, meeting of the UL 489 STP (Standards Technical Panel), the commenter made a presentation relative to a possible new supplement for UL 489 dealing with molded-case circuit breakers having specified instantaneous trip levels. Any change to circuit breaker test requirements could continue to be addressed to the UL 489 STP.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

10-26 Log #67 NEC-P10 **Final Action: Accept**

(240.91)

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 10-56

Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal with respect to introducing a single subsection. This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the direction of the Technical Correlating Committee.

Panel Statement: The request of the Technical Correlating Committee has been addressed by the action taken on Comment 10-27.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

10-27 Log #260 NEC-P10 **Final Action: Accept**

(240.91)

Submitter: Carl J. Fredericks, The Dow Chemical Company

Comment on Proposal No: 10-56

Recommendation: Continue to accept, but revise the wording as follows:

240.91 Protection of Conductors. Conductors shall be protected in accordance with 240.91(A) or (B).

(A) General. Conductors shall be protected in accordance with 240.4.

(B) Devices Rated over 800 Amperes. Where the overcurrent device is rated over 800 amperes, the ampacity of the conductors it protects shall be equal to or greater than 95% of the rating of the overcurrent device defined in 240.6, where the conductor is protected within recognized time vs. current limits for all short circuit currents of up to 1000 seconds duration.

Substantiation: This is a proposed editorial change, refelecting better code text that was developed to improve the clarity.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 9 Negative: 3

Explanation of Negative:

KIMBLIN, C.: NEMA opposes the panel action for the reason expressed with Comment 10-29.

KOVACIK, J.: See my explanation of negative vote on Comment 10-29.

SOBEL, R.: I would reject the Proposal 10-56 thus this editorial change would not be needed. See substantiation on Comments 10-29 and 10-30.

10-28 Log #959 NEC-P10 **Final Action: Accept in Principle**

(240.91)

Submitter: Mark C. Ode, Underwriters Laboratories Inc.

Comment on Proposal No: 10-56

Recommendation: Delete the phrase "unless otherwise permitted in 240.91(A)" at the end of the first sentence and turn (A) into an exception as follows:

240.91 Protection of Conductors. Conductors shall be protected in accordance with 240.4.~~, unless otherwise permitted in 240.91(A).~~

~~(A) Devices Rated over 800 Amperes.~~

Exception: Where the overcurrent device is rated over 800 amperes, the ampacity of the conductors it protects shall be equal to greater than 95% of the rating of the overcurrent device defined in 240.6, where the conductor is protected within recognized time vs. current limits for short circuit currents of up to 1000 seconds duration.

Substantiation: NEC Style Manual does not permit a (A) with a single subsection so the phrase "unless otherwise permitted in 240.91(A)" has been

deleted and the text in (A) has been turned into an exception. There is some text that is better as an exception.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 10-27.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
KIMBLIN, C.: NEMA opposes the panel action for the reason expressed with Comment 10-29.
KOVACIK, J.: See my explanation of negative vote on Comment 10-29.
SOBEL, R.: I would Reject Proposal 10-56, thus this editorial change would not be needed. Se my substantiation on Comments 10-29 and 10-30.

10-29 Log #1418 NEC-P10 **Final Action: Reject**
(240.91)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 10-56
Recommendation: The Proposal should be Rejected.
Substantiation: The proposal substantiation states that conductors in Supervised Industrial Installations are protected against overload by load calculation and by monitoring, and against short circuit by selection of the overcurrent device as part of an overcurrent coordination study. Presumably this statement refers to Transformer Secondary Conductors of Separately Derived Systems [240.92(B)] where short-circuit and ground-fault protection can be calculated [240.92(C)] and where overload protection can also be calculated [240.92(C)]. The proposal, however, deals with general overcurrent protection in Supervised Industrial Installations, and here conductors are protected under the rules of Article 240.4 rather than by calculation. The proposed change is the relaxation of a safety rule that has been in place for over 40 years and NEMA does not accept the substantiation statement that (1) conductors in Supervised Industrial Installations are (always) protected against overload by load calculation and monitoring and that (2) the factors associated with Supervised Industrial Installations make overload protection by the overcurrent device selection less critical. No testing has been performed to show that a 95 percent ampacity rule permits the safe application of lower ampacity conductors for all currents above 800A. Here it is noted that loading a conductor to 5 percent above rated conductor ampacity will increase the heating load by 10 percent. But, products such as circuit breakers and switches are evaluated with conductors of the correct ampacity. One reason is to determine acceptable temperature rises at device terminals. However, the substantiation does not address the product impact of these additional heating effects due to smaller conductors. No substantiation has been provided to demonstrate integrity of the conductors during normal operation or when the overcurrent device is called upon to operate. In addition, no substantiation has been presented to demonstrate that the integrity of the terminals (circuit breakers, fused switches, etc.) will be retained for the proposed reduction in conductor area. Since manufacturers themselves are unable to supply thermal and mechanical data without specific tests, it is difficult to understand how engineers in supervised industrial installations will be able to make these assessments.
This proposal removes numerous safety principles that ensure the safe performance of overcurrent device, conductors and equipment during overload. These reservations are also reflected in the negative comment of John Kovacik of UL, who states that, at the very least, a study should be conducted to demonstrate that conductors and equipment would not sustain damage from the currents permitted by this proposal. Finally it is noted that a similar Proposal, 10-9, dealt with a relaxation of ampacity requirements to 1600A. That proposal was rejected, and the panel statement reflects the panels' reservations. The safety concerns expressed in that 10-9 panel statement are not resolved by permitting relaxed ampacity protection requirements in Supervised Industrial Installations.
Panel Meeting Action: Reject
Panel Statement: As commented in the substantiation for Proposal 10-56, it is a common practice in supervised industrial installations to monitor conductors for overload and/or to design such that conductors cannot be overloaded in normal conditions. Where conductors are monitored for overload, action of the overcurrent device is not needed to protect the conductors against overheating by an overload condition. This principle is already recognized in 240.12 of the general Code text.
The commenter also did not acknowledge that higher percentage overloads without monitoring are permitted below 800 amps for general installations by existing Code text.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
KIMBLIN, C.: The panel statement reads that it is common practice, in supervised industrial installations, to monitor conductors for overload and/or to design such that conductors cannot be overloaded in normal conditions. But common practice is different from stating that all conductors in supervised industrial installations are monitored or protected in this manner. The code wording in 240.92 is intended to cover all Supervised Industrial Installations. However, the words "common practice" acknowledge that, in many cases, the additional monitoring and/or design will not be present. In those cases, the conductors will not be fully protected against overload. Proposal 10-56 should be rejected because it will permit conductor protection above their ampacity for all currents above 800A. This will also impact the performance of electrical equipment negatively. Thus, the panel continues to take a position that equipment can be used outside the permitted listing safety standard requirements of the equipment. But there is no method to determine the safe use of electrical equipment outside the listing parameters. Only the manufacturer understands the performance of the components within the equipment such as the fuse clip, blade hinge, lubricant, terminals, and plating. The interaction of multiple overcurrent devices within equipment further complicates any attempt to reduce the conductor size and not impact adjacent components. Consider a fusible switchboard with not only devices over 800A, but also those 800A and below. The increase in heat from smaller conductors will not only increase the heat on devices over 800A, but the additional heat will also impact the integrity of neighboring devices 800A or less.
It is foreseeable that a revision to the UL Product Standards to reduce conductor sizes during testing will drive either a derating of present product designs (1200A fuse switch possibly becoming a 1000A switch) or a redesign of products could drive a larger footprint with more copper within the equipment to compensate for the thermal impact of this change. Any short-term savings in wire size will likely be offset by an increase in equipment size and costs in the near future, not only for supervised installations but for all electrical installations.
There has been no substantiation presented that this has or can be accomplished in a safe manner. This change, presumably based on theory, is likely to impact the entire industry by increasing the cost of equipment and by possibly driving larger equipment. These could increase the size of the equipment rooms or reduce working space to NEC minimums.
Lastly, the panel did not address the questions and technical concerns presented in Comment 10-30. Failure to address these concerns places the manufacturer in the unfortunate position of having an NEC requirement that is in direct conflict with NEC 110.3(B).
KOVACIK, J.: The issue here is virtually identical to that raised in Proposal 10-9, which the Panel rejected. Specifically, quoting from the Panel Statement on Proposal 10-9, "It is noted that the amount of heat generated in a conductor increases as the square of the current through that conductor, and the characteristics of overcurrent devices are such that overloads are tolerated for significant periods of time before the device operates. At the very least, a study should be conducted to demonstrate that the conductors and equipment would not sustain damage from carrying the current permitted by this proposal.
SOBEL, R.: I agree with the submitter's substantiation and believe Proposal 10-56 should be a reject. Furthermore, the devices are not tested and listed with smaller conductors. See the substantiation for Comment 10-30.

10-30 Log #2335 NEC-P10 **Final Action: Reject**
(240.91)

Submitter: Alan Manche, Square D Company
Comment on Proposal No: 10-56
Recommendation: Reject this Proposal.
Substantiation: The panel has been consistent in their position and their statement with regard to this proposed text as repeated below:
"There has been no further substantiation presented in this proposal to address the concerns and issues raised by the panel in previous NEC development cycles. There are no specially listed devices that satisfy the proposed 240.4(C)(4), and the impact on the equipment in which these devices are to be used has not been considered."
"A study should be conducted to demonstrate that the conductors and equipment would not sustain damage from carrying the current permitted by this proposal. For example, the proposer could approach UL through their open Standards Technical Panel process to address the listing requirements."
The panel provided no statement that would support an understanding of how a Supervised Engineering Installation can resolve the issue raised. The panel has also been focused on a single overcurrent device, and has not considered how does this impact adjacent overcurrent devices, the equipment which not only includes the lugs but the insulating materials, impact on the switch blades in a fused switch to perform at elevated temperatures adjacent to other overcurrent device wired in a similar matter. What is the impact in an MCC, Switchboard, panelboard, or even a busway plug-in unit? As a registered Professional Engineer and formerly being an electrical facilities engineer for a large automotive facility, based on my experience in this environment I do not understand why Panel 10 would support product being utilized outside it's listing parameters. The product is no longer listed for this purpose and the safety mark and other ratings on the product are being used outside the ratings and markings. Is it the intent of Code Panel 10 to permit the use products outside the parameters of their listing? Does the panel truly believe an engineer has all of the knowledge to substitute for the performance evaluation that

is conducted by a staff of design engineers from the manufacturer and UL engineers? Reject this proposal.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 10-29.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
KIMBLIN, C.: NEMA opposes the panel action for the reason expressed with Comment 10-29.
KOVACIK, J.: See negative ballot and substantiation on Comment 10-29.
SOBEL, R.: I agree with the submitter's substantiation.

10-31 Log #941 NEC-P10 **Final Action: Reject**
(240.92(B))

Submitter: Robert G. Fahey, City of Evansville
Comment on Proposal No: 10-21
Recommendation: Revise text to read as follows:
(B) Feeder Taps. For feeder taps specified in 240.21(B)(2), (B)(3), and (B)(4), the tap conductors shall be permitted to be sized in accordance with Table 240.92(B) when the calculation is performed by a licensed professional engineer engaged primarily in the design or maintenance of electrical installations. The selection shall be documented and stamped by the professional engineer. This documentation shall be available to those authorized to design, install, inspect, maintain, and operate the system.
Substantiation: The new calculation which the CMP approved should only be allowed when the calculations are performed by an engineer who is familiar with the electrical installation at the supervised industrial location. With the additional language, it will clearly require an engineer to perform the calculation and with this requirement, it will help the electrical inspector be assured the wire is, in fact, protected properly. The additional wording is taken from 240.86(A) for series rated systems. My other concern is that this installation will continue to be safe after the initial installation, will other types of overcurrent devices be installed in the future which will change the characteristics of the circuit, thus having a negative impact on the tap conductor.
Panel Meeting Action: Reject
Panel Statement: The determinations needed to correctly apply this rule are well within the capabilities already required for a supervised industrial installation in 240.2, which requires conditions of engineering supervision among other qualifications.
The calculations referenced are simple and are performed daily by engineers and engineering designers.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
KIMBLIN, C.: NEMA votes affirmatively on the panel action but disagrees with the panel statement. See NEMA reason for its negative vote with Comment 10-32.

10-32 Log #1419 NEC-P10 **Final Action: Reject**
(240.92(B) (New))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 10-21
Recommendation: The Proposal should be Rejected.
Substantiation: These proposed changes to the tap rules, even for supervised industrial installations, can reduce electrical safety. NEMA also disagrees with the panel statement that these relaxed rules increase the enforceability of the tap rules. There is no "trigger" to indicate when the replacement of an overcurrent device may be placing not only the conductor protection at risk, but also the facility and the electrical maintenance personnel working around these "protected" conductors. Industry currently assumes that you can replace an overcurrent device with a comparable rated overcurrent device and the conductors will continue to be protected. In order to assure electrical safety, industry must now assume that all conductor sizes are being based on temperature calculations before replacing overcurrent devices.
The submitter indicates the value of this proposal is in providing a "significant cost savings for electrical distribution systems, allowing North American manufacturers to be more competitive in the global marketplace." The submitter only considers the initial installation and not the electrical safety and down time over the life of the system which has significant implications. All overcurrent device replacements must now be confirmed against ALL load side conductor sizes to understand if a tap conductor calculation has been applied during the initial installation before replacement and energizing can take place.
These proposed tap rules require an in-depth knowledge of the overcurrent device characteristics. Once again, this information is required not only during initial system installation, but throughout the maintenance life of the system to ensure either an identical overcurrent device replacement or reengineering of the system and possible replacement of the conductors to ensure appropriate protection is maintained.
The action of the panel to reject the inclusion of this proposal as part of the general tap rules in 240.21 indicates a safety issue does exist, however, the panel does not explain what safety issues are resolved by restricting to a supervised industrial location. How does the panel action enhance enforceability? It simply removes the need for enforcement from many electrical installations.
What enforceability exists to recheck the tap conductors when the available fault current changes serving the facility? An increase in the available fault current by a utility may be well within the maximum short circuit current rating of the service equipment, however, the tap conductor protection may have been calculated based on the previous available fault current. Is a utility notification process necessary to ensure electrical safety when these calculations are utilized within a facility?
The submitter further claims these rules are used around the world. There has been no substantiation presented, even with the claim of other world market acceptance, which support the work practices that would be necessary to ensure the safety of this installation over the life of the facility. Making this change requires careful consideration as this change will impact work practices and the safety of facilities and personnel.
Panel Meeting Action: Reject
Panel Statement: The determinations needed to correctly apply this rule are well within the capabilities required for a supervised industrial installation, which requires conditions of engineering supervision among other qualifications.
The calculations referenced are simple and are performed daily by engineers and engineering designers and do not require any detailed knowledge of overcurrent device characteristics, only standard curves and data that are available on every manufacturer's website.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
KIMBLIN, C.: Overcurrent protection rules in the NEC need to be uniformly applied across all applications and for the life of the facility. This revision for industrial supervised installations creates a significant anomaly to that uniformity. the expectation that the system is controlled enough to be able to have such exacting requirements for tap-conductor protection is a flawed expectation. the calculations would have to be performed not only during initial installation, but also for subsequent system upgrades due to higher available fault currents from the utility. In particular, the characteristics of the overcurrent protective device have to be taken into account, both during initial installation and during possible subsequent replacement.
Further, it is unclear whether the tap conductor sizing calculation would be based on the calculated available fault current or on the fault current rating of the overcurrent protective device. If the sizing calculation were based on the actual available fault current level, then available fault current changes due to fluctuations in utility parameters may establish unprotected conductors in the facility's electrical system. it would be necessary for the utility to notify the facility of such parameter changes. However, based on the present challenges in establishing the appropriate values for performing calculations for use in determining the level of PPE for NFPA 70E, utilities are not presently in a position to provide actual values of available fault current.
The present tap rules have served well in a large variety of installations and they are consistent with the engineering and long-term maintenance approaches taken in installations including supervised industrial installations. It is noted that a similar proposal (11-45) for determining the characteristics of tap conductors under engineering supervision was rejected by CMP-11 at the proposal stage with a reaffirming position in the comment stage on Comment 11-15.
KOVACIK, J.: No technical substantiation has been provided to support the proposed relaxation of the rules for determining the ampacity of tap conductors. Restricting this relaxation to supervised installations does not insure that all safety issues associated with conductors carrying currents higher than normally allowed will be resolved. The proposed formulas seem complex and onerous, and are better suited for a design manual than the NEC.

10-33 Log #1850 NEC-P10 **Final Action: Reject**
(240.92(E) (New))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 10-33
Recommendation: Accept proposal 10-33 in part in principle, by adding new section 240.92(E) as follows:
(E) Battery Conductors. Each set of battery conductors feeding separate loads shall be permitted to be connected to storage batteries, without overcurrent protection at the battery, as specified in 240.92 (E)(1) or 240.92(E)(2).
(1) Battery Conductors. Conductors from battery terminals shall be permitted to be protected from overload where the following conditions are met:
(1) The battery conductors are protected from physical damage by being enclosed in an approved raceway or by other approved means from the battery terminals to the overcurrent device. The positive and negative conductors may be enclosed in separate non-magnetic raceways.
(2) The ampacity of the battery conductors is not less than the design load

and is also not less than the 60-minute rated discharge current of the storage batteries.

(3) Where multiple overcurrent devices are used, all overcurrent devices are grouped, and the number of overcurrent devices does not exceed six circuit breakers or six sets of fuses

(4) The sum of the ratings of the overcurrent devices does not exceed the ampacity of the battery conductors.

(2) Battery Conductors From Chargers. Conductors from the battery charger to the batteries shall be protected from physical damage by being enclosed in an approved raceway or by other approved means. The conductors shall be protected by an overcurrent device rated not more than the ampacity of the conductors. The overcurrent device may be an integral part of the battery charger.

FPN: In some instances, the conductors from the batteries to the overcurrent device are the same conductors as those connected to the charger.

Substantiation: ACC agrees with Mr. Fredericks' explanation of negative vote on proposal 10-33. The panel action was inconsistent in that it asserts the basic rule of 240.21 should apply to battery conductors, while at the same time acknowledging that allowing 25 feet to the first overcurrent device might not be enough for some larger installations.

A companion comment addresses this issue for general installations, while this comment proposes new text for Supervised Industrial Installations in 240.92. This proposed text is in accordance with the text provided with Mr. Fredericks' explanation of negative vote.

Panel Meeting Action: Reject

Panel Statement: The panel rejects the comment to allow battery conductors of unlimited lengths without overcurrent protection.

For the location of storage battery conductor overcurrent protection, see the panel action and statement on Comment 10-13.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

10-34 Log #2326 NEC-P10 **Final Action: Reject**
(240.92(V))

Submitter: Jim Pauley, Square D Company

Comment on Proposal No: 10-21

Recommendation: Reject the Proposal.

Substantiation: This proposal will reduce electrical safety. Overcurrent protection rules in the NEC need to be uniformly applied across application. This revision creates a significant anomaly to that uniformity. The expectation that the system is controlled enough to be able to have such exacting requirements for conductor protection is a flawed expectation.

The current tap rules have served well in a large variety of installations and they are consistent with the engineering and maintenance approaches taken in all installations including large industrial.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 10-32.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

KIMBLIN, C.: NEMA opposes the panel action for the reason expressed with Comment 10-32.

KOVACIK, J.: See my explanation of negative vote on Comment 10-32.

ARTICLE 250 — GROUNDING

5-23 Log #31 NEC-P05 **Final Action: Accept**
(250)

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 5-48

Recommendation: The Technical Correlating Committee notes that in the proposal the text for 250.96(A) is incorrect in that it does not reflect the existing code text. The Technical Correlating Committee understands that the word "effectively" is to be deleted in 250.96(A). The Technical Correlating Committee directs that the panel reconsider the proposal and verify the action in 250.96(A). This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the Technical Correlating Committee to review its action. See panel action on Comment 5-128.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-24 Log #1229 NEC-P05 **Final Action: Accept**
(250)

Submitter: Neil F. LaBrake, Jr., Syracuse, NY

Comment on Proposal No: 5-76

Recommendation: Continue to accept the TCC Grounding and Bonding Task Group proposal 5-76 as modified by the actions of CMP-5. Please see Proposal 5-76 for affected sections.

Substantiation: The Technical Correlating Committee Task Group on Grounding and Bonding agrees with the action of CMP-5 on Proposal 5-76. It is understood that the revisions in the proposal that were accepted in principle have generated new CMP-5 proposals for each section independent of this proposal and action. The CMP-5 revisions to this proposal and the CMP-5 proposals 5-75a, 5-121a, 5-125a, 5-213a, 5-217a and 5-224a have been made for clarity and continue to be consistent with the TCC Grounding and Bonding Task Group's original initiatives.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-25 Log #1232 NEC-P05 **Final Action: Accept**
(250)

Submitter: Neil F. LaBrake, Jr., Syracuse, NY

Comment on Proposal No: 5-77

Recommendation: Continue to accept the TCC Grounding and Bonding Task Group proposal 5-77 as modified by the actions of CMP-5. Please see Proposal 5-77 for affected sections.

Substantiation: The Technical Correlating Committee Task Group on Grounding and Bonding agrees with the action of CMP-5 on Proposal 5-77. It is understood that the revisions in the proposal that were accepted in principle have generated new CMP-5 proposals for each section independent of this proposal and action. The CMP-5 revisions to this proposal and the CMP-5 proposals 5-77a, 5-102a, 5-247a, 5-252a, 5-252b, 5-253a, 5-294a, 5-301a, 5-313a, 5-329a have all been made for clarity and continue to be consistent with the TCC Grounding and Bonding Task Group's original initiatives.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-26 Log #1519 NEC-P05 **Final Action: Accept**
(250)

Submitter: James Daly, Upper Saddle River, NJ

Comment on Proposal No: 5-76

Recommendation: The Panel Action to Accept in Principle is correct, however, the Panel Action shows 250.32(B)(3) as Accept and that section does not exist. The reference should have been to 250.32(B)(2)(3).

Substantiation: 250.32(B)(3) does not exist in the 2005 Code, the 2008 Preprint, Proposal 5-121a, nor Proposal 5-119.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-27 Log #801 NEC-P05 **Final Action: Hold**
(250.2)

TCC Action: The Technical Correlating Committee notes that the panel statement is incomplete and not fully responsive to the technical content of the comment as noted in the comment on vote and directs that Proposal 5-57 and this comment be reported as "Hold" in accordance with 3.4.2 of the NFPA Regulations Governing Committee Projects. The Technical Correlating Committee notes that the revised definition will create correlation issues with the use of the term "ground fault" in other parts of the Code such as 230.95, the requirement for ground fault protection of equipment.

The Technical Correlating Committee also directs that Proposal 5-58 be reported as "Hold" because the Fine Print Note is related to the definition in Proposal 5-57 and Comment 5-27.

Submitter: Timothy M. Croushore, Allegheny Power / Rep. Edison Electric Institute-Electric Light & Power Group
Comment on Proposal No: 5-57
Recommendation: Accept in Principle the proposal. Change the definition to read as follows:

Ground Fault. An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the grounded conductor or normally non-current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment or earth.

Substantiation: In the National Electrical Code, calling the connection between the normally, current-carrying, grounded, unbalanced current return path and the not-normally, current-carrying, equipment grounding conductor path will cause confusion in the industry and a conflict within the National Electrical Code as it discusses prescriptive requirements for ground-fault protection in 230.95, 215.10, 240.13, 517.17 and Part IV and Part V of Article 430. This definition will also cause conflict and confusion between the National Electrical Code and the Codes and Standards of the Institute of Electrical and Electronic Engineers (IEEE). One such standard is ANSI/IEEE Std 242 – 2001, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems termed the "Buff Book". This reference sets the current standard for fault current calculation and system protection and the proper selection, application, and coordination of components that may be required to protect industrial and commercial power systems against abnormalities that could reasonably be expected to occur in the course of electrical system operation.

Other IEEE Standards such as the ANSI/IEEE Std 141-1993, IEEE Recommended Practice for Electric Power Distribution for Industrial Plants and the ANSI/IEEE Std 241-1990, IEEE Recommended Practice for Electric Power Systems in Commercial Buildings both reference appropriate editions of ANSI/IEEE Std 242 for fault current calculations. Also, the Bussman, Electrical Protection Handbook discusses and uses the methodologies developed in ANSI/IEEE Std 242 to discuss and recommend overcurrent protection as well as protection from ground faults in accordance with the requirements of the National Electrical Code.

The principle issue in Proposal 5-57 is the use of the phrase "a normally current carrying conductor" in the definition developed by CMP-5 in the Recommendation portion of the comment.

Many times "a normally current carrying conductor" is an ungrounded conductor (typically referred as a line conductor or a phase conductor). However, a grounded conductor or a neutral conductor is also "a normally current carrying conductor". Connection of a grounded conductor or a neutral conductor of an electric circuit and the normally non-current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment or earth is not a ground fault. Rather the term for this connection is not currently defined in any standard. Defining a grounded conductor or neutral conductor connection to the ground or non-current carrying grounded metal members goes against the history of the term as it is used in calculating the magnitude and phase angle of unbalanced currents during accidental connection of single-line to ground short-circuits or double-line to ground short-circuits.

The history of the term "ground fault" and ground fault current calculations dates back to 1926 when A. P. Mackerras used a mathematical method previously developed by Dr. C. L. Fortescue (later called Symmetrical Components) to establish and publish his work on the determination of single-phase short-circuits on three-phase systems. Unbalanced (unsymmetrical) currents during a single-phase, line-to-ground, short-circuit (termed ground fault) in a three-phase system using the mathematical method could be broken down into three, symmetrical currents to ease the complex circuit calculations. These three symmetrical models of the unsymmetrical current, voltage or impedance are the positive-sequence component, the negative-sequence component and the zero-sequence component.

In order to use the theory of symmetrical components on three-phase systems (that is now widely accepted as a standard practice) with Ohms law for AC systems,

$$\left(I = \frac{E}{Z} \right)$$

voltages (E) and circuit impedances (Z) are broken down into their respective symmetrical sequence components.

Calculations are made at the symmetrical sequence component level and re-constructed back to the unsymmetrical level for an answer to determine the magnitude and phase angle of current. Single-phase systems are much simpler to calculate a shorted phase to ground or shorted phase to neutral current.

In a three-phase wiring system, both the positive-sequence component and the negative-sequence component impedance are based on the resistance (wire resistance) and reactance (geometry) of the individual phase or line conductors. The zero-sequence component impedance is based on the resistance and reactance of the common return path. This work pre-dates the work of Eustace C. Soares and the equipment-grounding conductor philosophy currently found in the National Electrical Code (separate grounded conductor and equipment grounding conductor generally beyond the main disconnecting means in the NEC wired system).

It is interesting to note that the concept of defining Ground Fault and Short Circuit is not a new concept. It was recommended in 1966 by Eustace Soares himself to end the confusion between the definition of a short circuit and a ground fault. He proposed the following two definitions.

SHORT CIRCUIT: A conducting connection, whether intentional or accidental, between any of the conductors of an electrical system whether it be from line to line or line to the grounded conductor.

GROUND FAULT: A conducting connection, whether intentional or accidental between any of the conductors of an electrical system and the conducting material which encloses the conductors or any conducting material that is grounded or that may become grounded.

Here is the reason why these definitions were not accepted in the past. In the NEC system, both the grounded conductor path (usually a wire or busbar) and the equipment-grounding conductor path (generally, a wire, a metallic raceway or metallic conductor enclosure) are part of the zero-sequence component impedance. Connecting these two conducting paths (grounded path and grounding path) together does not constitute a fault and will not cause a high current to flow in the system. Rather, connecting these two together roughly relates to paralleling two impedances together and reducing the overall impedance. This is one technical reason why in patient care areas of health care facilities, a parallel equipment-grounding conductor inside a metallic raceway is used as required by 517-13. It reduces the zero-sequence impedance and improves the effective fault current path (as discussed in 250.4) for line-to-ground faults.

Connecting the grounded conductor to the equipment-grounding conductor path will cause normal unbalanced load current to flow on non-normally current carrying metallic raceways, metallic enclosures and other metallic paths such as building steel, plumbing, metallic support structures and etc. This current flow outside of the normal conductor path is generally undesired (but, not necessarily unsafe) in premises wiring installed in accordance with the National Electrical Code.

The proposed definition in 5-57 falls apart in service enclosures, enclosures such as meter sockets prior to the main disconnecting means, and metallic service raceways. If the bare grounded conductor comes in contact with one of these enclosures, is it a ground fault or a short circuit or just a normal occurrence provided it was intentional? What happens if an electrician intentionally makes an inappropriate connection and re-grounds the grounded conductor in a feeder supplied panel board? Does an erroneously made, intentional connection vitiate the proposed definition of ground fault in 5-57?

If definition of "ground fault" is approved as it appears in Proposal 5-57 of the ROP, the National Electrical Code will now permit ground faults as the normal occurrences with the connection of the main bonding jumper at the service, the system bonding jumper at a separately derived system, or the connections as permitted in 250.32 (B).

I would agree that a term that describes the inappropriate grounding connection (grounding error) between a grounded conductor and the equipment grounding conductor path beyond the main disconnecting means should be developed. However, the term "ground fault" is not the correct term for this occurrence. The revised wording of the definition shown below in this comment accurately defines the term "ground fault".

Ground Fault. An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the grounded conductor or normally non-current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment or earth.

Further, if this definition of ground fault is accepted, the definition of short circuit could be defined as follows in a future edition of the NEC.

Short Circuit. An unintentional, electrically conducting connection between two or three ungrounded conductors of an electrical circuit.

References:

C. F. Wagner, R. D. Evans, Symmetrical Components, McGraw-Hill Book Company, Inc., New York and London, 1933.

ANSI/IEEE Std 141-1993, IEEE Recommended Practice for Electric Power Distribution for Industrial Plants (Red Book).

ANSI/IEEE Std 241-1990, IEEE Recommended Practice for Electric Power Systems in Commercial Buildings (Gray Book).

ANSI/IEEE Std 242 – 2001, Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems (Buff Book).

Bussman Electrical Protection Handbook, Copyrighted October 1996, Cooper Industries, Bussman Division. USA.

W. I. Summers, Editor, Soares' Grounding Electrical Distribution Systems for Safety, International Association of Electrical Inspectors, Park Ridge, IL, 1981.

ANSI/NFPA 70 – The National Electrical Code, 2005 Edition, Copyrighted 2004, National Fire Protection Association, Inc., Quincy, MA.

Panel Meeting Action: Reject
Panel Statement: An unintentional connection of a grounded conductor of an electric circuit and the normally non-current-carrying conductors, metallic enclosures, metallic raceways, metallic equipment or earth may trip a GFCI, and thus is a ground fault.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
WHITE, C.: This comment should have been accepted. The submitter provided a sound argument that the proposed definition of a Ground Fault is technically incorrect. And, he proposed the following more technically correct definition:

Ground Fault. An unintentional, electrically conducting connection between an ungrounded conductor of an electrical circuit and the grounded conductor or normally non-current-carrying conductors, metallic enclosures, metallic raceways metallic equipment or earth.

According to the definition of "Ground-Fault Protection of Equipment" in Article 100, the intent is to provide protection of equipment from damaging line-to-ground fault currents. This protection is provided at current levels less than those required to protect conductors from damage through the operation of a supply circuit overcurrent device. As pointed out by the submitter, when the neutral or grounded conductor comes in contact with the equipment-grounding conductor path, normal unbalanced load current will begin to flow on non-normally current carrying metallic raceways, metallic enclosures and other metallic path
s such as building steel, plumbing, metallic support structures, etc. This current flow outside of the normal conductor path is generally undesired but it is not damaging. It is not an overcurrent and it is not a ground fault. By accepting this new definition of fault current, will we now ask "Ground Fault Protection Equipment" to trip for the current levels caused by the grounded conductor coming into contact with the equipment grounding conductor path? Obviously not? And, if not, why would that connection be included in the definition of "Ground Fault".

5-28 Log #1016 NEC-P05 **Final Action: Accept in Principle**
(250.2)

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-51
Recommendation: In line 2, replace "permanent" with "durable" so as to read:

An intentionally constructed, ~~permanent,~~ durable low-impedance electrically conductive path...

Substantiation: Our interpretation and enforcement of the NEC is supposed to be based on the dictionary definitions of common English terms, augmented by special definitions found in Article 100, and those unique to particular articles and defined at the beginning of each such article. While the NEC is not intended as a design manual for untrained persons, its language is not supposed to be based on "Hey, Bud, you should know what they intend here" translation. Saying "...the word...is generally understood in...[this] application" demands just that sort of interpretation. I don't know how commonly inexpert inspectors make the sort of mistake Mr. Schwan is trying to head off, but I do know that AHJs often rely on inadequately trained inspectors. For this reason, the Style Manual's blessing on terms that have become accepted warrants sparing use. The CMP does have a point, that while the change in the original proposal to remove the sense of "permanent" as meaning "not subject to removal" is worthwhile, "reliable" is a term that is particularly difficult to pin down. I propose "durable," a term that is in fact used elsewhere in the NEC for similar purposes, as better conveying the intent. We understand a plug-in under cabinet light that is not double-insulated as a point on an electrical system potentially part of a ground fault current path, whose ground prong should make a durable or reliable grounding connection. However, a separable connection definitely can be viewed as not being permanent.
Panel Meeting Action: Accept in Principle

The panel action is to remove the word "permanent" and revise the definition of Effective Ground-Fault Current Path to read as follows:
Effective Ground-Fault Current Path. An intentionally constructed,~~, permanent,~~ low-impedance electrically conductive path designed and intended to carry current under ground-fault conditions from the point of a ground fault on a wiring system to the electrical supply source and that facilitates the operation of the overcurrent protective device or ground fault detectors on high-impedance grounded systems.
Panel Statement: The panel agrees with the concept of removing the word "permanent" from this section and does not agree that the proposed replacement word "durable" is necessary for this definition. Removing the word "permanent" addresses the concerns of the submitter, and not replacing it with any other descriptive word addresses the other concerns of subjectivity, ambiguity, enforceability, and inconsistent application of the provisions of this section by users of the Code. The panel concludes that the descriptive wording provides the performance language necessary for users without the use of the word "permanent" or any other descriptive adjective. The panel also affirms that this action to remove the word permanent is consistent with similar revisions in the NEC where the same concerns were raised about the use of this word. This action is also consistent with the work of the TCC assigned Task Group on Grounding and Bonding to keep definitions of words and terms related to grounding and bonding in their simplest form.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-29 Log #2063 NEC-P05 **Final Action: Accept in Principle**
(250.2)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-51
Recommendation: Accept the Proposal.
Substantiation: The substantiation for the Proposal is persuasive. The term "reliable" is more correct then "permanent" when describing the effective ground-fault current path.

CMP-5 in its substantiation for Panel Proposal 5-224a on 250.97 Exception states, "The phrase "...reliable bonding connection" is the preferred requirement." A similar wording should be used in this section.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 5-28.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-30 Log #2064 NEC-P05 **Final Action: Accept in Principle**
(Figure 250.4)

TCC Action: The Technical Correlating Committee advises that article scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee accepts the panel action.
Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-61
Recommendation: Move Figure 250.4 to become Figure 250.1.
Substantiation: Figure 250.4 gives the organization of Article 250. As such, it should be located with Section 250.1 which gives the scope of Article 250.

Other Articles having similar organization charts locate them with the Article scope. See 220.1 and 430.1 for examples.
Panel Meeting Action: Accept in Principle
Move the FPN to 250.1 and revise as follows:

"FPN: See Figure ~~250.4~~ 250.1 for information on the organization of Article 250 covering grounding and bonding requirements."

Renumber the present Figure 250.4 as Figure 250.1
Panel Statement: Editorial revisions were made for consistency with the new location of the table.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-31 Log #1520 NEC-P05 **Final Action: Accept**
(250.4(A)(1))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Accept" since the text of the Fine Print Note accepted in the panel action contains a recommendation and is not in compliance with 3.1.3 of the NEC Style Manual. The text of the comment as submitted is informational and, as such, is in compliance with the NEC Style Manual.
Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 5-89
Recommendation: Convert the proposed text into a new FPN located after 250.4(A)(1) as follows:

An important consideration for limiting the imposed voltage is the routing of bonding and grounding conductors so that they are not any longer than necessary to complete the connection without disturbing the permanent parts of the installation and so that unnecessary bends and loops are avoided.

Substantiation: The comment revises the original proposal into an FPN as suggested by the Panel Statement. This information is important and needs to be in the NEC.
Panel Meeting Action: Accept in Principle
Add a new FPN after 250.4(A)(1) as follows:
FPN: An important consideration for limiting the imposed voltage is the routing of bonding and grounding conductors. These conductors should not be longer than necessary to complete the connection without disturbing the permanent parts of the installation. Unnecessary bends and loops should be avoided.
Panel Statement: The revised text provides good guidance and consideration to users of the NEC.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-32 Log #278 NEC-P05 **Final Action: Reject**
(250.4(A)(5))

Submitter: Steve Byers, Scott Industrial Systems
Comment on Proposal No: 5-66
Recommendation: Vague - "permanent-low-impedance". Is an enclosure door continuous hinge considered a permanent low-impedance path to ground?

Require enclosure manufacturers to install ground stud on enclosure doors capable of having electrical devices mounted on the door.
Substantiation: Some less expensive enclosures are being manufactured without door ground studs, NFPA 79-2003 Section 8.2.3.6.1 states if devices are mounted on conductive doors, a bonding jumper shall be installed. Since I can find no code that requires a stud be welded on the door, how can this be accomplished without compromising the NEMA rating.

Panel Meeting Action: Reject
Panel Statement: This comment does not comply with 4.4.5(c) of the NFPA Regulations Governing Committee Projects in that it does not provide text of the comment, including the wording to be added, revised (and how revised), or deleted.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-33 Log #1017 NEC-P05 **Final Action: Accept in Principle (250.4(A)(5))**

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-65
Recommendation: In line 4, replace "permanent" with "durable" so as to read:
(5) Effective Ground-Fault Current Path. Electrical equipment and wiring and other electrically conductive material likely to become energized shall be installed in a manner that creates a ~~permanent,~~ durable low-impedance circuit...
Substantiation: Our interpretation and enforcement of the NEC is supposed to be based on the dictionary definitions of common English terms, augmented by special definitions found in Article 100, and those unique to particular articles and defined at the beginning of each such article. While the NEC is not intended as a design manual for untrained persons, its language is not supposed to be based on "Hey, Bud, you should know what they intend here" translation. I don't know how commonly inexpert inspectors make the sort of mistake Mr. Schwan is trying to head off, but I do know that AHJs often rely on inadequately trained inspectors. For this reason, the Style Manual's blessing on terms that have become accepted warrants sparing use. The CMP does have a point, that while the change in the original proposal to remove the sense of "permanent" as meaning "not subject to removal" is worthwhile, "reliable" is a term that is particularly difficult to pin down. I propose "durable," a term used elsewhere in the NEC for similar purposes, as better conveying the intent. We understand a plug-in under cabinet light that is not double-insulated as a point on an electrical system potentially part of a ground fault current path, whose ground prong should make a durable or reliable grounding connection. However, a separable connection definitely can be viewed as not being permanent.
Panel Meeting Action: Accept in Principle
The panel action is to remove the word "permanent" and revise Section 250.4(A)(5) as follows:
(5) Effective Ground-Fault Current Path. Electrical equipment and wiring and other electrically conductive material likely to become energized shall be installed in a manner that creates a ~~permanent,~~ low-impedance circuit facilitating the operation of the overcurrent device or ground detector for high-impedance grounded systems. It shall be capable of safely carrying the maximum ground-fault current likely to be imposed on it from any point on the wiring system where a ground fault may occur to the electrical supply source. The earth shall not be considered as an effective ground-fault current path.
Panel Statement: The panel agrees with the concept of removing the word "permanent" from this section and does not agree that the proposed replacement word "durable" is necessary for this section. Removing the word "permanent" addresses the concerns of the submitter, and not replacing it with any other descriptive word addresses the other concerns of subjectivity, ambiguity, enforceability, and inconsistent application of the provisions of this section by users of the Code. The panel concludes that the descriptive wording provides the performance language necessary for users without the use of the word "permanent" or any other descriptive adjective. The panel also affirms that the action to remove the word "permanent" is consistent with similar revisions in NEC where the same concerns were raised about the use of this word.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-34 Log #2065 NEC-P05 **Final Action: Accept in Principle (250.4(A)(5))**

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-65
Recommendation: Accept the Proposal.
Substantiation: The substantiation for the Proposal is persuasive. The term "reliable" is more correct then "permanent" when describing the effective ground-fault current path.
CMP-5, in its substantiation for Panel Proposal 5-224a on 250.97 Exceptions states, "The phrase "...reliable bonding connection" is the preferred requirement." A similar wording should be used in this section.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 5-33.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-35 Log #1018 NEC-P05 **Final Action: Accept in Principle (250.4(B)(2))**

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-67
Recommendation: Revise text to read as follows:
...~~permanent~~ durable low-impedance path for ground-fault current...
Substantiation: Our interpretation and enforcement of the NEC is supposed to be based on the dictionary definitions of common English terms, augmented by special definitions found in Article 100, and those unique to particular articles and defined at the beginning of each such article. While the NEC is not intended as a design manual for untrained persons, its language is not supposed to be based on "Hey, Bud, you should know what they intend here" translation. I don't know how commonly inexpert inspectors make the sort of mistake Mr. Schwan is trying to head off, but I do know that AHJs often rely on inadequately trained inspectors. For this reason, the Style Manual's blessing on terms that have become accepted warrants sparing use. The CMP does have a point, that while the change in the original proposal to remove the sense of "permanent" as meaning "not subject to removal" is worthwhile, "reliable" is a term that is particularly difficult to pin down. I propose "durable," a term that is used elsewhere in the NEC for similar purposes, as better conveying the intent. We understand a plug-in under cabinet light that is not double-insulated as normally non-current-carrying conductive equipment enclosing electrical conductors. Its ground prong should make a durable or reliable grounding connection. However, a separable connection definitely can be viewed as not being a permanent bond.
Panel Meeting Action: Accept in Principle
The panel action is to remove the word "permanent" and revise Section 250.4(B)(2) as follows:
(2) Bonding of Electrical Equipment. Non–current-carrying conductive materials enclosing electrical conductors or equipment, or forming part of such equipment, shall be connected together and to the supply system grounded equipment in a manner that creates a ~~permanent,~~ low-impedance path for ground-fault current that is capable of carrying the maximum fault current likely to be imposed on it.
Panel Statement: The panel agrees with the concept of removing the word "permanent" from this section and does not agree that the proposed replacement word "durable" is necessary for this section. Removing the word "permanent" addresses the concerns of the submitter, and not replacing it with any other descriptive word addresses the other concerns of subjectivity, ambiguity, enforceability, and inconsistent application of the provisions of this section by users of the Code. The panel concludes that the descriptive wording provides the performance language necessary for users without the use of the word "permanent" or any other descriptive adjective. The panel also affirms that this action to remove the word "permanent" is consistent with similar revisions in NEC where the same concerns were raised about the use of this word.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-36 Log #2066 NEC-P05 **Final Action: Accept in Principle (250.4(B)(2))**

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-67
Recommendation: Accept the Proposal.
Substantiation: The substantiation for the Proposal is persuasive. The term "reliable" is more correct then "permanent" when describing the low-impedance path for fault current.
CMP-5, in its substantiation for Panel Proposal 5-224a on 250.97 Exceptions states, "The phrase "...reliable bonding connection" is the preferred requirement." A similar wording should be used in this section.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-35.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-37 Log #1019 NEC-P05 **Final Action: Accept in Principle (250.4(B)(3))**

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-68
Recommendation: Revise text to read as follows:
...a manner that creates a ~~permanent~~ durable low-impedance path for ground-fault current...
Substantiation: Our interpretation and enforcement of the NEC is supposed to be based on the dictionary definitions of common English terms, augmented

by special definitions found in Article 100, and those unique to particular articles and defined at the beginning of each such article. While the NEC is not intended as a design manual for untrained persons, its language is not supposed to be based on "Hey, Bud, you should know what they intend here" translation. I don't know how commonly inexpert inspectors make the sort of mistake Mr. Schwan is trying to head off, but I do know that AHJs often rely on inadequately trained inspectors. For this reason, the Style Manual's blessing on terms that have become accepted warrants sparing use. The CMP does have a point, that while the change in the original proposal to remove the sense of "permanent" as meaning "not subject to removal" is worthwhile, "reliable" is a term that is particularly difficult to pin down. I propose "durable," a term used elsewhere in the NEC for similar purposes, as better conveying the intent. We understand a plug-in under cabinet light that is not double-insulated as an example of electrically conductive materials that are likely to become energized. Its ground prong should make a durable or reliable grounding connection. However, a separable connection definitely can be viewed as not being a permanent bond.

Panel Meeting Action: Accept in Principle

The panel action is to remove the word "permanent" and revise Section 250.4(B)(3) as follows:

(3) Bonding of Electrically Conductive Materials and Other Equipment. Electrically conductive materials that are likely to become energized shall be connected together and to the supply system grounded equipment in a manner that creates a ~~permanent,~~ low-impedance path for ground-fault current that is capable of carrying the maximum fault current likely to be imposed on it.

Panel Statement: The panel agrees with the concept of removing the word "permanent" from this section and does not agree that the proposed replacement word "durable" is necessary for this section. Removing the word "permanent" addresses the concerns of the submitter, and not replacing it with any other descriptive word addresses the other concerns of subjectivity, ambiguity, enforceability, and inconsistent application of the provisions of this section by users of the Code. The panel concludes that the descriptive wording provides the performance language necessary for users without the use of the word "permanent" or any other descriptive adjective. The panel also affirms that the action to remove the word "permanent" is consistent with similar revisions in NEC where the same concerns were raised about the use of this word.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-38 Log #2067 NEC-P05 **Final Action: Accept in Principle (250.4(B)(3))**

Submitter: Phil Simmons, Simmons Electrical Services

Comment on Proposal No: 5-68

Recommendation: Accept the Proposal.

Substantiation: The substantiation for the Proposal is persuasive. The term "reliable" is more correct then "permanent" when describing the low-impedance path for fault current.

CMP-5, in its substantiation for Panel Proposal 5-224a on 250.97 Exceptions states, "The phrase "...reliable bonding connection" is the preferred requirement." A similar wording should be used in this section.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 5-37.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-39 Log #600 NEC-P05 **Final Action: Reject (250.4(B)(4))**

Submitter: Henry A. Jenkins, Wake County, Inspections Development / Rep. N.C. Ellis Cannady Chapter of I.A.E.I

Comment on Proposal No: 5-71

Recommendation: We suggest the proposal be Accepted as originally proposed because the second fault is a phase to phase fault and not a ground fault.

Substantiation: None given.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms the action on Proposal 5-71, and Proposal 5-69 clarifies that the overcurrent device operates when a second phase to ground fault occurs on a different ungrounded phase conductor supplied by the system. FPN No. 1 provides users with the information and clarification necessary for users and indicates that the second phase fault to ground is a ground fault condition, in addition to becoming a phase-to-phase short-circuit condition. The panel action on Proposal 5-69 addresses the concerns of the submitter.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-40 Log #1020 NEC-P05 **Final Action: Accept in Principle (250.4(B)(4))**

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education

Comment on Proposal No: 5-70

Recommendation: Revise text to read as follows:

...a manner that creates a ~~permanent~~ durable low-impedance path for ground-fault current...

Substantiation: Our interpretation and enforcement of the NEC is supposed to be based on the dictionary definitions of common English terms, augmented by special definitions found in Article 100, and those unique to particular articles and defined at the beginning of each such article. While the NEC is not intended as a design manual for untrained persons, its language is not supposed to be based on "Hey, Bud, you should know what they intend here" translation. I don't know how commonly inexpert inspectors make the sort of mistake Mr. Schwan is trying to head off, but I do know that AHJs often rely on inadequately trained inspectors. For this reason, the Style Manual's blessing on terms that have become accepted warrants sparing use. The CMP does have a point, that while the change in the original proposal to remove the sense of "permanent" as meaning "not subject to removal" is worthwhile, "reliable" is a term that is particularly difficult to pin down. I propose "durable," a term used elsewhere in the NEC for similar purposes, as better conveying the intent. We understand a plug-in under cabinet light that is not double-insulated as an example of equipment and electrically conductive materials that are likely to become energized. It's ground prong should make a durable or reliable grounding connection. However, a separable connection definitely can be viewed as not being a permanent bond.

Panel Meeting Action: Accept in Principle

The panel action is to remove the word "permanent" and revise Section 250.4(B)(4) as follows:

(4) Path for Fault Current. Electrical equipment, wiring, and other electrically conductive material likely to become energized shall be installed in a manner that creates a ~~permanent,~~ low-impedance circuit from any point on the wiring system to the electrical supply source to facilitate the operation of overcurrent devices should a second fault occur on the wiring system. The earth shall not be considered as an effective fault-current path.

Panel Statement: The panel agrees with the concept of removing the word "permanent" from this section and does not agree that the proposed replacement word "durable" is necessary for this section. Removing the word "permanent" addresses the concerns of the submitter, and not replacing it with any other descriptive word addresses the other concerns of subjectivity, ambiguity, enforceability, and inconsistent application of the provisions of this section by users of the Code. The panel concludes that the descriptive wording provides the performance language necessary for users without the use of the word "permanent" or any other descriptive adjective. The panel also affirms that this action to remove the word "permanent" is consistent with similar revisions in NEC where the same concerns were raised about the use of this word.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-41 Log #1021 NEC-P05 **Final Action: Accept (250.4(B)(4))**

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education

Comment on Proposal No: 5-69

Recommendation: Revise text to read as follows:

low-impede<u>a</u>nce

Substantiation: Typo.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-42 Log #2068 NEC-P05 **Final Action: Accept in Principle (250.4(B)(4))**

Submitter: Phil Simmons, Simmons Electrical Services

Comment on Proposal No: 5-70

Recommendation: Accept the Proposal.

Substantiation: The substantiation for the Proposal is persuasive. The term "reliable" is more correct then "permanent" when describing the low-impedance path for fault current.

CMP-5, in its substantiation for Panel Proposal 5-224a on 250.97 Exceptions states, "The phrase "...reliable bonding connection" is the preferred requirement." A similar wording should be used in this section.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 5-40.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-43 Log #1228 NEC-P05 **Final Action: Accept**
(250.6 Title, 250.24(A)(1), 250.24(A)(2) Exception, 250.24(A)(3), 250.24(A)(5), 250.30(A)(3)Exception No.2, 250 Part IV Title)

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 5-61
Recommendation: Continue to accept the TCC Grounding and Bonding Task Group proposal 5-61 as modified by the actions of CMP-5.
Substantiation: The Technical Correlating Committee Task Group on Grounding and Bonding agrees with the action of CMP-5 on Proposal 5-61. The CMP-5 revisions to the proposal have been made for clarity and continue to be consistent with the Task Group's original initiatives.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-44 Log #2249 NEC-P05 **Final Action: Accept**
(250.8)

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 5-84
Recommendation: Continue to accept in principle.
Substantiation: The original submitted wording would have prohibited the use of standard pressure connectors (wire nuts) for use with EGCs, and would have required the use of "green" wire nuts for this purpose. The panel should continue to accept its revised wording as the revised wording makes it very clear that any listed pressure connector can be used for the connection of EGCs.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-45 Log #1023 NEC-P05 **Final Action: Reject**
(250.8(A)(5) and (6))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-84
Recommendation: Revise text to read as follows:

(5) Machine screw-type fasteners that engage not less than two threads or are secured with a nut, with a washer inserted between the fastener's head and the conductor, where necessitated by the size or shape of the head.

(6) Thread-forming machine screws that engage not less than two threads in the enclosure, with a washer inserted between the fastener's head and the conductor, where necessitated by the size or shape of the head.
Substantiation: We were advised at the UL session of the 2006 Eastern Section, IAEI meeting that grounding screws are not Listed items. However, any screw that engages the two or more threads and grabs the conductor under its head should be as acceptable as the green screws sold for the purpose. As such, a screw or fastener is not required to be tested as an element of a Listed system, it would be well to put installers on notice that when the conductor would not be held securely by its head, it would need to be augmented. This also would take into account a recommendation in Proposal 5-85 that was not addressed by the CMP.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its actions and statements on Proposal 5-85 addressing the term "sheet metal screws" as previously used in that section and provided the needed clarification regarding the acceptable means of making grounding and bonding connections. Accessory features are currently provided by equipment manufacturers that do not include any washers as mentioned in this comment. Providing no specific size or head shape would make this additional language difficult to apply.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-46 Log #1847 NEC-P05 **Final Action: Reject**
(250.14 (New))

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 5-90
Recommendation: This Proposal should be Rejected.
Substantiation: This proposal should be rejected for a few different reasons:

(1) The substantiation seems to imply that an unsafe condition would exist should a person remove the termination from the enclosure. While this is true, the code can't protect against persons changing the electrical installation.

(2) The proponent seems to be concerned about the metal enclosure carrying neutral current. If the enclosure is in fact listed to carry neutral current, then it has been tested, evaluated and listed for such use, indicating that it is in fact safe. If the product is not listed for such an application, the installation is illegal via 110.3(B). Perhaps this concern would be better addressed by the proponent changing the product standard instead of the Code.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its original actions on Proposal 5-90. It is recognized that this new requirement is addressed in the listing information of equipment as is the other equipment that is listed as suitable for use as service equipment that is installed to meet the requirements in 250.24. See the panel actions on Comment 5-47.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-47 Log #1906 NEC-P05 **Final Action: Accept**
(250.14 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-90
Recommendation: Accept the proposal in principle. Locate the text in 200.2 as a lettered paragraph, as follows:

200.2 General... in accordance with 200.6. The grounded conductor shall comply with (A) and (B).
(A) Insulation. The grounded conductor, where insulated, shall have.. as described in 250.184(A).
(B) Continuity. [Insert the text of Proposal 5-90 here]
Substantiation: This comment responds to the reservation expressed in the voting, with which the submitter now agrees. Instead of simply tacking this topic on at the end of the article, however, the submitter has tried to incorporate it where it would be more editorially suitable.
Panel Meeting Action: Accept

The comment is accepted to locate the text in 200.2 as a lettered paragraph. Section 200.2 reads as follows:
200.2 General. All premises wiring systems, other than circuits and systems exempted or prohibited by 210.10, 215.7, 250.21, 250.22, 250.162, 503.155, 517.63, 668.11, 668.21, and 690.41 Exception, shall have a grounded conductor that is identified in accordance with 200.6. The grounded conductor shall comply with (A) and (B).
(A) Insulation. The grounded conductor, where insulated, shall have insulation that is (1) suitable, other than color, for any ungrounded conductor of the same circuit on circuits of less than 1000 volts or impedance grounded neutral systems of 1 kV and over, or (2) rated not less than 600 volts for solidly grounded neutral systems of 1 kV and over as described in 250.184(A).
(B) Continuity. The continuity of a grounded conductor shall not depend on a connection to a metallic enclosure, raceway, or cable armor.
Panel Statement: The action on this comment does not add a new 250.14 but rather relocates the recommendation to 200.2.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-48 Log #2070 NEC-P05 **Final Action: Reject**
(250.14 (New))

Submitter: Chuck Mello, Underwriters Laboratories
Comment on Proposal No: 5-90
Recommendation: The text should be relocated to an appropriate section in Article 300, such as under 300.3, under wiring methods that addresses the general installation of circuit conductors.

Continuity of Grounded Conductors. The continuity of a grounded conductor shall not depend on a connection to a metallic enclosure, raceway, or cable armor.
Substantiation: Panel 5 should have rejected this proposal. The intent is correct but the requirements are in the wrong Article. The grounded conductor is permitted or required to be connected to the grounding system under specific conditions in Article 250 so as to provide for the grounded conductor to also serve an equipment grounding function or to establish which conductor is the grounded conductor for a system. The example of the main bonding jumper being called a "grounded conductor" is a clear misapplication of terms and creates confusion. The connection of the grounded conductor in and out of any enclosure must be on a suitable conductor, as indicated in the proposal's substantiation, and not use the metal enclosure for the current carrying path. The TCC should correlate this to the correct location since panel 5 is not the correct panel to establish wiring methods for connection of the grounded conductor.

Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its original actions on Proposal 5-90. It is recognized that this new requirement is addressed in the listing information of equipment as is the other equipment that is listed as suitable for use as service equipment that is installed to meet the requirements in 250.24. See the panel action on Comment 5-47.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-49 Log #604 NEC-P05 **Final Action: Accept in Principle**
(250.21 Exception)

TCC Action: The Technical Correlating Committee directs that the accepted text of the comment be rewritten as follows to be in compliance with 3.3.3 of the NEC Style Manual in expressing limits.
"(B) Ground Detectors. Ungrounded alternating current systems as permitted in 250.21(A)(1) through (A)(4) operating at not less than 120 volts and not exceeding 1000 volts shall have ground detectors installed on the system."
Submitter: Jamie McNamara, Hastings, MN
Comment on Proposal No: 5-97
Recommendation: Revise as follows:
250.21 Exception: Systems of less than 120 volts ~~to ground~~ phase-to-phase as permitted by this Code shall not be required to have ground detectors.
Substantiation: The panel was correct in rejecting the original proposed text. The panel should reconsider the clarified text, requirement for nongrounded systems. In a nongrounded system, theoretically, there are zero volts to ground and an installer could be misled in applying the exception. (Into thinking for example a 480 volt ungrounded system that measured less than 120 volts to ground with a meter would not require ground detectors). I thank the panel for the very clear panel statement as to the intent of the exception and how it is to be applied.
Panel Meeting Action: Accept in Principle
Revise the text of 2008 NEC Draft Section 250.21(B) to read as follows:
(B) Ground Detectors. Ungrounded alternating current systems as permitted in 250.21(A)(1) through (A)(4) operating from ~~at~~ 120 volts to 1000 volts ~~to ground~~ shall have ground detectors installed on the system.
Panel Statement: Only systems less than 120 volts nominal are permitted to omit ground detection. The panel changes the existing text of the Code for clarity.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
BOKSINER, J.: The new language might not comply with the NEC Style Manual with respect to expression of limits. Alternative language could be as follows:
(B) Ground Detectors. Ungrounded alternating current systems as permitted in 250.21(A)(1) through (A)(4) operating at not less than 120 volts to and not exceeding 1000 volts to ground shall have ground detectors installed on the system.

5-50 Log #2075 NEC-P05 **Final Action: Accept in Principle**
(250.24(C))

Submitter: Chuck Mello, Underwriters Laboratories
Comment on Proposal No: 5-76
Recommendation: Revise the proposed text to read as follows:
250.24(C)
(C) Grounded Conductor Brought to Service Equipment. Where an ac system operating at less than 1000 volts is grounded at any point, the grounded conductor(s) shall be run to each service disconnecting means and shall be connected ~~bonded~~ to each disconnecting means grounded conductor(s) terminal or bus. A main bonding jumper shall connect the grounded conductor(s) to each service disconnecting means enclosure. The grounded conductor(s) shall be installed in accordance with 250.24(C)(1) through (C)(3).
Exception: Where more than one service disconnecting means are located in ~~an~~ single assembly listed for use as service equipment, it shall be permitted to run the grounded conductor(s) to the assembly common grounded conductor(s) terminal or bus. The assembly shall have a main bonding jumper for connecting the grounded conductor(s)~~and the conductor(s) shall be connected bonded~~ to the assembly enclosure.
Substantiation: The revised text as acted on the by the panel would literally require the grounded circuit conductor to be connected to the service disconnecting means enclosure. This could easily be interpreted as being "directly" connected which is not a proper installation. The proper termination point for the service grounded conductor is to the grounded conductor terminal or bus intended and identified for the termination of this conductor. The main bonding jumper is in fact the conductor that connects the service grounded conductor terminal or bus to the service equipment enclosure (green screw, strap, bus, or wire type MBJ). Similarly in the exception, the grounded conductor would appear to be required to be connected to the assembly enclosure and not to the service grounded conductor terminal(s) or bus provided for that purpose. The grounded conductor is to be connected to that terminal or bus and the main bonding jumper then connects that terminal or bus to the assembly enclosure. Under the definition in the 2005 code using the word "bonded" allowed the correct installation of terminating on the lug or bus, but then some mean of "bonding" of this terminal or bus was provided.
Panel Meeting Action: Accept in Principle
Change the word "have" in the last sentence of the exception to the word "include." Accept the rest of the comment as an editorial revision to the work in Proposal 5-76.
Panel Statement: Editorial revision to Proposal 5-76.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
MELLO, C.: The panel statement is not correct that this was an editorial change to proposal 5-76. The text changes shown in the comment and accepted by the panel were more than editorial and corrected a deficiency created by the action on proposal 5-76.

5-51 Log #467 NEC-P05 **Final Action: Reject**
(250.24(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-104
Recommendation: Accept proposal revised:
The grounding electrode conductor shall be connected to a non-flexible metal enclosure of the service conductors suitable for use as a grounding conductor at any accessible...(remainder unchanged).
Substantiation: Method (15) permits flexible metal conduit or liquidtight flexible metal conduit not suitable for a ground clamp connection. Although a conduit connector with a lug for a bonding jumper could be used for a connection point, it is a fitting not an enclosure.
Panel Meeting Action: Reject
Panel Statement: Use of the term "nonflexible" is not appropriate for enclosures that are applicable for this section.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

(Note: The sequence no. 5-52 was not used)

5-53 Log #1758 NEC-P05 **Final Action: Accept**
(250.28(D))

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 5-107
Recommendation: Add titles to each of (1) through (3) to comply with the NEC Style Manual, such as:
(1) General. (2) Main Bonding Jumper for Service with More Than One Enclosure (3) Separately Derived System With More Than One Enclosure. 250.28 Main Bonding Jumper and System Bonding Jumper
(D) Size. Main bonding jumpers and system bonding jumpers shall be sized in accordance with 250.28(D)(1) through (D)(3).
(1) General. Main bonding jumpers and system bonding jumpers shall not be smaller than the sizes shown in Table 250.66. Where the supply conductors are larger than 1100 kcmil copper or 1750 kcmil aluminum, the bonding jumper shall have an area that is not less than 12 1/2 percent of the area so the largest phase conductor except that, where the phase conductors and the bonding jumper are of different materials (copper or aluminum), the minimum size of the bonding jumper shall be based on the assumed use of phase conductors of the same material as the bonding jumper and with an ampacity equivalent to that of the installed phase conductors.
(2) Main Bonding Jumper for Service with More Than One Enclosure. Where a service consists of more than a single enclosure as permitted in 230.71(A), the main bonding jumper for each enclosure shall be sized in accordance with 250.28(D)(1) based on the largest ungrounded service conductor serving that enclosure.
(3) Separately Derived System With More Than One Enclosure. Where a separately derived system supplies more than a single enclosure, the system bonding jumper for each enclosure shall be sized in accordance with 250.28(D)(1) based on the largest ungrounded feeder conductor serving that enclosure or a single system bonding jumper shall be installed at the source and sized in accordance with 250.28(D)(1) based on the equivalent size of the largest supply conductor determined by the largest sum of the areas of the corresponding conductors of each set.
Substantiation: Add titles to each of the (1) through (3) to comply with the NEC Style Manual.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-54 Log #1843 NEC-P05 **Final Action: Reject**
(250.28(D))

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 5-107
Recommendation: Accept the Proposal as modified:
(D) Size. Main bonding jumpers and system bonding jumpers shall be sized in accordance with 250.28(D)(1) through (D)(3).
(1) Proposed text to remain unchanged.
(2) Where a service consists of more than a single enclosure as permitted in 230.71(A), the main bonding jumper for each enclosure shall be sized in accordance with 250.28(D)(1) based on the largest ungrounded service conductor serving that enclosure.
(3) Where a separately derived system supplies more than a single enclosure, the system bonding jumper for each enclosure ~~shall be sized in accordance with 250.28(D)(1) based on the largest ungrounded service conductor serving that enclosure or a single system bonding jumper~~ shall be installed at the source and sized in accordance with 250.28(D)(1) based on the equivalent size of the largest supply conductor determined by the largest sum of the areas of the corresponding conductors of each set.
Substantiation: The proposed allowance of installing multiple system bonding jumpers at separate enclosures will result in objectionable currents. It is assumed that the multiple enclosures will ultimately be bonded together, presumably through the grounding electrode system.
Panel Meeting Action: Reject
Panel Statement: The suggested revisions in this comment would restrict installation of the system bonding jumper to the source enclosure where multiple enclosures are installed. This restriction is without substantiation and is in conflict with the current provisions of 250.30(A)(1).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-55 Log #510 NEC-P05 **Final Action: Reject**
(250.30(A)(4)(a))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-113
Recommendation: Accept the proposal.
Substantiation: It is not reasonable that a common GEC for two transformers, regardless how small the kVA is required to be 3/0 (copper) even if connected to a ground rod whereas if separately grounded two transformers, regardless how large the kVA if connected to a ground rod the GEC could be 6 AWG copper.
Panel Meeting Action: Reject
Panel Statement: The panel affirms its actions on this proposal through its actions and statements on Proposal 5-78 and Comment 5-61 in the 2005 NEC cycle. See panel action and statement on Comment 5-61 on page 70-150 of the 2004 NEC Report on Comments publication.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-56 Log #1620 NEC-P05 **Final Action: Reject**
(250.30(A)(7))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 5-115
Recommendation: This proposal should have been accepted.
Substantiation: The panel statement that they reaffirm a previous position is unresponsive to the issue. Contrary to the panel statement, it is not clear that "nearest" applies to the other electrode types, when in fact the wording does not say that. In reality, the other electrode types are not an option under the existing wording unless the building steel and water pipe are "not available." Is far away "not available?" Under the existing wording, a concrete-encased electrode or ground ring or even the busbar permitted by 250.64(C)(3) may be within a few feet, but if the water pipe is 250 ft away, it is available and the water pipe must be used rather than the other electrodes, even though other changes the panel has made support the fact that some of the other electrodes probably provide superior earth connections and are more reliable. The issue in 250.50 is not whether they are available, but whether they exist. It makes no sense to go a long distance for an electrode that the panel has acknowledged is not entirely reliable on its own rather than use a superior electrode that is nearby.
Panel Meeting Action: Reject
Panel Statement: The panel concludes that the wording of current NEC 250.30(A)(7) already addresses the submitter's concerns through the wording "as near as practicable and preferably in the same area." This allows judgment to be applied to address the conditions identified by the submitter rather than resulting in an absolute and impracticable requirement.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-57 Log #1341 NEC-P05 **Final Action: Reject**
(250.32)

Submitter: Nathan Philips, Integrated Electronic Systems
Comment on Proposal No: 5-119
Recommendation: Reject the proposed change in its entirety.
Substantiation: The submitter provides no evidence that accidents have resulted from the existing Code language. There are many rural and remote applications where the additional burden imposed by this change would be quite significant, and adequate justification has not been provided. In addition, the proposed change is unenforceable, since buildings and structures aren't normally inspected following original construction.
Panel Meeting Action: Reject
Panel Statement: This change as suggested by the submitter would help reduce the number of designs that purposely invite the possibilities of inappropriate neutral-to-ground connections that can and often do happen at a later date. There is no sound engineering basis for allowing neutral current to return on multiple paths because of improper or multiple neutral-to- ground connections at buildings or structures supplied by a feeder or branch circuit. The panel concludes that this requirement is enforceable and has already been adopted by some jurisdictions.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
TOOMER, R.: Adequate substantiation has not been provided for this major change in the NEC. This provision has been in the NEC for many, many years with no evidence of any problems. We have received only one proposal in over 30 years to make this change, and now we take this action with little regard to the consequences. The fact that the Panel has received no prior Proposals on this issue suggests that it is not a major problem. This comment should have been accepted.
Comment on Affirmative:
JOHNSTON, M.: The submitter indicated that this requirement is not enforceable because buildings normally are not inspected after the original construction. fortunately this is not true in most parts of the country. The previous codes have allowed two options for grounding and bonding feeders to separate buildings or structures, which have resulted in many misapplications of grounding and bonding. The new requirement of a separate equipment grounding conductor routed to a separate building in this section will provide safer installations by minimizing the conditions that lead to neutral currents returning on multiple paths creating an unsafe installation. It will now be clear on how to ground and bond a feeder to a separate building with no questions whether to bond or not to bond the grounded neutral conductor or the potential problems with future installations of a metallic path ran to the separate building. From the enforcement perspective this will help reduce problems in the field and provide additional safety. Retaining the exception in this section assists users by allowing installations that met the criteria of 250.52(B)(2) to remain operational and built upon in the future as long as the conditions contained with the exception are maintained.

5-58 Log #1518 NEC-P05 **Final Action: Accept in Principle**
(250.32)

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 5-119
Recommendation: The Panel Action should continue to be Accept in Principle with the following additional changes.
In 250.32 (B), revise the last phrase to read "shall comply with the following requirements."
Delete the title "(1) Equipment Grounding Conductor" from 250.32(B)(1). The remainder of the Panel Action is unchanged.
Substantiation: The Panel Action changed 250.32(B)(2) into an Exception to 250.32(B)(1) so there is now only one section and, therefore, it should not be numbered. It can be a separate paragraph without a title.
The revision to 250.32(B) correlates this change.
Panel Meeting Action: Accept in Principle
Revise 250.32 as follows:
250.32 Buildings or Structures Supplied by a Feeder(s) or Branch Circuit(s).
(A) Remains unchanged.
(B) Grounded Systems. For a grounded system at the separate building or structure, ~~the connection to the grounding electrode and grounding or bonding of equipment, structures, or frames required to be grounded or bonded shall comply with either 250.32(B)(1) or (B)(2).~~
~~(1) Equipment Grounding Conductor.~~ an equipment grounding conductor as described in 250.118 shall be run with the supply conductors and be connected to the building or structure disconnecting means and to the grounding electrode(s). The equipment grounding conductor shall be used for grounding or bonding of equipment, structures, or frames required to be grounded or bonded. The equipment grounding conductor shall be sized in accordance with 250.122. Any installed grounded conductor shall not be connected to the equipment grounding conductor or to the grounding electrode(s).

Exception: For existing premises wiring systems only, ~~new or existing buildings or structures only~~, the grounded conductor run with the supply to the building or structure shall be permitted to be connected to the building or structure disconnecting means and to the grounding electrode(s) and shall be used for grounding or bonding of equipment, structures, or frames required to be grounded or bonded where all the requirements of (1), (2), and (3) are met:
(1) An equipment grounding conductor is not run with the supply to the building or structure.
(2) There are no continuous metallic paths bonded to the grounding system in each building or structure involved.
(3) Ground-fault protection of equipment has not been installed on the supply side of the feeder(s).
Where the grounded conductor is used for grounding in accordance with the provision of this exception, the size of the grounded conductor shall not be smaller than the larger of either of the following:
(1) That required by 220.61
(2) That required by 250.122

Panel Statement: The panel incorporates the concepts in this and other comments and makes editorial improvements.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
TOOMER, R.: Adequate substantiation has not been provided for this major change in the NEC. This provision has been in the NEC for many, many years with no evidence of any problems. We have received only one proposal in over 30 years to make this change and now we take this action with little regard to the consequences. The fact that the Panel has received no prior Proposals on this issue suggests that it is not a major problem. This comment should have been rejected.

5-59 Log #1845 NEC-P05 **Final Action: Accept in Principle**
(250.32)

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 5-119
Recommendation: Continue to Accept in Principle this Proposal.
Substantiation: This is an important change and should continue to pass.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-58.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
TOOMER, R.: See my Explanation of Negative Vote on Comment 5-58.

5-60 Log #1907 NEC-P05 **Final Action: Reject**
(250.32)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-119
Recommendation: Reject the proposal.
Substantiation: This submitter has been consistently supported as CMP 5 steadfastly made the transition to the concept that neutral return current should travel over conductors bought at electrical supply houses. It has previously done so in ways that, until now, allowed electrical designers to choose how to deal with regrounded neutrals as long as neutral current passed over recognized conductors. However, Proposal 5-119 crosses a line that should not be crossed that is, into the territory of attempting to sunset a distribution practice that has been routine for over a century. Furthermore, it is a practice that brings the overwhelming majority of electrical service power to commercial and residential occupancies throughout North America, and that will not be going away within the lifetime of any member of the NEC committee The comparison with 250.140 is not apt, because that was an anomaly occasioned by the Second World War. However, it is also instructive in that it hung on for fifty years. Why? Because no one ever demonstrated any loss experience even though just about all of us (myself included) thought it was bad practice. The proposal substantiation is frankly overwrought. CMP 5 should not take sides in this political controversy.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-57.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
TOOMER, R.: See my Explanation of Negative Vote on Comment 5-57.

5-61 Log #2250 NEC-P05 **Final Action: Reject**
(250.32)

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 5-119
Recommendation: This proposal should be rejected.
Substantiation: The submitter and the panel are asking the code users to believe that electricity behaves differently on the line side of the service disconnect than is does on the load side. Not only are the parallel paths that the submitter says are so hazardous on the load side of the service disconnect permitted on the line side, they are actually even required on the line side in a number of cases. How can these parallel paths be a serious hazard on the load side of the service disconnect and be required on the line side of the same disconnect? What magic takes place at the service disconnect that changes the hazard? Where is the technical justification for the acceptance of this proposal? Where are the reports of accidents or other types of problems that have been caused by the existing rule?
Panel Meeting Action: Reject
Panel Statement: The panel does accept the concept of continuation of migrating away from the use of the grounded circuit conductor for grounding beyond the service. See panel action and statement on Comment 5-57.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
TOOMER, R.: See my Explanation of Negative Vote on Comment 5-57.

5-62 Log #979 NEC-P05 **Final Action: Accept in Principle**
(250.32(B)(2) Exception)

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 5-119
Recommendation: There cannot be a (B)(1) without a (B)(2) so this must be revised by deleting (1) and the title and rewording (B) as follows:
250.32 Buildings or Structures Supplied by Feeder(s) or Branch Circuit(s)
(B) Grounded Systems. For a grounded system at the separate building or structure, the connection to the grounding electrode and grounding or bonding of equipment, structures, or frames required to be grounded or bonded shall be as follows~~: comply with either 250.32(B)(1) or (B)(2).~~
~~(1) Equipment Grounding Conductor.~~ An equipment grounding conductor as described in 250.118 shall be run with the supply conductors and connected to the building or structure disconnecting means and to the grounding electrode(s). The equipment grounding conductor shall be used for grounding or bonding of equipment, structures, or frames required to be grounded or bonded. The equipment grounding conductor shall be sized in accordance with 250.122. Any installed grounded conductor shall not be connected to the equipment grounding conductor or to the grounding electrode(s).
Exception: For existing premises wiring systems only, new or existing buildings or structures only, the grounded conductor run with the supply to the building or structure shall be permitted to be connected to the building or structure disconnecting means and to the grounding electrode(s) and shall be used for grounding or bonding of equipment, structures, or frames required to be grounded or bonded where all the requirements of (1), (2), and (3) are met:
(1) An equipment grounding conductor is not run with the supply to the building or structure,
(2) There are no continuous metallic paths bonded to the grounding system in each building or structure involved, and
(3) Ground-fault protection of equipment has not been installed on the supply side of the feeder(s),
Where the grounded conductor is used for grounding in accordance with the provision of this exception, the size of the grounded conductor shall not be smaller than the larger of either of the following:
(1) That required by 220.61
(2) That required by 250.122

Substantiation: The text in 250.32(B) must be revised to comply with the NEC Style Manual. Since (2) was deleted and made into an exception, (1) title and text was revised by deleting (1) and the title and rewording the text in (B).
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-58.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
TOOMER, R.: See my Explanation of Negative Vote on Comment 5-58.

5-63 Log #2107 NEC-P05 **Final Action: Accept in Principle**
(250.32(B)(2) Exception)

Submitter: Patrick Healy, County of San Diego
Comment on Proposal No: 5-119
Recommendation: Revise text to read as follows:

Exception: For existing premises wiring systems ~~only~~, serving new or existing buildings or structures ~~only~~, the grounded conductor run with the supply to the building or structure shall ~~be permitted to~~ be connected to the building or structure disconnecting means and to the grounding electrode system and shall be used for grounding or bonding of equipment, structures or frames required to be grounded or bonded where all the requirements of (1), (2), and (3) are met...

Substantiation: 1) The use of the word "only" twice is confusing especially since this is an exception to the article which means that it already assumes the meaning of "only".

2) The words "shall be permitted" suggests that they have the option of bonding the neutral conductor to the structure disconnect enclosure and grounding electrode system. In the next sentence, the word "shall" assumes that the same conditions are not an option.

3). The word "system" needs to be added to avoid the interpretation that the neutral needs to be directly run to the grounding electrode.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-58.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
TOOMER, R.: See my Explanation of Negative Vote on Comment 5-58.

5-64 Log #1908 NEC-P05 **Final Action: Reject**
(250.32(D))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-125
Recommendation: Reject the proposal.
Substantiation: The proposal is unnecessary. The references to Article 700, 701, and 702 are Chapter 7 modifications to Chapter 2 general requirements, and as such are fully covered in 90.3. See also 4.1 of the Style Manual.
Panel Meeting Action: Reject
Panel Statement: The panel concludes that this is an area where users need to be advised of requirements in the referenced articles regarding generators that are sometimes installed in out buildings.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-65 Log #518 NEC-P05 **Final Action: Reject**
(250.34)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-126
Recommendation: Accept the proposal.
Substantiation: Same as proposal. According to the definition of "Grounded" in

Article 100, the generator frame is a conducting body that serves in place of the earth. Unless the frame is considered grounded, and one conductor is bonded to the frame there is no ground fault current return path, no grounded (white) conductor, no equipment grounding conductor (by definition), and devices with terminals intended for connection to grounded (white) conductors or grounding conductors cannot be used.
Panel Meeting Action: Reject
Panel Statement: The frame of a generator is not considered to be grounded if not connected to a grounding electrode, based on the definition of "grounded" as accepted by CMP-5 and published in the Report on Proposals. In addition, 250.34(D) of the 2005 NEC requires the system conductor required to be grounded by 250.26 to be bonded to the frame of the generator that is a component of a separately derived system. This connection provides the ground-fault return path.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-66 Log #494 NEC-P05 **Final Action: Reject**
(250.34(B))

Submitter: Richard D. Thompson, Thompson Assoc.
Comment on Proposal No: 5-127
Recommendation: Revise as follows:

250.34(B) Vehicle-Mounted Generator. The frame of a vehicle shall not be required to be connected to a grounding electrode as defined in 250.52 for a system supplied by a generator located on this vehicle under the following conditions:

(1) The frame of the generator is bonded to the vehicle frame, and

(2) The generator supplies only equipment located on the vehicle, ~~or~~ cord-and-plug connected equipment supplied through receptacles, or through single-pole separable connectors mounted on the vehicle, or both equipment located on the vehicle ~~and~~ cord-plug-connected equipment, or through single-pole separable connector receptacles mounted on the vehicle or on the generator, and

(3) The non-current carrying metal parts of the equipment and the equipment grounding conductor terminals of the receptacles are bonded to the generator frame.

(4) Where the service provided by the generator supplies equipment that is located, installed or adjacent to other derived electrical services; the ground of the generator and that of the other derived system shall be bonded.

Substantiation: While this section of the NEC may have originally been written to cover small engine generators or welding/generator machines installed in work trucks; more recently we find that larger truck mounted or towed vehicle mounted generators ranging from 5.0 KW (17.5) AMPS at 120 VOLTS to trailer mounted generators in capacities up to 4000 KW (12040) AMPS at 240 VOLTS. Typically, these generators provide voltages at 120/208 volts or 120/240 volts AC or supply a transformer with voltages suitable to the service required. Some have a rectifier to provide a 110 Volt DC voltage, but this requirement, by the motion picture industry, is being phased out as the use of carbon arc luminaires are obsolete.

Besides construction sites, these generators are commonly used in a number of entertainment industry applications such as on location motion picture and television productions, outdoor concerts or theatrical events, carnivals, circuses and fairs. These generator assemblies will also be found as emergency back-up power for cell phone towers, other communication installations, emergency lighting, rescue equipment, etc. during failure of the utility supplied power such as immediately following an earthquake, or hurricanes.

The question as to whether or not there is a requirement for installing a ground rod needs to now be clarified. The City of Los Angeles does not require the installation of a ground rod for motion picture production. However, the industry finds that when the same production moves it location to another jurisdiction they may be required to install a ground rod. Investigation within the carnivals has found that the requirement of installing a ground rod and its later removal have created more workers compensation claims due to accidents in the removal of the rod than any other claims.

At a 2003 Southern California Section meeting of the International Association of Electrical Inspectors that was chaired by this submitter, the question of ground rods was discussed. Some AHJs present at the meeting would accept a "floating ground" while others were adamant that within their jurisdiction there shall be a ground stake in the ground. The same organization held another meeting in 2004 where a representative of UL explained that if the service was cord and plug connected a ground rod was not required.

There was a question as to whether or not the single-pole separable connectors commonly known as "Cam-Lock" connectors were considered a "plug". These devices fall under UL "Receptacles Stage Type" (RUFR) and UL 1681 Standard. An interpretation by a representative of Underwriters Laboratories has stated that the single-pole separable connector is defined as a plug.
Panel Meeting Action: Reject
Panel Statement: The addition of "single-pole separable connectors" is unnecessary and confusing. The addition of the fourth condition is incorrect because generators do not meet the definition of Service.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-67 Log #1797 NEC-P05 **Final Action: Accept in Principle**
(250.35)

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 5-128
Recommendation: Accept the proposal in principle and revise to read:

Permanently Installed Generators. A conductor that provides an effective ground fault current path shall be installed with the supply conductors from a permanently installed generator(s) to the first disconnecting means in accordance with (A)(1) or (2) and (B)(1) or (2).

(A) Bonding Means.

(1) Where the generator is installed as a separately derived system the requirements in 250.30 shall apply.

(2) Where the generator is not installed as a separately derived system an equipment bonding jumper shall be installed between the generator equipment grounding terminal and the equipment grounding terminal or bus of the first disconnecting means enclosure.

(B) Equipment Bonding Jumper Size.

(1) Where installed on the supply side of the first overcurrent device, the conductor shall be sized in accordance with 250.102(C) based on the size of the derived phase conductors.

(2) Where installed on the load side of the first overcurrent device the conductor shall be sized in accordance with 250.102(D).

Substantiation: I agree with Mr. Mello in his negative comment in that this is an area where guidance is necessary and it could be a safety issue. How to ground the non-current carrying parts of a permanently installed generator that is operating as non-separately derived system is a common question. There is little guidance to provide a definitive answer. This new text attempts to consider the panel's concern regarding re-grounding of the grounded conductor while following the path set forth in 2002 with 250.30(A)(2). The above proposed text considers both the submitters recommendations and Mr. Mello's recommendations in his negative vote comment. The language regarding the metal to metal attachment of the disconnecting means enclosure and the raceway systems was purposely left out of the proposed text. I had concerns with evaluating the suitability of the metal to metal contact and not including the metallic raceway systems seemed to be in line with the action taken in 250.30(A)(2) in 2002. The reference towards using the grounded conductor as the bonding means was also purposely left out as the panel seems to be migrating toward not using the grounded conductor for that purpose. A reference to the use of the grounded conductor could be added if deemed appropriate. The proposed text may need additional work, but hopefully it will provide a benchmark for the panel to develop a clear requirement to address a very real issue.

Panel Meeting Action: Accept in Principle

Revise the 250.35 text from Comment 5-67 to read as follows:

250.35 Permanently Installed Generators. A conductor that provides an effective ground-fault current path shall be installed with the supply conductors from a permanently installed generator(s) to the first disconnecting mean(s) in accordance with (A) or (B).

(A) Separately Derived System. Where the generator is installed as a separately derived system, the requirements in 250.30 shall apply.

(B) Non-separately Derived System. Where the generator is not installed as a separately derived system, an equipment bonding jumper shall be installed between the generator equipment grounding terminal and the equipment grounding terminal or bus of the enclosure of supplied disconnecting mean(s) in accordance with (1) or (2).

(1) The equipment bonding jumper on the supply side of each generator overcurrent device shall be sized in accordance with 250.102(C) based on the size of the conductors supplied by the generator.

(2) The equipment grounding conductor on the load side of each generator overcurrent device shall be sized in accordance with 250.102(D) based on the rating of the overcurrent device supplied.

Panel Statement: Editorial revisions were made for clarity.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-68 Log #2080 NEC-P05 **Final Action: Accept in Principle**
(250.35 (New))

Submitter: Chuck Mello, Underwriters Laboratories
Comment on Proposal No: 5-128
Recommendation: Revise proposed text to read as follows:
250.35 Permanently Installed Generators. A means that provides an effective ground fault current path shall be installed from a permanently installed generator(s) to the enclosure for the first disconnecting means in accordance with 250.35(A) and (B).

250.35(A) Bonding Means. Where the generator is a separately derived system the requirements in 250.30 shall apply. Where the generator is not a separately derived system, the generator shall be bonded to the disconnecting means enclosure by one of the following:

(1) Direct metal-to-metal attachment of the disconnecting means enclosure to the generator frame

(2) Installing the generator feeder conductors in rigid metal conduit, intermediate metal conduit, electrical metallic tubing or wireway

(3) Installing a wire type equipment bonding jumper between the generator terminal enclosure and the first disconnecting means enclosure.

250.35(B) Equipment Bonding Jumper Size. Where on the supply side of the generator overcurrent device, the conductor shall be sized in accordance with 250.102(C) based on the size of the derived phase conductors. Where on the load side of the overcurrent device, the conductor shall be sized in accordance with 250.102(D).

Substantiation: The substantiation provided by the submitter for the proposal clearly indicates a significant safety problem and also an area where the NEC is lacking guidance. There are clear requirements for connection of generators that are in fact separately derived systems but there is no direction on all the connections for non-separately derived systems for permanently installed units. This is particularly true when large generators are installed in parallel to separate paralleling switchgear, which contain both the generator disconnecting means and overcurrent protection. What are the requirements for connecting the generator frame to this switchgear enclosure since it is ahead of the overcurrent protection? This is the same case the panel clarified in the 2002 NEC for separately derived systems with the added equipment bonding jumper between the derived system and the first disconnecting means enclosure. While I agree with the panel's desire not to create another situation where the system grounded conductor is connected to ground again, creating possible parallel paths, the panel should have considered revised language to address the problem. The proposed language above does address this issue and does address the panel's concern about reconnecting the grounded conductor to ground.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 5-67.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-69 Log #1861 NEC-P05 **Final Action: Accept in Principle**
(250.36)

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 5-133
Recommendation: Accept the Proposal with the following changes:

250.36 High-Impedance Grounded ~~Neutral~~ Systems. High-impedance grounded neutral systems in which a grounding impedance, usually a resistor, limits the ground-fault current to a low value shall be permitted for 3-phase ac systems of 480 volts to 1000 volts where all the following conditions are met:

(1) Remain unchanged.
(2) Remain unchanged.
(3) Remain unchanged.
(4) Remain unchanged.

High-impedance grounded ~~neutral~~ systems shall comply with the provisions of 250.36(A) through (G).

(A) Grounding Impedance Location. The grounding impedance shall be installed between the grounding electrode conductor and the system neutral point. Where a neutral point is not available, the grounding impedance shall be installed between the grounding electrode conductor and the neutral point derived from a grounding transformer.

(B) ~~Neutral~~ Conductor. The ~~neutral~~ conductor from the neutral point of the transformer or generator to its connection point to the grounding impedance shall be fully insulated.

The ~~neutral~~ conductor shall have an ampacity of not less than the maximum current rating of the grounding impedance. In no case shall the ~~neutral~~ conductor be smaller than 8 AWG copper or 8 AWG aluminum or copper-clad aluminum.

(C) System Neutral Connection. The ~~system neutral~~ conductor shall not be connected to ground except through the grounding impedance.

FPN: Remain unchanged.

(D) ~~Neutral~~ Conductor Routing. The conductor connecting the neutral point of the transformer or generator to the grounding impedance shall be permitted to be installed in a separate raceway. It shall not be required to run this conductor with the phase conductors to the first system disconnecting means or overcurrent device.

(E) Remain unchanged.
(F) Remain unchanged.
(G) Remain unchanged.

Substantiation: Mr. Mello's statements at the proposal stage are 100 percent correct. The accepted definition (at the ROP stage) does not include the conductor being described in this Code section. The conductor described here does not carry current under normal conditions... it carries current under fault conditions. A fault is not a normal condition. Whatever you call this conductor it most certainly can't be called a neutral, if the accepted definition of "neutral" continues to pass in Article 100.

A similar comment is being made to the proposed definition of "neutral conductor" (5-36) that would allow the technical committees to change the proposed definition so that it doesn't conflict with all of section 250.36. These two comments should be correlated so the discrepancy between this section and the definition does not occur.

Panel Meeting Action: Accept in Principle
Revise 236.36 in the 2008 NEC ROP Draft as follows:

250.36 High-Impedance Grounded Neutral Systems.

High-impedance grounded neutral systems in which a grounding impedance, usually a resistor, limits the ground-fault current to a low value shall be permitted for 3-phase ac systems of 480 volts to 1000 volts where all the following conditions are met:

(1) The conditions of maintenance and supervision ensure that only qualified persons service the installation.
(2) Ground detectors are installed on the system.
(3) Line-to-neutral loads are not served.

High-impedance grounded neutral systems shall comply with the provisions of 250.36(A) through (G).

(A) Grounding Impedance Location. The grounding impedance shall be installed between the grounding electrode conductor and the system neutral point ~~conductor~~. Where a neutral point ~~conductor~~ is not available, the grounding impedance shall be installed between the grounding electrode conductor and the neutral point derived from a grounding transformer.

(B) Grounded System ~~Neutral~~ Conductor. The grounded system ~~neutral~~ conductor from the neutral point of the transformer or generator to its connection point to the grounding impedance shall be fully insulated. The grounded system ~~neutral~~ conductor shall have an ampacity of not less than the maximum current rating of the grounding impedance. In no case shall the grounded system ~~neutral~~ conductor be smaller than 8 AWG copper or 6 AWG aluminum or copper-clad aluminum.
(C) System Grounding ~~Neutral~~ Connection. The system ~~neutral conductor~~ shall not be connected to ground except through the grounding impedance. FPN: Remain Unchanged.
(D) Neutral Point to Grounding Impedance Conductor Routing. The conductor connecting the neutral point of the transformer or generator to the grounding impedance shall be permitted to be installed in a separate raceway from the ungrounded conductors. It shall not be required to run this conductor with the phase conductors to the first system disconnecting means or overcurrent device.
(E) Remain Unchanged
(F) Remain Unchanged
Panel Statement: Editorial changes are made for consistency with Comments 5-70 and 5-71. The title is not changed because these systems have a neutral point.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-70 Log #2071 NEC-P05 **Final Action: Accept in Principle (250.36(A))**

Submitter: Chuck Mello, Underwriters Laboratories
Comment on Proposal No: 5-133
Recommendation: Revise the proposed text to read as follows:
250.36(A) Grounding Impedance Location. The grounding impedance shall be installed between the grounding electrode conductor and the system neutral point. Where a neutral point is not available, the grounding impedance shall be installed between the grounding electrode conductor and the neutral point derived from a grounding transformer.
Substantiation: The panel action should have been to accept in principle. Changing the term "neutral" to "neutral conductor" is incorrect in accordance with the definition of the term "neutral conductor" accepted by the panel. Since this conductor is not expected to carry current, unbalanced or from non-linear loads, under normal conditions, then it cannot be called a neutral conductor. Adding the term "neutral point" is clearer and bypasses the necessity of naming this conductor, which may really be a bonding conductor or another variation of a grounding conductor.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-69.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-71 Log #2076 NEC-P05 **Final Action: Accept in Principle (250.36(D))**

Submitter: Chuck Mello, Underwriters Laboratories
Comment on Proposal No: 5-134
Recommendation: Revise 250.36(D) to read as follows:
~~Neutral~~ Conductor Routing. The conductor connecting the neutral point of the transformer or generator to the grounding impedance shall be permitted to be installed in a separate raceway. It shall not be required to run this conductor with the phase conductors to the first system disconnecting means or overcurrent device.
Substantiation: In this case, just deleting the term "neutral" from the section title is the best solution. The specific conductor being addressed is clarified by the first part of the first sentence, which states "The conductor connecting the neutral point of the transformer or generator to the grounding impedance", and does not need any additional label. The term neutral conductor as defined now is to carry current under certain normal conditions and in this application, the only time this conductor has current flow is under ground fault (abnormal) conditions.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-69.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-72 Log #1024 NEC-P05 **Final Action: Reject (250.50)**

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-135
Recommendation: Add between the two sentences presently constituting 250.50:
"...electrode system. An electrode or electrodes fulfilling the requirement in 250.52(A)(3) shall be installed in any construction utilizing one or more new concrete footings whose dimensions would permit their installation. Where none of these are...".
Substantiation: Mr. Whitehead has provided ample substantiation in terms of improved safety in the City of Macon. Many jurisdictions, in Maryland and other places, have local amendments requiring the installation of concrete-encased electrodes in new construction, based on the work of Mr. Herbert Ufer and on less-than-satisfactory results from other means of establishing grounding electrode systems. The proposed clarification of wording and location should satisfy the CMP's concern about format.
Panel Meeting Action: Reject
Panel Statement: The additional language suggested would add a requirement to install a structural component. The intent of this section is to mandate the use of appropriate structural components, when they exist, as grounding electrodes.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-73 Log #1025 NEC-P05 **Final Action: Accept (250.50)**

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-136
Recommendation: Reject this proposal.
Substantiation: I agree with Mr. Brender that using the earth as a means of maintaining an equal potential between the piers or foundation elements is undesirable. There is no harm in using encapsulated rebar for all but one section of concrete. If Proposal 5-135 is accepted as I suggested in my comment on that, the installation still will not lose out on having this preferable form of grounding electrode.
Panel Meeting Action: Accept
Panel Statement: The submitter wants the proposal rejected, which was the action of the panel in ROP. The panel continues to reject Proposal 5-136. This substantiation appears to be for Proposal 5-137, which also has a comment from submitter.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-74 Log #1060 NEC-P05 **Final Action: Reject (250.50)**

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-137
Recommendation: I urge that you do not Accept nor Accept in Principle.
Substantiation: Mr. Brender's concern should not be overlooked. There is no evidence that builders eliminate all potential concrete-encased electrodes where their bonding is required. I certainly have heard nothing to this effect from AHJs in my area where Ufers are required. Indeed, the hardship of having to bond rebar can be eliminated by using encapsulated rebar, a better system-but a more-expensive one! Furthermore, if Mr. Whitehead's proposal is accepted as I propose rewording it in my comment on Proposal 5-135, we retain the benefit and reduce the risk that concerns Mr. Jones, one usable Ufer will remain.
Panel Meeting Action: Reject
Panel Statement: The permissive language in this proposal would not preclude designer and builders from bonding multiple concrete-encased electrodes together.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
BRENDER, D.: The action on the Proposal to Accept in Principle should be reversed. Where more than one concrete encased electrode exists in the foundation for the building or structure, they should all be bonded together. If this is not done, dangerous voltages can be impressed between metallic portions of the buildings or structures that are connected to grounding electrodes that are not bonded together.

5-75 Log #1909 NEC-P05 **Final Action: Reject (250.50)**

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-138
Recommendation: Continue, in effect, to accept the proposal in principle (even though it was erroneously rejected). The concept of the multiple concrete-encased electrodes only needing a single connection (II of the proposal) has been accepted under Proposal 5-137. The concept of a concrete-encased electrode bonded to a steel column (I of the proposal) appears to have been accepted in the panel action on Proposal 5-148.

Substantiation: Please reconsider the proposal and double check to be sure that the concepts are indeed included, particularly the allowance to allow structural steel as a sufficient bonding path to a concrete-encased electrode. Many foundation designs show the reinforcing steel members tightly secured to the J bolts holding the steel columns. We routinely review this during inspections.
Panel Meeting Action: Reject
Panel Statement: Proposal 5-138 has multiple requirements that were rejected by the Code panel. No additional substantiation was provided for reconsideration.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-76 Log #382 NEC-P05 **Final Action: Reject**
(250.50, FPN (New))

Submitter: James D. Erwin, Celanese Ltd
Comment on Proposal No: 5-135
Recommendation: Add FPN to 250.50 to read:
"FPN: For new construction, buildings or structures requiring rebar or rods (concrete-encased electrodes) shall include the rebar or rods as part of the grounding electrode system, regardless if other grounding electrodes are available."
Substantiation: The Article does not clearly address new construction. The second sentence of 250.50 specifies that where no grounding electrodes exist, listed specific requirements must be installed and used. Assuming no grounding electrodes exist with new construction, this seems to imply that the second sentence requirement is sufficient. The addition of the FPN will add clarity.
Panel Meeting Action: Reject
Panel Statement: The proposed text does not comply with 3.1.3 of the NEC Style manual, since it uses mandatory text in the FPN.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-77 Log #609 NEC-P05 **Final Action: Reject**
(250.50(A))

Submitter: Paul Guidry, Fluor Enterprises, Inc
Comment on Proposal No: 5-153
Recommendation: Add new text:
250.50(A): For engineered, supervised industrial installations it shall be permissible to eliminate the bonding of the concrete-encased steel reinforcing bars in foundations to the grounding electrode system where it has been determined corrosion of the steel reinforcing bars will occur due to galvanic corrosion.
FPN: Refer to NACE Standard Recommended Practice RP0290-2000. Item No. 21403, Impressed Current Cathodic Protection of Reinforcing Steel In Atmospherically Exposed Concrete Structures, for more information regarding steel corrosion and other deterioration phenomena associated with concrete.
Substantiation: I disagree with the panel statement that "there are methods of bonding the concrete-encased grounding electrode to the grounding electrode system that would minimize or eliminate any possibilities of corrosion due to galvanic reactions". This implies that there is a pressure connector or an exothermic connection that reduces corrosion. I'm not aware of a UL 467 listed, dielectric electrical connector. If this is a true statement, can the panel please refer to a document such as NEMA, NFPA or IEEE where this is covered?

There are indeed methods to minimize or eliminate the possibility of corrosion of the rebar and it's usually referred to as "cathodic protection" systems. Adding a cathodic protection system to the rebar has nothing to do with bonding methods. Cathodic protection systems can add a great deal of cost to a project when the rebar didn't need to be bonded to the copper to begin with. When this revision was made in the 2005 Code, (Proposal 5-115 and Comment 5-77) there was no substantiation given as to a history of problems in using copper rods and cable alone for a grounding electrode system.

The other part of the cost issue is the amount of rebar that would need to be bonded. According to the words in 250.50 today, all rebar in pile caps, small pump foundations, i.e., any concrete slab with more the 20 ft of 1/2 in. rebar has to be bonded to the copper grounding electrode system. This is impractical as well as costly. If bonding all this rebar to the copper grounding electrode system served a real safety purpose, then cost wouldn't be an issue. But, in industrial plants where the specifications typically require less the 5 ohms resistance, bonding all the rebar doesn't make it a safer installation.

I agree with the panel that for most commercial or residential installations that the rebar should be part of the grounding electrode system. But, in large, engineered, petrochemical plants with a copper rod/cable grounding electrode system this is unnecessary. I've modified the text to allow this exception to apply to engineered, industrial installations only.

The Code states in Article 90 that the NEC isn't a design guide. This is a design issue, not a safety issue. Engineering judgment should prevail in some instances and I believe this is one of them.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its original actions on Proposal 5-153. Concrete-encased electrodes that are an inherent element of the building construction are natural grounding electrodes that are required to be included as part of the grounding electrode system as required in 250.50. There has been no substantiation provided that indicates corrosion in building footings is a problem directly related to connecting a copper conductor to a length of steel reinforcing rod. The submitter has provided no substantiation that indicates equivalent safety can be achieved in supervised industrial installations by eliminating a natural and present grounding electrode from the required grounding electrode system.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-78 Log #1120 NEC-P05 **Final Action: Reject**
(250.52(5))

Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 5-144
Recommendation: Reconsider the proposal.
Substantiation: Please see comment for Proposal 5-174.
Panel Meeting Action: Reject
Panel Statement: This comment provided no additional substantiation for reconsideration of Proposal 5-144.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-79 Log #1121 NEC-P05 **Final Action: Reject**
(250.52(6))

Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 5-145
Recommendation: See comment for 5-174.
Substantiation: None.
Panel Meeting Action: Reject
Panel Statement: This comment provided no additional substantiation for reconsideration of Proposal 5-145.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-80 Log #1115 NEC-P05 **Final Action: Accept**
(250.52(A)(1))

Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 5-146
Recommendation: Please accept the proposal to add the word "institutional."
Substantiation: The panel comment "CONCLUDES" that institutional buildings are INCLUDED, but the Panel's comment doesn't count as they REJECTED the proposal.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 11 Negative: 4
Explanation of Negative:

BRETT, JR., M.: I am voting negative, I agree with the negative votes. The term "institutional" is well understood, however, I do not believe a special allowance should be permitted. Most facilities such as a school campus or a military base have multiple occupancies and each should be individually classified by use, occupancy and safety hazards to personnel when determining the proper electrical installation methods.

HAMMEL, D.: The current wording is used in exceptions throughout the NEC. The use of the term "institutional" as an occupancy variance from a main rule should have a broad consensus throughout the NEC.

MELLO, C.: Adding the word "institutional" resolved one submitter's issue but now raises the greater issue of how many "occupancy types" will the panel be requested and have to debate about adding to this ever growing list. Also see my statement for Comment 5-81.

MOHLA, D.: This proposal to add term "institutional" should be rejected otherwise it will become a laundry list of various terms.
The term "institutional" is not defined in the National Electrical Code. Addition of this term to the code would create confusion to what is an "institution" and what does it cover?
Does it cover educational institutions only? Or does it cover other institutional installations such as correctional facilities, health care etc.? How is it ensured that maintenance work has not been out sourced at such facilities? AHJ has the final jurisdiction to confirm. If conditions of maintenance and supervisions ensure only qualified personnel will perform the electrical work similar to the conditions in industrial and commercial installations. This cannot be a laundry list of locations where such provisions apply and final decision has to be by AHJ on a case by case basis.

5-81 Log #2081 NEC-P05 **Final Action: Reject**
(250.52(A)(1))

Submitter: Chuck Mello, Underwriters Laboratories
Comment on Proposal No: 5-146
Recommendation: Delete the terms "industrial and commercial" from the existing text to read as follows:

250.52(A)(1) Exception: In ~~industrial and commercial~~ buildings or structures where conditions of maintenance and supervision ensure that only qualified persons service the installation, interior metal water piping located more than 1.52 m (5 ft) from the point of entrance to the building shall be permitted as a part of the grounding electrode system or as a conductor to interconnect electrodes that are part of the grounding electrode system, provided that the entire length, other than short sections passing perpendicular through walls, floors, or ceilings, of the interior metal water pipe that is being used for the conductor is exposed.

Substantiation: The panel should have acted to Accept in Principle and revise the existing text to delete the terms "industrial and commercial". The problem raised by the submitter is common when there are NEC definitions for some types of buildings and there are Building Code definitions and names that are different from the NEC. The panel's statement is correct that the intent is to include "institutional" buildings in the group of "industrial and commercial". The question for the panel is what other type of occupancies are intended to be included that is now open to wide interpretation? The real question that needs to be asked is if the building type, industrial, commercial, health care facility, institutional, multi-family dwelling, multiple occupancy, etc. matters where the key qualifier is having continuous maintenance and supervision that ensures the original system is not impaired through actions of other trades over the building or structures life. If the qualified staff and supervision are present then the building or business type really would not appear to matter. Deleting the qualifier "industrial and commercial" altogether would be a better alternative than adding "institutional" as proposed and continue the list building evolution that will assuredly come.
Panel Meeting Action: Reject
Panel Statement: The removal of "industrial and commercial" from the exception would allow the exception to be applied in a residential occupancy. The current wording is used throughout the NEC. There is no technical substantiation that a problem exists with the current wording.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

BRETT, JR., M.: I am voting negative, I agree with the negative voter. See my explanation of vote on Comment 5-80.

MELLO, C.: As stated in the substantiation for the comment, the real concern is that a properly qualified maintenance management staff or system be in place to ensure other trades do not disturb the water piping and thereby open the "ground" reference where used as an extended grounding electrode. In reality, the type of occupancy does not matter and by continuing to establish and use undefined occupancy types as a qualifier will only garner more proposals for adding to the list. The great concern identified for "residential" or "dwellings" is easily covered by having to convince the AHJ that the owner has "qualified maintenance and supervision" to maintain the integrity of the system. Even for the "institutional" occupancy that was added for the university cited in the proposal substantiation, does this also include the residence halls that are technically residential type occupancies? I would think it does since the same maintenance staff oversees these buildings as well as the classroom and laboratory buildings. Does a high-rise building with multiple floors of retail and office space topped by several stories of condominiums qualify as a "commercial" building or does the residential aspect disqualify the entire structure from using the exception. What about a small manufacturing "industrial" plant that has the owner residing above the plant office. The comment submitted should have been considered by the panel to really highlight the requirement for "qualified maintenance and supervision" and eliminate the undefined type of building use.

5-82 Log #1033 NEC-P05 **Final Action: Reject**
(250.52(A)(1) Exception)

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-146
Recommendation: Revise text to read as follows:

"In ~~industrial and commercial~~ buildings or...".

Substantiation: The operant terms are "where conditions of maintenance and supervision ensure...".

To take the most extreme example, Mr. Cartal talks of a college campus, but let's look at their dormitories; these are parts of institutions that serve as residences, and moreover residences occupied by often-immature people. Nonetheless, where the AHP can be convinced that conditions of maintenance and supervision ensure that only qualified persons will have dealings with the GEC connections, the degree of safety may be comparable to or better than that in a store basement.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-81.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:

MELLO, C.: See the statement for Comment 5-81.

5-83 Log #345 NEC-P05 **Final Action: Reject**
(250.52(A)(2))

Submitter: Edward G. Kroth, Westphal & Company Electrical Construction
Comment on Proposal No: 5-149
Recommendation: Revise text to read as follows:

(2) Effectively Grounded Metal Frame of the Building or Structure. The metal frame of the building or structure shall be considered effectively grounded when it is connected to earth in either of the following methods. ~~where any of the following methods are used to make connection to earth.~~

Substantiation: As an instructor in IBEW Local 159's night school program, I have found that having the phrase "Effectively Grounded" as part of the previous code edition helped to reinforce the concept that not all building steel is necessarily a grounding electrode.

Moreover, I do not agree with the panel's statement that the term "effectively grounded" is vague and unenforceable in this case. Effectively has a definition of "producing the expected results." In this instance, the expected result is to provide a permanent and low impedance path to ground. The adverb is appropriate because the emphasis is necessary in order to distinguish the difference between metal structural framing that is a grounding electrode and that which is not. (I've seen experienced electricians confuse the two types all too often.)

Due to the criteria set out in 250.52(A)(2), the term "effectively grounded" is no longer vague and unenforceable. 250.52(A)(2)(1) through (4) as it exists in the '05 NEC and (1) through (3) as it exists in the panel's response to Mr. Johnston's Proposal 5-148 in the current ROP in effect defines the term "effectively grounded" metal frames of a building or structure and in my mind gives clear separation from the structural metal referred to in 250.104(C).

Using the phrase "effectively grounded metal frame" certainly rolls off the tongue easier than having to say "metal frame of the building or structure that satisfies the criteria of 250.52(A)(2)".
Panel Meeting Action: Reject
Panel Statement: The term "effectively grounded" is subjective, and there are no specific parameters by which one can judge something to be "effectively grounded." CMP-5 deleted the definition of this term for this reason under the scope and work of the TCC-assigned task group on grounding and bonding. See panel action and statements on Proposal 5-12 (Log. No. 1516).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-84 Log #1283 NEC-P05 **Final Action: Reject**
(250.52(A)(2))

Submitter: Michael P. O'Quinn, MOGO Enterprises, Inc.
Comment on Proposal No: 5-148
Recommendation: Revise text to read as follows:

(2) Metal Frame of the Building or Structure. The metal frame of the building or structure, where ~~any of the following methods are used to make an earth connection~~:

~~(1)~~ 3.0 m (10 ft) or more of a single structural metal member in direct contact with the earth or encased in concrete ~~that~~ is in direct contact with the earth.

~~(2) The structural metal frame is bonded to one or more of the grounding electrodes as defined in 250.52(A)(1). (A)(3), or (A)(4)~~
~~(3) The structural metal frame is bonded to one or more of the grounding electrodes as defined in 250.52(A)(5) or (A)(6) that comply with 250.56, or~~
~~(4) Other approved means of establishing a connection to earth.~~
FPN: See 250.104(C) for required bonding.

Substantiation: The problem with this Section deals with the definition of a grounding electrode introduced in the 2005 NEC®. "A device that establishes an electrical connection to the earth." Simply put, if the possible electrode relies on another electrode to fulfill this definition, it is not an electrode.

I think we are confusing a grounding electrode - a device used to fulfill 250.4(A)(1), 250.4(A)(2), and 250.4(B)(1) to establish a ground reference - with the bonding requirements of 250.104(C), which fulfllls 250.4(A)(3), 250.4(A)(4), 250.4(B)(2), and 250.4(B)(3) keeping building steel at ground-level voltage.

The examples given by the submitter, as well as Mr. Rappaport in his Explanation of Negative, refer to using a "real" grounding electrode to make building steel one. This does fulfill 250.104(C), but requires building steel to be "supplemented" in most cases with another real electrode, essentially having the same requirements as metal water piping, without the wording. This gives the false belief that building steel establishes the ground reference, but actually the ground rod or concrete-encased electrode does - building steel is just bonded.

The addition of the fine print note will remind the installer of the bonding requirement.

Panel Meeting Action: Reject
Panel Statement: The commenter has proposed, without substantiation, eliminating viable grounding practices. While the comment may be attempting to ensure that the language of 250.52 is semantically correct, editorial changes of this type require corresponding correlating changes in other Code sections to ensure that the existing Code rules are not affected. The panel action on Proposal 5-146 addressed the concerns of the submitter by removing the conflict with the water pipe electrode supplement requirements created in the 2005 NEC cycle. The panel retained former (4) as a renumbered (3) to recognize other approved means of establishing a connection to the earth through the metal building frame.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-85 Log #1521 NEC-P05 **Final Action: Accept**
(250.52(A)(2))

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 5-148
Recommendation: Modify 250.52(A)(2) resulting from Panel Action on Proposal 5-148 as follows:

(2) Metal Frame of the Building or Structure. The metal frame of the building or structure that is connected to the earth by either of the following methods:

(1) 3.0 m (10 ft) or more of a single structural metal member in direct contact with the earth or encased in concrete that is in direct contact with the earth

(2) The structural metal frame is connected to the reinforcing bars of a concrete-encased electrode as provided in 250.52(A)(3) or 250.52(A)(4).

(3) The structural metal frame is bonded to one or more of the grounding electrodes as defined in 250.52(A)(5) or (A)(6) that comply with 250.56, or

(4 ~~3~~) Other approved means of establishing a connection the earth.

Substantiation: Panel Action on proposal 5-148 removed the possibility of using metal frame of the building or structure as a grounding electrode where the metal frame is connected to other acceptable grounding electrodes. This comment would restore the permission to consider the metal frame of a building or structure as a grounding electrode if it is connected to a ground ring or made electrodes.

The substantiation in the proposal was related to connections to water pipes and supplemental electrodes. The problem described in the substantiation can be solved completely by removing reference to 250.52(A)(1) in item 2. This comment retains this deletion. There was no substantiation for deletion of a connection to a ground ring or other electrodes. Use of metal frame of a building or structure connected to a ground ring or a field of made electrode as grounding electrode has been a long-standing practice used when extensive contact with earth and good shielding is required for facilities.
Panel Meeting Action: Accept

Modify 250.52(A)(2) resulting from panel action on Proposal 5-148 as follows:

(2) Metal Frame of the Building or Structure. The metal frame of the building or structure that is connected to the earth by any of the following methods:

(1) By 3.0 m (10 ft) or more of a single structural metal member in direct contact with the earth or encased in concrete that is in direct contact with the earth

(2) By connecting the structural metal frame to the reinforcing bars of a concrete-encased electrode as provided in 250.52(A)(3) or ground ring as provided in 250.52(A)(4)

(3) By bonding the structural metal frame to one or more of the grounding electrodes as defined in 250.52(A)(5) or (A)(6) that comply with 250.56, or

(4 ~~3~~) By other approved means of establishing a connection to earth.

Panel Statement: Only editorial corrections were made to this recommended text.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

JOHNSTON, M.: The panel action confirms that structural steel that is only grounded to the metal water system should not be considered as a grounding electrode. Metal water systems are required to be supplemented by another electrode to be considered a grounding electrode and should not be allowed to be the only qualifier for structural steel to become a grounding electrode. This was inadvertently incorporated in the 2005 edition in error.

The panel action on Comment 5-85 has not addressed the primary objectives of Proposal 5-148. All grounding electrodes listed in 250.52(A) should meet the criteria in the revised definition of the term grounding electrode in Article 100. This definition, as revised by Proposal 5-14, clearly indicates that grounding electrodes are in direct contact with the earth. The panel actions on Comment 5-148 to restore item (3) contradicts what constitutes a grounding electrode, by definition. A grounding electrode should not require being connected to another electrode to become a grounding electrode. As accepted, this is what item (3) allows.

Information provided in the substantiation to Comment 5-148 indicated a need to introduce additional provision that will recognize interconnected metallic building frames as serving as a conductive path to ground through the electrodes in 250.52(A) to which it is connected. The resulting action on Comment 5-85 and Proposal 5-148 clearly indicate a need for new provisions in the 2011 NEC that will adequately address current industry practices of using structural metal building frames as grounding electrodes, even when they do not qualify as grounding electrodes by definition.

MELLO, C.: The efforts of the TCC Grounding and Bonding Task Group were to clarify terminology and to ensure correct application. This panel action goes against those efforts. There is a clear definition of what a "grounding electrode" is in Article 100 and that is expanded on in 250.52 with specifics. 250.52(A)(2)(1) is clearly a grounding electrode all by itself and historically is what was meant by the old terminology "effectively grounded structural metal". 250.52(A)(2)(2) in the first part, with the rebar in the support footings connected to the frame, also provides the structural metal columns and interconnecting beams as a grounding electrode unto itself. To now say that something is a grounding electrode because it is connected to something else that really is a grounding electrode is illogical and can create great confusion to installers and AHJs. One of the accepted substantiations to redefine the structural metal electrode in the 2005 cycle was that the bonding of the structural metal to the service as required in 250.104 does not then make the structural metal a grounding electrode. While I agree that the structural metal frame of a building may be the best conductor to get to the grounding electrode, when the structural metal frame is itself not a grounding electrode, the fact is that it is a conductor and to call it a "grounding electrode" is incorrect.

5-86 Log #381 NEC-P05 **Final Action: Accept in Principle**
(250.52(A)(3))

Submitter: James D. Erwin, Celanese Ltd
Comment on Proposal No: 5-152
Recommendation: Accept Proposal 5-152.
Substantiation: Present wording requires concrete-encased electrodes to be located near the bottom of the concrete foundation or footing. There is no technical substantiation for this requirement and it precludes the use of any other type of design without major modification.
Panel Meeting Action: Accept in Principle

(3) Concrete-Encased Electrode. An electrode encased by at least 50 mm (2 in.) of concrete, located horizontally ~~within and~~ near the bottom or vertically, and within that portion of a concrete foundation or footing that is in direct contact with the earth, consisting of at least 6.0 m (20 ft) of one or more bare or zinc galvanized or other electrically conductive coated steel reinforcing bars or rods of not less than 13 mm (1/2 in.) in diameter, or consisting of at least 6.0 m (20 ft) of bare copper conductor not smaller than 4 AWG. Reinforcing bars shall be permitted to be bonded together by the usual steel tie wires or other effective means. Where multiple concrete-encased electrodes are present at a building or structure, it shall be permissible to bond only one into the grounding electrode system.

Panel Statement: The revised text meets the intent of the submitter.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-87 Log #1059 NEC-P05 **Final Action: Reject**
(250.52(A)(3))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-135
Recommendation: Add new text as follows:
In any construction utilizing a new concrete footing, at least one concrete-encased electrode shall be constructed.
Substantiation: Mr. Whitehead offers ample substantiation based on Macon's before-and-after experience. The utility of adding such language is borne out by the practice of various other jurisdictions, including a number in Maryland, that have required Ufers in new construction. The language, "In any construction utilizing a new concrete footing..." is intended to make this easier to accept, by reducing the burden on a contractor, with the Ufer requirement added when there's going to be a pour anyway.
Panel Meeting Action: Reject
Panel Statement: There is no additional substantiation to require the installation of a concerte-encased electrode. It is not the intent of this section that a concrete-encased electrode be constructed. Rather it must be used if present.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-88 Log #1047 NEC-P05 **Final Action: Reject**
(250.52(A)(4))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-155
Recommendation: Revise text to read as follows:
(4) ~~Ground Ring.~~ Copper Wire Electrode. At least 6.0 m (20 ft) of bare copper conductor not smaller than 2 AWG ~~ground ring encircling the building or structure, or a grounding lateral~~ in direct contact with the earth.~~, consisting of at least 6.0 m (20 ft) of bare copper conductor not smaller than 2 AWG.~~
FPN: Traditionally, this has been installed in the form of a ring encircling the building or structure.
Substantiation: I agree with Messrs. Don Ganiere and Chuck Mello that since there is no technical substantiation for use of the ring shape, we lack justification for restricting these installations to that design. If ground rings were installed in the form of closed loops, they would enjoy some of the advantages of the British ring wiring of circuits-break a wire in one place and continuity remains from the other direction. However, installers have not been required to install these with their ends bonded together, so this remains a design choice. Hence, the ring shape offers no clearly substantiated advantage over others. I agree with the CMP that there is no strong reason for using the additional term, "grounding lateral."
Panel Meeting Action: Reject
Panel Statement: No substantiation has been provided to remove the provisions for grounding ring electrode from this section. The proposed allowance for not less than 6.0 m (20 ft) of 2 AWG copper in contact with the earth is unsubstantiated as a satisfactory grounding electrode.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-89 Log #1054 NEC-P05 **Final Action: Reject**
(250.52(A)(4))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-155
Recommendation: Accept as proposed.
Substantiation: I agree with Messrs. Don Ganiere and Chuck Mello that since there is no technical substantiation for use of the ring shape, we lack justification for restricting these installations to that design. If ground rings were installed in the form of closed loops, they would enjoy some of the advantages of the British ring wiring of circuits-break a wire in one place and continuity remains from the other direction. However, installers have not been required to install these with their ends bonded together, so this remains a design choice. Hence, the ring shape offers no clearly substantiated advantage over others.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its original action and statements on Proposal 5-155. See also panel action and statement on Comment 5-88.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-90 Log #2072 NEC-P05 **Final Action: Reject**
(250.52(A)(4))

Submitter: Chuck Mello, Underwriters Laboratories
Comment on Proposal No: 5-155
Recommendation: Revise the text for 250.52(A)(4) as follows:
Ground Ring or Grounding Lateral. A ground ring encircling the building or structure, or a grounding lateral in direct contact with the earth, consisting of at least 6.0 m (20 ft) of bare copper conductor not smaller than 2 AWG.
Substantiation: The panel's statement in rejecting this proposal does not support the panel action. 250.52 and its various subparts are In fact what defines the device or thing that constitutes a grounding electrode. The panel statement that a "ground lateral" is not currently defined is negated by the fact that a "ground ring" is also not currently defined except by 250.5(A)(4) exactly where the submitter wants to add this other option. The panel's statement that there was no substantiation is also incorrect. No more substantiation than the statement that a ground ring is acceptable is needed and is sufficient to what is proposed, otherwise the panel needs to technically substantiate why the ring continues to be accepted and that the proposed "grounding lateral" is not. The IEEE green book and a number of long time engineering practices for telecommunications and power distribution sites (high voltage transmission towers) have recognized the "counterpoise" or "ground lateral", or whatever term is to be used, as a suitable grounding electrode. The proposed "grounding lateral" is no more than the already accepted "ground ring" straightened out instead of being in a circular shape. If 20 feet of 2 AWG copper in a circular shape around a building or structure is acceptable, what is the technical reason for 20 feet of 2 AWG copper buried along side the building or structure or radiating out from one or more sides or corners not acceptable? The same earth contact is achieved at the same burial depth, etc.
Panel Meeting Action: Reject
Panel Statement: The panel maintains that ground ring electrodes are required to encircle the building or structure, and no substantiation has been provided that demonstrates 6.0 m (20 ft) of 2 AWG copper wire in contact with the earth will perform as a satisfactory grounding electrode. The panel maintains that the term "ground lateral" is undefined and would contribute to inconsistent application and interpretations of the Code rules applying to ground ring electrodes. See panel action and statement on Proposal 5-155 and Comment 5-88.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
MELLO, C.: The panel statement fails to technically address the substantiation provided. To continue to say the term "grounding lateral" is not defined, when "ground ring" is also not defined, yet both serve the same function is illogical. Technical substation was provided from industry practice and also from recognized industry standards on this application. It should be noted that NFPA 780 section 4.13.5 for Lightning Protection systems specifically recognizes the "grounding lateral" (their term is a "radial electrode" as a suitable grounding electrode. The amount of earth contact for a wire 20 feet in length buried 30 inches deep is exactly the same if it is in a straight line or if it is in a circle around a building or structure. The panel did not provide a technical response as to why the ground ring continues to be accepted and this proposed and industry recognized alternative is not.

5-91 Log #2251 NEC-P05 **Final Action: Reject**
(250.52(A)(4) (New))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 5-155
Recommendation: The panel should accept this proposal.
Substantiation: This proposal should be reviewed in the light of the negative comments of Mr. Mello. I am asking for an additional option for the installation of grounding electrodes. Clearly a 20ft length of bare copper, buried at least 30 in. below grade would be a superior electrode to a single 8ft rod buried horizontally at the same depth as now permitted by 250.53(G).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-90.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
MELLO, C.: See my statement for Comment 5-90.

5-92 Log #446 NEC-P05 **Final Action: Reject**
(250.52(A)(4), FPN (New))

Submitter: Paul Schwartz, FLUOR
Comment on Proposal No: 5-155
Recommendation: Add a new FPN below paragraph 250.52(A)(4) as follows:
FPN: For more information regarding the installation of ground rings, see IEEE 80, Guide for Safety in AC Substation Grounding.
The text may also be added to 250.53(F) if the panel decides it is appropriate.
Substantiation: 250.52(A)(4) allows for ground rings to be installed. The recommended FPN addition will clarify that information on ground rings and ground grids associated with high voltage installations can be found in IEEE 80.
Panel Meeting Action: Reject
Panel Statement: IEEE 80 generally covers installations outside of the scope of the NEC. A reference to IEEE 80 in 250.52(A)(4) is not helpful to the user.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-93 Log #628 NEC-P05 **Final Action: Accept**
(250.52(A)(5))

Submitter: Roger J. Montambo, Glavan Industries, Inc.
Comment on Proposal No: 5-160
Recommendation: Affirmative comment!
Substantiation: This communication is intended to provide technical support and acceptance by offering an "affirmative comment" on panel-5's action to "accept-in-principle" proposed amendment for the 2008 NEC 250.52.A.5, Log #1985. The panel's action very effectively clarifies 250.52 by eliminating potential interpretation errors by the AHJs related to wording, which has been interpreted inconsistently by AHJs nationwide. These changes eliminate confusion, and allow the code to be interpreted for exactly what it is.
We feel that certified or "listed products" further simplify inspections performed by AHJs by acknowledging the "listing mark" during the inspection process. This allows the AHJ to immediately proceed to the next step in the process. It also removes likelihood of misinterpretation due to code wording confusion, thus providing an installation in full compliance of the NEC. How many "non-listed" products are presently permitted in a residential electrical installation?

Galvan is a supporter of the panel's decision to accept in principle paragraph 250.52(A)(5) - as written. This does not eliminate "non-listed" products which may comply with the code, but provides for a means to verify compliance without the need for special tools and/or equipment during the inspection process.

Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-94 Log #2077 NEC-P05 **Final Action: Reject**
(250.52(A)(5))

Submitter: Chuck Mello, Underwriters Laboratories
Comment on Proposal No: 5-156
Recommendation: Revise text of 250.52(A)(5) to read as follows:

250.52(A)(5) Rod-Type and Pipe Electrodes. Rod and pipe-type electrodes shall meet the following requirements:

(a) Pipe or conduit-type electrodes shall not be smaller than metric designator 21 (trade size ¾) and, where of iron or steel, shall have the outer surface galvanized or otherwise metal-coated for corrosion protection.

(b) Rod-type electrodes shall meet all the following requirements:

(1) Rod-type electrodes shall be listed.

(2) Rod-type electrodes shall not be less than 2.44 m (8 ft) in length.

(3) Rod-type electrodes of steel, stainless stee
l, or their equivalent shall not be less than 13 mm (½ in.) in diameter.

(4) Rod-type electrodes of steel, other than stainless steel, shall be coated with copper or zinc.

Substantiation: The panel action on proposal 5-156 should have been to Accept in Part. The part to delete the "pipe" electrode was substantiated by the fact, indicated by the installer representatives on the panel, that galvanized pipe or rigid conduit is still used, although infrequently in the United States.

With regard to ground rods the action should have been to Accept in Principle. Over the past three Code cycles there have been numerous proposals about hard set size, vs. hard or soft metric conversions, tolerances due to nominal manufacturing size, copper vs. galvanized coating, etc. The submitter made a good case for the enforcement agencies to have all ground rods listed to eliminate this continued flow of proposals and the field issues the many installers and AHJs have to wrestle with about if this one acceptable or is that acceptable, or can I use this splice connector on this rod, and so on. UL 467 already deals with the make up of the rod materials, dimensions, coating issues, suitability of the coating to withstand the impact of installation, compatibility of splice connectors etc. Listing can and does exist for ground rods of diameters 5/8 inch or greater. One of the major manufacturer's in his presentation to the panel confirmed that Listing would resolve many of the controversies and issues coming from the industry. In addition, by requiring Listing, some of the existing convoluted Code language can be simplified into a list format as detailed above with the incorporation of panel accepted actions. The panel should also note that by the present language an Iron or steel rod 5/8 Inch or greater in diameter has no restrictions, no corrosion protection requirements or anything else. The big controversy about sustainability for some time is not even considered for rods that are 5/8 Inch or larger, whereas with the proposed changes all rods will have to meet specific requirements.

Panel Meeting Action: Reject
Panel Statement: There is no field evidence to require rod-type electrodes to be listed.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

JOHNSTON, M.: The installation of different types and sizes of listed and non-listed rod type grounding electrodes is a concern for the enforcement and installers of rod type grounding electrodes. The submitter is correct that it has led to many field issues with contractors and inspectors. Listing of rod type electrodes is done by some manufacturers and if only listed rod type electrodes were required, there would be no questions by the contractor or the inspector that the rod complies. Enforcers of the code rely on testing laboratories to verify the construction criteria of many electrical components and UL 467 is a standard that evaluates rod type electrodes for various installation concerns. A requirement that all ground rods be listed will result in leveling the playing field and require manufacturers of these grounding electrodes to meet minimum criteria in a product standard, not just the NEC. This type of requirement would benefit the code enforcement community by providing a more ready basis for approvals and limit the amount of non-code-complaint products being installed to meet a grounding requirement, which is an essential element of the electrical safety system. The submitters of the proposal and comment did provide evidence indicating a clear need for this listing requirement.

MELLO, C.: The panel statement for rejecting this comment does not address the substantiation provided in the comment. In fact much substantiation has been provided in the several proposals and comments over the last three Code cycles that many ground rods are not suitable or cannot be determined to be suitable by AHJs. It is interesting the panel continues to require a ¾ inch pipe electrode to be galvanized, yet continues to allow "rod" made of steel or iron 5/8 inch or greater in diameter to be used without any corrosion protection requirements. It is also interesting to note the panels unwavering requirement that the connectors for the grounding electrode conductor to this "rod" have to be listed as grounding and bonding equipment, yet the rod does not if it is 5/8 inch or greater in diameter. In the presentation to the panel this cycle, one such example was shown where a rod failed one of the basic tests for coatings required under the listing, but this rod could continue to be sold and installed since there is no Code listing requirement where 5/8 inch or greater in diameter. The discussion about longevity is not an issue since none of the electrodes identified in 250.52 have requirements for longevity nor is longevity a Code consideration in 250.50. Longevity of the grounding electrode(s) selected is an issue with many variables on soil conditions, moisture, and other environmental variables and is a design decision that goes beyond Code requirements. This comment sought to finally set minimum requirements that would allow products meeting those minimum requirements to be in the marketplace and to enable AHJs to readily verify the product is suitable in its installation. This would take all the debates about nominal dimensions, coatings, and the other product specific arguments surrounding ground rods out of the Code realm and properly place them in the product standard arena where they belong.

5-95 Log #383 NEC-P05 **Final Action: Reject**
(250.52(A)(5)(b))

Submitter: Michael Gassman, ERICO, Inc.
Comment on Proposal No: 5-160
Recommendation: Revise as follows:

Grounding rod electrodes of solid stainless steel, solid copper, ~~and or~~ copper coated solid steel or zinc coated solid steel shall be at least 15.87 mm (5/8 in.) in diameter, ~~unless listed and not less than 12.70 mm (1/2 in.) in diameter.~~

Listed grounding rod electrodes of solid stainless steel or copper coated solid steel shall be at least 12.70 mm (1/2 in.) in diameter.

Substantiation: 1. The draft of 250.52(A)(5)(b) is ambiguous. The current draft could be interpreted to exclude copper coated steel ground rod electrodes. It also does not specify "rod" electrodes.

The NEC Style Manual states:

3.3...procedure clear, unambiguous, NEC language.

3.3.5...list should be parallel...

2. Solid stainless steel and solid copper ground rod electrodes need to be clearly identified.

3. In the substantiation of Proposal 5-160, "Longevity is NOT part of the NEC."

Comment:

NEC 90.1 Purpose

NEC 90.1(A) Practical Safeguarding. The purpose...practical safeguarding of persons and property from hazards...

NEC 90.1(B) Adequacy...considered necessary for safety. Compliance therewith and proper maintenance results in an installation that is essentially free from hazard...

Conclusion: Safeguarding and safety indicate longevity. This makes it a code concern.

In addition, 250.52(A)(7)(B) excludes the use of aluminum. This is because it will not last.

4. "Corrosion" is used throughout the code. It is referred to over 100 times. "Corrosion-resistant is referred to over 30 times.

5. Corrosion resistance is related to longevity.

Galvanic series charts are established based on electrochemical potentials (V) for a material.

Zinc is highly anodic, while copper is noble.

Zinc sacrifices itself for the steel core. Copper protects the steel core.

Corrosion due to electrochemical action between dissimilar metals are minimized if the potential difference between the metals is no more than 0.50V.

6. The changes to the code are assuming equality between a stainless steel, a copper coating and a zinc coating, which we know not to be true.

In addition, while no changes will be envisioned for the copper coated ground rod electrode requirements, the proposed change on the zinc coated ground rod electrode means the rod may have up to 36.4% less steel and 20.13% less zinc. It will have a shorter life cycle. Once the zinc corrodes there is less steel to corrode.

7. The most extensive research on metallic structures buried in soils or in contact with soils is the "National Bureau of Standards Circular 579" on underground corrosion.

Page 110 states: "An analysis of these data showed that in most soils, zinc coatings of 2 oz. or less were destroyed during the 10 year exposure period, and pitting of the underlying steel occurred."

Page 115 states: "It was also shown that a 3 oz. coating provided adequate protection for 10 to 13 years in all the inorganic reducing soils except in soils 51 and 56, which are strongly reducing soils containing high concentrations of soluble salts."

The report confirms that copper lasts longer than zinc coated steel in buried applications.

8. Technical Report R660 "Field testing of Electrical Grounding Rods" February 1970 by the Naval Facilities Engineering Command reported that after 7 years, zinc coated steel ground rod electrodes have a weight loss of 1.57 to 4.46 times that of a copper coated steel ground rod electrode. Listed copper coated ground rod electrodes have 0.01 in. of copper coating. Zinc coated

ground rod electrodes have 0.0039 in. on zinc. Zinc coated ground rod electrodes have a shorter life.

9. 250.52(A)(6) on plate electrodes do not differentiate between galvanized steel plate electrode and a plate electrode of iron or steel. The plate electrode must be at least four times thicker than a copper plate electrode. Again, the reason is corrosion.

10. NEMA GR-1 2005 and NESC C2-2007 have both standardized on a minimum 0.625 inch diameter for zinc coated steel ground rod electrodes. The proposed dimension change to the zinc coated steel ground rod electrodes reduces the effectiveness of those rod electrodes in the 5-160 proposal.

11. In the substantiation of Proposal 5-160, "Listed products are certified by a listing laboratory, and are subject to performance testing."

Comment:

This is an untrue statement. UL tests coated steel rod ground electrodes for physical dimensions and coating adhesion. No corrosion testing is performed.

12. In the substantiation of Proposal 5-160, "The ground rod electrodes addressed herein are "UL" and include permanent marking on the rod."

Comment: A true statement, however, the stamping is often unreadable as it fills in with zinc. In addition, to pass the "listed" requirements for a zinc coated steel ground rod electrode requires special handling during manufacturing. The special handling of submitted samples would not reflect actual products purchased by the consumer. ERICO's standard product of zinc coated steel grounds will not pass the listed test.

13. Adding an international perspective, IEC 0364-5-54 2002 requires a minimum diameter of 16 mm (0.629 in.) for zinc coated steel ground rod electrodes, and 14 mm (0.551 in.) for copper coated steel ground rod electrodes.

Panel Meeting Action: Reject

Panel Statement: The panel affirms its original action and statements on Proposal 5-160 as providing the necessary clarity and usability to this section. This comment attempts to introduce a type of electrode (solid copper grounding rods) not currently addressed by the NEC. See panel actions on Proposals 5-160 and 5-156 and Comment 5-93.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

STEINMAN, G.: NEMA votes affirmatively on the panel action but acknowledges there remains some confusion in the NEC regarding the construction, installation and use of the various types of ground rod type electrodes.

5-96 Log #1961 NEC-P05 **Final Action: Accept in Principle**
(250.52(A)(6) (New))

Submitter: Noel Williams, Herriman, UT

Comment on Proposal No: 5-164

Recommendation: This Proposal should have been Accept in Principle and revised to read as follows:

(6) Listed electrodes installed in accordance with their listing and their installation instructions.

Substantiation: The panel statement that the proposal is not complete sets a standard that may not be possible to meet as each type of listed electrode may have somewhat different installation requirements. The suggested revised language makes the installation requirements part of the requirement since the specific installation instructions for every listed product cannot be included in 250.53. The panel should give more consideration to the comments on negative expressed by Mr. Mello.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 5-97.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-97 Log #2082 NEC-P05 **Final Action: Accept in Principle**
(250.52(A)(8) (New))

TCC Action: The panel action only adds a title that does not contain text. The Technical Correlating Committee directs that the sentence "Other listed grounding electrodes shall be permitted." be added as the text to 250.52(A)(6) to accomplish the panel's intent.

Submitter: Chuck Mello, Underwriters Laboratories

Comment on Proposal No: 5-164

Recommendation: Add the following text to 250.52(A):

250.52(A) (6) Listed Electrodes.

Renumber present 250.52(A)(6) to (A)(7) Plate Electrodes and renumber present 250(A)(7) Other Local Metal Underground Systems or Structures to 250.52(A)(8).

Substantiation: The panel action should have been to Accept the original proposal with whatever sequence numbering that would be appropriate. While the panel statement that there is nothing to specifically prohibiting the use of "Listed" electrodes, the fact that 250.52 is a distinct list and does not Include and language to indicate that It is not all Inclusive, as well as the fact that 250.50 only recognizes the grounding electrodes identified in 250.52 effectively makes use of anything else that might be suitable, not acceptable to many AHJs without long discussions, and potential project delays. To just add the ability to use "Listed" grounding electrodes to the list of existing does not create any burden and meets the same thing the panel statement is saying is not prohibited. If there are installation requirements, these would have to be dealt with as part of the listing and be covered by 110.3(B) since not every type of Listed electrode is known. If there are concerns specifically for the chemical rod type electrodes, then those can be dealt with in future Code cycles in 250.53. The proposal used the chemical type electrodes as an example and the proposed change language did not Indicate or limit the addition to chemical type electrodes. I do not believe the lack of installation requirements for one type of Listed electrode used as an example in the substantiation should be sufficient reason not to allow the use of Listed grounding electrodes in general in 250.52.

Panel Meeting Action: Accept in Principle

Add the following text to 250.52(A):

250.52(A)(6) Other Listed Electrodes.

Renumber present 250.52(A)(6) to "(A)(7) Plate Electrodes" and renumber present 250(A)(7) Other Local Metal Underground Systems or Structures as 250.52(A)(8).

In addition, change 250.50 to read as follows:

250.50 Grounding Electrode System. All grounding electrodes as described in 250.52(A)(1) through (A)(7) that are present at each building or structure served shall be bonded together to form the grounding electrode system. Where none of these grounding electrodes exist, one or more of the grounding electrodes specified in 250.52(A)(4) through (A)(8) shall be installed and used.

Panel Statement: Editorial correction to Section 250.50 to allow this panel action. The word "other" was added to differentiate from the listed electrodes identified in 250.52(A)(5).

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-98 Log #2097 NEC-P05 **Final Action: Reject**
(250.52(B), FPN)

Submitter: James H. Maxfield, Dover, NH

Comment on Proposal No: 5-166

Recommendation: Add a new FPN to read as follows:

FPN: For further information see NFPA 13, Standard for the Installation of Sprinkler Systems and NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances for the limited use of these systems as grounding electrode.

Substantiation: CMP-5 should reconsider the addition of the FPN as submitted in the proposal stage because Section 10.6.7 of both NFPA 13 and NFPA 24 (2002 ed.) clearly indicates the limited use of the piping systems. Sections 10.6.8 of both standards state "In no chase shall pipe in 10.6.7 be used for grounding of electrical service." The addition of the FPN as submitted would assist the industry in determining what metal water piping systems may be used as grounding electrodes and which documents to refer to.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its original action and statement on Proposal 5-166 and concludes that the additional FPN as suggested in the proposal and comment do not improve usability or provide additional clarity to the requirements of this section. The panel maintains that grounding electrodes as described in 250.52(A) that are present for use in the grounding electrode system for buildings and structures are required to be used to form such grounding electrode systems, regardless of the type of water piping system or its use within the building or structure.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-99 Log #1964 NEC-P05 **Final Action: Reject**
(250.52(B)(2) (New))

Submitter: Noel Williams, Herriman, UT

Comment on Proposal No: 5-165

Recommendation: This Proposal should have been Rejected or Accepted in Principle with the following revised wording for item (2):

Aluminum electrodes in direct contact with the earth.

Substantiation: As proposed and as accepted, the proposal prohibits the use of an aluminum structure. The metal used for a structure is not specified in 250.52(A)(2). A metal structure that meets the requirements of that section is not just permitted, it is required to be used as an electrode. Aluminum is not the most common material for building structures, but it is used for many structures such as permanently installed "tents." The prohibition of aluminum for any electrode system is in direct contradiction to 250.52(A) for such structures. In previous cycles, Panel 5 accepted revised wording for 250.104(C) to recognize structural metal materials other than steel.

Panel Meeting Action: Reject

Panel Statement: The concerns of the submitter are already addressed in the revised definition of Grounding Electrode that resulted from the work of the TCC-assigned task group on grounding and bonding. See panel action and statement on Proposal 5-14 that indicate that grounding electrodes are required to be in direct contact with the earth. The panel actions on Proposal 5-148 and Comments 5-84 and 5-85 also provide additional clarification on the concerns expressed by the submitter.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-100 Log #1122 NEC-P05 **Final Action: Accept in Principle**
(250.56)

Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 5-174
Recommendation: Delete "shall be augmented by one additional electrode of any of the types specified by 250.52(A)(1) through 250.52(A)(7)."
Substantiation: The present wording of this section presents us with an endless loop of requirements. For example, 250.52(A)(2), (3), and (4) are individually or collectively permitted without a supplemental electrode. Including them in 250.56 makes no sense as there is no resistance value and if they were installed 250.56 would NOT apply. I can see now why inspectors are requiring a concrete encased electrode to be AUGMENTED by ground rods.
Panel Meeting Action: Accept in Principle
Revise 250.56 to read as follows:
250.56 Resistance of Rod, Pipe, and Plate Electrodes
A single electrode consisting of a rod, pipe, or plate that does not have a resistance to ground of 25 ohms or less shall be augmented by one additional electrode of any of the types specified by 250.52(A)(4) through (A)(8). Where multiple rod, pipe, or plate electrodes are installed to meet the requirements of this section, they shall not be less than 1.8 m (6 ft) apart.
FPN: The paralleling efficiency of rods longer than 2.5 m (8 ft) is improved by spacing greater than 1.8 m (6 ft).
Panel Statement: The requirement for a single electrode that does not have a resistance 25 ohms or less to be augmented does not apply to any electrodes other than rod, pipe, or plate. It is required to augment such an electrode with one additional electrode of any of the types specified by 250.52(A)(4) through 250.52(A)(8).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-101 Log #500 NEC-P05 **Final Action: Reject**
(250.62)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-179
Recommendation: Accept in Part as revised:
Where the grounding electrode conductor is installed with other conductors in a raceway, cable tray, or enclosure and is not in cable armor or a dedicated raceway, it shall be identified by tagging or other effective means acceptable to the authority having jurisdiction.
Substantiation: Where installed with other conductors, a simple test will indicate it is grounded and it may be assumed to be a grounded circuit conductor or equipment ground (especially if bare). A connection of an equipment grounding conductor to this GEC does not comply with the connection point specified in the definition of equipment grounding conductor (service equipment or separately derived system source). Although 250.130(C)(2) permits such a connection (which appears to be a conflict).
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its original action and statement on Proposal 5-179. No additional substantiation has been provided to indicate there is a need to introduce this new specific identification requirement for grounding electrode conductors where they are installed with other conductors in the same raceway, enclosure, cable tray, etc.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-102 Log #1055 NEC-P05 **Final Action: Reject**
(250.62)

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-178
Recommendation: Add to the end of the existing text:
When covered or insulated, the grounding electrode conductor(s) in switchboards, panelboards, cutout boxes, transfer switches, and other enclosures, shall be identified by a green stripe or other distinctive means.
Substantiation: While I agree with the CMP that there is an advantage to retaining the unique identification of equipment grounding/bonding conductors, at least as a requirement, I also agree with Mr. Nadon that it would be good to sort out GECs from hot conductors. It also would be good to more easily sort them out from what ought-to-be-identified conductors that didn't, however, get painted or taped. In performing inspections and consultations, I have had to hunt and to puzzle unnecessarily. "Is this a subpanel that's missing its floating neutral? I don't see a main bonding jumper. Is this a service panel missing its MBJ, or have I overlooked it? It's kinda crowded. Where are the GECs? Oh, maybe this is one. Geez, I wish it was easier to trace what was what."
Panel Meeting Action: Reject
Panel Statement: The identification requirements for equipment grounding conductors are provided in 250.119. The grounding electrode conductor is currently not required or prohibited from being identified by any of the means specified in 250.119. The possibility is not likely that the grounding electrode conductor will be confused with any other conductor. The submitter has failed to indicate there is a safety concern related to the proposed more restrictive identification requirements.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-103 Log #1522 NEC-P05 **Final Action: Accept**
(250.64)

TCC Action: The Technical Correlating Committee directs that the words "the source of " in the recommendation be deleted to correlate with the Technical Correlating Committee action on Comments 5-116 and 5-119.
In addition, the Technical Correlating Committee understands that this comment relates to the action taken on Proposal 5-18.
Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 5-16
Recommendation: Modify the first paragraph of 250.64 as follows:
250.64 Grounding Electrode Conductor Installation.
Grounding electrode conductors at the service, at each building or structure where supplied by a feeder(s) or branch circuit(s), or at the source of a separately derived system shall be installed as specified in 250.64(A) through (F).
Substantiation: This is a correlating comment to resolve a problem created by the change in the definition of the "grounding electrode conductor." NEC Section 250.64 has specific requirements for the grounding electrode conductors that ground the service or the separately derived system as such conductors perform an essential safety function. However, certain installations, particularly installations for information technology and communications technology equipment, often have various supplementary (auxiliary) grounding conductors installed for reasons of electromagnetic compatibility, lightning protection, establishing ground planes for antennas, etc. The change in the definition defines these supplementary grounding conductors as grounding electrode conductors. Thus, the new definition would imply that requirements of 250.64 apply to these supplementary grounding conductors.
I do not believe that CMP 5 intended to change the application of 250.64, nor is there any rationale to change the requirements for all grounding conductors. Therefore, the term grounding electrode conductor in 250.64 should be qualified by the phrase "at the service, at each building or structure where supplied by a feeder(s) or branch circuit(s), or at the source of a separately derived system," as proposed in this comment.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-104 Log #410 NEC-P05 **Final Action: Reject**
(250.64(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-204
Recommendation: Accept proposal revised:
Where installed ~~used~~ outside uninsulated aluminum or copper-clad aluminum grounding electrode conductors not in a raceway or enclosure shall not be used where in direct contact with masonry or the earth or where subject to corrosive conditions. Where installed ~~used~~ outside connections of aluminum or copper-clad aluminum grounding electrode conductors not in an enclosure shall not be within 450 mm (18 in.) of the earth.
Substantiation: The grounding conductor should be specified as a grounding electrode conductor for consistency with 250.62, 250.64, and 250.64(B). Since aluminum conductors are permitted in cables and raceways underground and embedded in concrete and masonry, separation from earth where in a raceway or enclosure does not seem warranted. Present wording does not permit a connection (termination) inside a completely enclosed outdoor switchgear assembly within 18 in. of the earth. "Terminations" implies an end to the conductor, conductors may loop unbroken through ground clamps.
Panel Meeting Action: Reject
Panel Statement: The submitter added text without substantiation. The submitter misquoted the existing Code text. The proposed wording is confusing.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-105 Log #444 NEC-P05 **Final Action: Reject**
(250.64(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-204
Recommendation: Accept proposal revised:
Where installed ~~used~~ outside uninsulated aluminum or copper-clad aluminum grounding electrode conductors in cable armor or not in a raceway or enclosure shall not be used where in direct contact with masonry or the earth or where subject to corrosive conditions. Where installed ~~used~~ outside connections of aluminum or copper-clad aluminum grounding electrode conductors in cable armor or not in an enclosure shall not be ~~terminated~~ within 450 mm (18 in.) of the earth.

Substantiation: The grounding conductor should be specified as a grounding electrode conductor for consistency with 250.62, 250.64, and 250.64(B). Since aluminum conductors are permitted in cables and raceway underground and embedded in concrete and masonry separation fro earth where in a raceway or enclosure does not seem warranted. Present wording does not permit a connection (termination) inside a completely enclosed outdoor switchgear assembly. If within 18 in. of the earth "Terminations" implies an end to the conductor, conductors may loop unbroken through ground clamp.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-104.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-106 Log #1056 NEC-P05 **Final Action: Reject**
(250.64(B))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-184
Recommendation: Accept as proposed.
Substantiation: The CMP lists one objection to the proposed wording: use of an armored conductor should not be prohibited.

Using a coil of armored bare conductor is not much more similar to greenfield with a bare wire field-installed than running ACHH is the same as running greenfield and pulling (kraft-wrapped) insulated wires and a bonding strip through it. Armored conductors are in close proximity to the armor, protecting it much as-in fact better than-the new type of MC cable's bare conductor protects its armor.
Panel Meeting Action: Reject
Panel Statement: Cable armor is permitted as specified in the last sentence of 250.64(B). The bare armored ground cable is listed as grounding and bonding equipment for this purpose.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-107 Log #1285 NEC-P05 **Final Action: Reject**
(250.64(C))

Submitter: Michael P. O'Quinn, MOGO Enterprises, Inc.
Comment on Proposal No: 5-186
Recommendation: Reject this Proposal; Restore wording to 2005 NEC language.
Substantiation: 250.64(C) refers to grounding electrode conductors - the connection between one of the grounding electrodes listed in 250.52 and the grounded service bus. In the NEC 2005, 250.64(C)(3) allowed the use of aluminum or copper busbars for "splicing" purposes, or just a convenient location to collect the grounding electrode conductors from various electrodes before attaching with a single conductor to the grounded service bus. [See Proposal 5-158 and Panel Statement, 2005 NEC ROP.] If used for this purpose, for instance, a ground rod used to supplement a metal underground water pipe would require a grounding electrode conductor the same size as the grounding electrode conductor from the metal underground water pipe. This is because the grounding electrode conductor from the ground rod would not be run solely to the grounded service terminal as 250.66(A) through (C) requires for size reduction, but instead to the "collection" busbar. The last sentence of 250.64(F) states: "The grounding electrode conductor shall be sized for the largest grounding electrode conductor required among all the electrodes connected to it." The exceptions to Table 250.66 listed in 250.66(A) through (C) would not apply.

The installer has the choice to run each grounding electrode conductor directly to the grounded service bus, allowing the provisions of 250.66(A) through (C), but if multiple electrodes are connected/bonded together and run with a common grounding electrode conductor to the service grounded bus, 250.64(F) applies, requiring the same size grounding electrode conductor from each electrode.

The term "bonding jumpers" referred to in 250.64(C)(3), according to Article 100, is "A reliable conductor to ensure the required electrical conductivity between metal parts required to be electrically connected." In this case the "bonding jumpers" are grounding electrode conductors, but are not run directly/solely to the grounded service bus. "Sole connection" is the main requirement for size reduction in 250.66(A) through (C).

Further, 250.64(F) is concerned with the size of the grounding electrode conductor and its connection to the electrode(s). The copying of 250.64(C)(3) to 250.64(F) would increase understanding, but deleting 250.64(C)(3) will prohibit the use of this "collection" busbar for use with grounding electrode conductors, which does not appear to be the intent of the Proposal submitter.

Additionally, 250.64(C)(4) should be kept for the same reason the submitter added it to 250.64(F) - the installer needs to be reminded about the prohibiting of connections to aluminum conductors within 18 inches of the earth.
Panel Meeting Action: Reject
Panel Statement: Section 250.64(C) is to ensure the grounding electrode conductor is continuous, without splices (except as permitted) from the equipment served to the grounding electrode or grounding electrode system. See the revised definition of "grounding electrode conductor" from Comment 5-6. The panel notes that the bonding jumpers used to interconnect multiple grounding electrodes or from the grounding electrodes to the common busbar are not "grounding electrode conductors" and are purposefully identified as "bonding jumpers". The panel concludes that the installation requirement for the common busbar do belong in 250.64(F) as substantiated in Proposal 5-186.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-108 Log #598 NEC-P05 **Final Action: Accept**
(250.64(C)(4))

Submitter: Henry A. Jenkins, Wake County, Inspections Development / Rep. N.C. Ellis Cannady Chapter of I.A.E.I
Comment on Proposal No: 5-186
Recommendation: We support the proposal.
Substantiation: None given.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-109 Log #1206 NEC-P05 **Final Action: Accept in Principle**
(250.64(C)(4))

Submitter: James Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 5-186
Recommendation: We support the panel's action in Accepting this Proposal as written.
Substantiation: None.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-113.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-110 Log #517 NEC-P05 **Final Action: Reject**
(250.64(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-194
Recommendation: Accept the proposal.
Substantiation: This section only requires ferrous enclosures for grounding electrode conductors (e.g., raceways) to be electrically continuous and exempts nonferrous raceways. 250.92(A)(3) requires bonding of metallic (includes ferrous and nonferrous types) raceways and enclosures which in effect makes them electrically continuous.
Panel Meeting Action: Reject
Panel Statement: The referenced 250.92(A)(3) was removed by panel action on Proposal 5-219 and therefore no longer applies to raceways containing grounding electrode conductors. Only 250.64(E) addresses raceways for grounding electrode conductors and the panel intends that this apply only to ferrous metal raceways.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-111 Log #922 NEC-P05 **Final Action: Accept**
(250.64(E))

Submitter: Peter D. Noval, Jr., Philadelphia, PA
Comment on Proposal No: 5-195
Recommendation: Delete "service equipment" from text proposed by panel meeting action, so that the section reads as follows:

(E) Enclosures for Grounding Electrode Conductors. Ferrous metal enclosures for grounding electrode conductors shall be electrically continuous from the point of attachment to cabinets or equipment to the grounding electrode and shall be securely fastened to the ground clamp or fitting.

Nonferrous metal enclosures shall not be required to be electrically continuous. Ferrous metal enclosures that are not physically continuous from cabinets or equipment to the grounding electrode shall be made electrically continuous b y bonding each end of the raceway or enclosure to the grounding electrode conductor. Bonding shall apply at each end and to all intervening ferrous raceways, boxes, and enclosures between the ~~service equipment, cabinets, or equipment~~ cabinets or equipment and the grounding electrode. The bonding jumper for a grounding electrode conductor raceway or cable armor shall be the same size as, or larger than, the ~~required~~ enclosed grounding electrode conductor. Where a raceway is used as protection for a grounding electrode conductor, the installation shall comply with the requirements of this appropriate raceway article.

Substantiation: The panel meeting action to leave "service equipment" in the text increases the chance of misinterpretation that the requirements pertain to just service-related equipment and cabinets. Deleting "service equipment" will eliminate any potential ambiguity. Due to the addition of "cabinets or equipment" in the text, the requirement for bonding is consistent throughout 250.64(E), and bonding between the grounding electrode and service equipment is still covered by this section.

I am in concurrence with panel action to delete "required" as referenced in the panel statement.

Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-112 Log #924 NEC-P05 **Final Action: Reject**
(250.64(E))

Submitter: Peter D. Noval, Jr., Philadelphia, PA
Comment on Proposal No: 5-199
Recommendation: Revise text to read as follows:

(E) Enclosures for Grounding Electrode Conductors. Ferrous metal enclosures for grounding electrode conductors shall be electrically continuous from the point of attachment to cabinets or equipment to the grounding electrode ~~and shall be securely fastened to the ground clamp or fitting~~. ~~Nonferrous metal enclosures shall not be required to be electrically continuous.~~ ~~Ferrous~~ Metal enclosures that are not physically continuous from cabinets or equipment to the grounding electrode shall be made electrically continuous by bonding each end of the raceway or enclosure to the grounding electrode conductor. Bonding shall apply at each end and to all intervening ~~ferrous~~ metal raceways, boxes, and enclosures between the service equipment and the grounding electrode. The bonding jumper for a grounding electrode conductor raceway or cable armor shall be the same size as, or larger than, the required enclosed grounding electrode conductor. Where a raceway is used as protection for a grounding electrode conductor, the installation shall comply with the requirements of the appropriate raceway article.

Substantiation: I am in agreement with the panel statement that "the electrically continuous requirement applies to metal enclosures for grounding electrode conductors and is the general requirement of this section. The bonding requirements are applicable where the metal enclosure is not electrically continuous from the cabinet or enclosure to the grounding electrode."

In support of this statement, the revised text makes it clear that all metal enclosures, not just ferrous ones, are subject to the intent of the panel, with regard to bonding requirements, where the metal enclosure is not electrically continuous from the cabinet or enclosure to the grounding electrode.

In addition, as written, 250.64(E) does not require nonferrous metal enclosures to be "securely fastened to the ground clamp or fitting." Only ferrous metal enclosures need to "Be securely fastened to the ground clamp or fitting." If this intent here is bonding the enclosure, that requirement is stated in subsequent text.

The revised text clarifies the intent of this section by deleting this potentially unenforceable statement.

Further, if the panel insists on retaining the exemption from bonding for nonferrous metal enclosures in 250.64(E), then Section V. Bonding should be reviewed and revised accordingly to provide consistency throughout Article 250.

Panel Meeting Action: Reject
Panel Statement: The proposal would lessen the requirements of this section without technical substantiation. The electrically continuous requirement applies to ferrous metal enclosures for grounding electrode conductors and is the general requirement of this section. The bonding requirements are applicable where the ferrous metal enclosure is not electrically continuous from the cabinet or enclosure to the grounding electrode.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-113 Log #32 NEC-P05 **Final Action: Accept**
(250.64(F))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 5-203
Recommendation: The Technical Correlating Committee directs that the Code-Making Panel clarify the Panel Action on this Proposal with respect to the wording of the subsections (1) through (4) and their relationship to (F). This action will be considered by the Code-Making Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Revise the text of 250.64(F) from the 2008 NEC Draft as follows:

(F) Installation to Electrode(s). ~~A~~ ~~g~~Grounding electrode conductor(s) and bonding jumpers interconnecting grounding electrodes shall be ~~permitted~~ installed as in (1), (2), or (3)~~, or (4)~~. The grounding electrode conductor shall be sized for the largest grounding electrode conductor required among all the electrodes connected to it.

(1) The grounding electrode conductor shall be permitted to ~~B~~be run to any convenient grounding electrode available in the grounding electrode system where the other electrode(s), if any, are connected by bonding jumpers per 250.53(C).

(2) Grounding electrode conductor(s) shall be permitted to be run to ~~O~~one or more grounding electrode(s) individually.

(3) Bonding jumper(s) from grounding electrode(s) ~~and grounding electrode conductor(s)~~ shall be permitted to be connected to an aluminum or copper busbar not less than 6 mm × 50 mm (1.4 in. × 2 in.). The busbar shall be securely fastened and shall be installed in an accessible location. Connections shall be made by a listed connector or by the exothermic welding process. The grounding electrode conductor shall be permitted to be run to the busbar. Where aluminum busbars are used, the installation shall comply with 250.64(A).

~~(4) Where aluminum busbars are used, the installation shall comply with 250.64(A).~~

~~The grounding electrode conductor shall be sized for the largest grounding electrode conductor required among all the electrodes connected to it.~~

Panel Statement: The panel accepts the direction of the TCC to clarify the text. The panel action accomplishes this direction.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-114 Log #1842 NEC-P05 **Final Action: Accept in Principle**
(250.64(F))

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 5-203
Recommendation: Accept the proposed language, with the following changes:

~~(F) To Electrodes(s). A grounding electrode conductor shall be permitted in (1), (2), (3) or (4).~~

~~(1) Be run to any convenient grounding electrode available in the grounding electrode available in the grounding electrode system, or~~

~~(2) One or more grounding electrode(s) individually, or~~

~~(3) Bonding jumper(s) from grounding electrode(s) and grounding electrode conductor(s) shall be permitted to be connected to an aluminum or copper busbar not less than 6 mm × 50 mm (1/4 in. × 2 in.). The busbar shall be securely fastened and shall be installed in an accessible location. Connections shall be made by a listed connector or by the exothermic welding process.~~

~~(4) Where aluminum busbars are used, the installation shall comply with 250.64(A). The grounding electrode conductor shall be sized for the largest grounding electrode conductor required among all the electrodes connected to it.~~

The new text should read as follows:

(F) To Electrodes(s). A grounding electrode conductor shall be sized for the largest grounding electrode conductor required among all the electrodes connected to it. In addition, a grounding electrode conductor shall be permitted.

(1) Run to any convenient grounding electrode available in the grounding electrode system.

(2) Run to one or more grounding electrode(s) individually

(3) Connected to an aluminum or copper busbar. Connections shall be made by a listed connector or by the exothermic welding process.

Substantiation: As the TCC stated, the proposed text does not make sense grammatically. In addition, there is no reason to repeat the requirement for aluminum conductors and busbars complying with 250.64(A), since (F) does not modify the rule of (A). The remainder of the proposed (4) is better located in the charging text of (F), since it applies to all installations, not just busbars.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-113.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-115 Log #1442 NEC-P05 **Final Action: Reject**
(Table 250.66)

Submitter: Lawrence Cross, Local Union #98 IBEW
Comment on Proposal No: 5-206
Recommendation: Add new table:

Table 250.67, Grounded Conductor, System Bonding and Main Bonding Conductors.

Table 250.67 Grounded, Main Bonding and System Bonding Conductors for Alternating-Current Systems

Size of Largest Ungrounded Service-Entrance Conductor or Equivalent Area for Parallel Conductors (AWG/kcmil)		Size of Grounded, Main Bonding and System-Bonding Conductors (AWG/kcmil)	
Copper	Aluminum or Copper-Clad Aluminum	Copper	Aluminum or Copper-Clad Aluminum
2 or smaller	1/0 or smaller	8	6
1 or 1/0	2/0 or 3/0	6	4
2/0 or 3/0	4/0 or 250	4	2
Over 3/0 through 350	Over 250 through 500	2	1/0
Over 350 through 600	Over 500 through 900	1/0	3/0
Over 600 through 1100	Over 900 through 1750	2/0	4/0
Over 1100 through 1500	Over 1750 through 2000	3/0	250
Over 1500 through 2000	Over 2000 through 3000	4/0	400
Over 2000 through 2500	Over 3000 through 4000	250	500
Over 2500 through 3000	Over 4000	350	700
Over 3000 through 3500	through 5000	400	750
Over 3500 through 4000	Over 5000 through 6000	450	900
Over 4000 through 5000	Over 6000 through 7000	500	1000
Over 5000 through 6000	Over 7000 through 8000	600	1250
See note 1	See note 1		

*Note 1: Size of largest ungrounded service-entrance conductor × 12 1/2 percent = size of conductors.

Substantiation: Panel should accept new table 250.67 Grounded Conductor, System Bonding and Main Bonding Conductors. The new table will show the aluminum or copper-clad aluminum with size ranges as per the panel statement, also the 12.5 percent calculations in the table up to 8000 KCMIL Conductors.
Panel Meeting Action: Reject
Panel Statement: There are no code sections that refer to the new Table 250.67. The requirements that point to Table 250.66 with the qualifiers of sizing over 1100 kcmil copper or 1750 kcmil aluminum make this new table unnecessary.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-116 Log #1523 NEC-P05 **Final Action: Accept**
(250.66)

TCC Action: The Technical Correlating Committee directs that the language be modified as shown in the affirmative comment on vote.
In addition, the Technical Correlating Committee understands that this comment relates to the action taken on Proposal 5-18.
Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 5-16
Recommendation: Modify the first paragraph of 250.66 as follows:
250.66 Size of Alternating-Current Grounding Electrode Conductor. The size of the grounding electrode conductor at the service, at each building or structure where supplied by a feeder(s) or branch circuit(s), or at the source of a separately derived system of a grounded or ungrounded ac system shall not be less than given in Table 250.66, except as permitted in 250.66(A) through (C).
Substantiation: This is a correlating comment to resolve a problem created by the change in the definition of the "grounding electrode conductor." NEC Section 250.66 has specific requirements for the grounding electrode conductors that ground the service or the separately derived system as such conductors perform an essential safety function. However, certain installations, particularly installations for information technology and communications technology equipment, often have various supplementary (auxiliary) grounding conductors installed for reasons of electromagnetic compatibility, lightning protection, establishing ground planes for antennas, etc. The change in the definition defines these supplementary grounding conductors as grounding electrode conductors. Thus, the new definition would imply that requirements of 250.66 apply to these supplementary grounding conductors.

I do not believe that CMP 5 intended to change the application of 250.66, nor is there any rationale to change the requirements for all grounding conductors. Therefore, the term grounding electrode conductor in 250.66 should be qualified by the phrase "at the service, at each building or structure where supplied by a feeder(s) or branch circuit(s), or at the source of a separately derived system," as proposed in this comment.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:

BRENDER, D.: The language accepted by the Panel is flawed as it controls the sizing of a grounding electrode conductor only when the connection to a separately derived system is made at the source. Section 250.30(A)(1) and (A)(3) permits the grounding electrode conductor to be connected at a single point from the source to the first system disconnecting means or overcurrent device. Clearly, these sections distinguish between the source and other points on the separately derived system.

The words "the source of" should be deleted from the accepted new sentence so it would read, "250.66 Size of Alternating-Current Grounding Electrode Conductor. The size of the grounding electrode conductor at the service at each building or structure where supplied by a feeder(s) or branch circuit(s), or at ~~the source of~~ a separately derived system, of a grounded or ungrounded ac system shall not be less than given in Table 250.66, except as permitted in 250.66(A) through (C)."

5-117 Log #2141 NEC-P05 **Final Action: Reject**
(250.66)

Submitter: Danish Verma, Bowie, MD
Comment on Proposal No: 5-205
Recommendation: Add new text as follows:

250.66(D) Connection to Enclosures. Termination of the grounding electrode conductors entering cabinets, cutout boxes and other equipment enclosures shall be done using only listed devices such as lugs, clamps pressures connectors or other listed means. Ground clamps or fittings shall be listed for the materials of the grounding electrode conductor. Not more than one conductor shall be connected to a single clamp or fitting unless the clamp or fitting is listed for multiple conductors.

Substantiation: The grounding electrode connection to enclosures, cutout boxes requires standardization. The current wiring practice of using no fitting or an unlisted fitting or fitting not listed for grounding poses many problems.

(1) Difference of potential (2) Choke effect (3) Does not comply with the appropriate ANSI/UL Standards (4) Not in compliance with NFPA 780 recommendations for bonding the electrode to the enclosures, sideflash (5) Using a fitting listed for bonding and grounding will ensure positive bonding jumper connection under severe fault conditions, surges, over voltages or if one were to misapply or fail to install the proper bonding jumper at the service enclosure. The fitting would provide a safety net in these applications. Not to mention possibility of cross threading or over tighten or breaking of the bonding screw.

The NEC recognizes the connection of the grounding electrode conductor at the electrode under 250.70 but does not identify the connection at the cabinet. The use of listed fittings will ensure proper support, proper strain relief (torque value) and ensure proper bonding. Will clarify the requirements of 312.5(A) NEC "Openings to be Closed" in cut out boxes and cabinets by using a proper listed grounding and bonding fittings.

Strain relief testing is required under both UL 486A Standards for Connectors and UL 467 Standard for Grounding and Bonding. Although I have witnessed arguments over whether strain relief is necessary, without the use of a proper fitting the grounding electrode conductor can work loose from the grounded bar after being struck by hand held mower equipment without proper strain relief. UL Standards requires a push pull test on connectors and fittings. It's appropriate to apply the standard. UL 486A 12.1 requires a pullout test for connectors, Table 12.1 provides the test values for the pullout test. Example: 6 AWG requires 100LB pullout force.

UL 467, Table 13.1 Short - time test currents: present practice of not using a listed fitting fails to meet the short-time current test of the standard. Knowing that the NEC now identifies these product safety standards in Annex A, I believe it's just as important to adhere to these recognized standards. UL 467, Table 13.1 requires a 3/0 copper conductor to withstand 8030 amperes for 9 seconds without burning away from the enclosure. Unlisted fittings do not meet these requirements/standards.

UL White Book (KDER) recommends that "If there is a need for such a conductor a grounding bushing should be used." Note: KDER "covers bonding devices, ground clamps, grounding and bonding bushings and locknuts, ground rods, armored grounding wire, protector grounding wire, grounding wedges, ground clips for securing the ground wire to an outlet box, water meter shunts, and similar equipment". Applying all the standards and knowledge one can teach and apply these applications, it would be helpful and added safety for bonding the electrode to enclosures.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its action and statements on Proposal 5-205 (Log No. 1437). See also panel action and statement on Proposal 5-167 (Log No. 1053) in the 2004 Report on Proposals
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-118 Log #1123 NEC-P05 **Final Action: Reject**
(250.66(D))

Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 5-211
Recommendation: Please review requested technical substantiation and accept the proposal.
Substantiation: Figure 11-14 on page 206 of Soares Grounding and Bonding gives the five second withstand rating of a #6 copper conductor as 621 amperes-per ICEA (the lowest of the 3 values). Based on unrealistically low residential grounding electrode systems of 5 Ohms at 120V to ground, the current in the grounding electrode conductor with be 24 amperes. Let's consider a residential primary voltage conductor, 2100V to ground, contacting the service (worst case) in a storm, the current would be 420 amperes - and this is for a 5 OHM grounding electrode system! How many of those are out there? The service conductor size has no effect on the current on the grounding electrode conductor.
Panel Meeting Action: Reject
Panel Statement: Insufficient substantiation has been provided to relax the minimum sizing requirements for grounding electrode conductors for existing installations at single-family dwellings. The proposed text is not adequate in all cases. Grounding electrode conductors for all installations are required to meet the minimum sizes specified in 250.66.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-119 Log #1524 NEC-P05 **Final Action: Accept**
(250.68)

TCC Action: The Technical Correlating Committee directs that the language be modified as shown in the affirmative comment on vote.
In addition, the Technical Correlating Committee understands that this comment relates to the action taken on Proposal 5-18.
Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 5-16
Recommendation: Add a new the first paragraph to 250.68 as follows:
250.68 Grounding Electrode Conductor and Bonding Jumper Connection to Grounding Electrodes.
The connections of grounding electrode conductor at the service, at each building or structure where supplied by a feeder(s) or branch circuit(s), or at the source of a separately derived system and associated bonding jumper(s) shall be made as specified 250.68(A) and (B).
Substantiation: This is a correlating comment to resolve a problem created by the change in the definition of the "grounding electrode conductor." NEC Section 250.68 has specific requirements for the grounding electrode conductors that ground the service or the separately derived system as such conductors perform an essential safety function. However, certain installations, particularly installations for information technology and communications technology equipment, often have various supplementary (auxiliary) grounding conductors installed for reasons of electromagnetic compatibility, lightning protection, establishing ground planes for antennas, etc. The change in the definition defines these supplementary grounding conductors as grounding electrode conductors. Thus, the new definition would imply that requirements of 250.68 apply to these supplementary grounding conductors.
I do not believe that CMP 5 intended to change the application of 250.68, nor is there any rationale to change the requirements for all grounding conductors. Therefore, the term grounding electrode conductor in 250.68 should be qualified by the phrase "at the service, at each building or structure where supplied by a feeder(s) or branch circuit(s), or at the source of a separately derived system," as proposed in this comment.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
BRENDER, D.: The language accepted by the Panel is flawed as it controls the connection of the grounding electrode conductor and bonding jumper connection to grounding electrodes only when the connection to a separately derived system is made at the source. Section 250.30(A)(1) and (A)(3) permits the grounding electrode conductor to be connected at a single point from the source to the first system disconnecting means or overcurrent device. Clearly, these sections distinguish between the source and other points on the separately derived system.
The words "the source of" should be deleted from the accepted new sentence so it would read, "The connections of grounding electrode conductor at the service, at each building or structure where supplied by a feeder(s) or branch circuit(s), or at ~~the source of~~ a separately derived system, and associated bonding jumper(s) shall be made as specified in 250.68(A) and (8)."

5-120 Log #2034 NEC-P05 **Final Action: Reject**
(250.68(A))

Submitter: Donald Cook, Shelby County Building Inspections
Comment on Proposal No: 5-212
Recommendation: Accept proposal as submitted.
Substantiation: For several code cycles, I have submitted proposals and comment to this section hoping to gain understanding for the purpose of the accessibility requirement. The panel statement for this proposal appears to question the value of the "listing" of these termination fittings. If they are listed for the purpose of terminating grounding electrode conductors to the specific electrode that is utilized, it would seem that users and AHJ should be concerned for the connection loosening during construction. If there is concern for loosening, it seems these mechanical connections should be prohibited. I still do not see any explanation for CMP-5's confidence these mechanical connections will not loosen where installed in concrete or direct burial applications. Outdoor, underground connections to ground rods, rebar, or water pipe would seem to be subject to damage by landscape work than a termination behind wall covering like sheetrock or paneling. The current requirement is very clear, but very difficult for an AHJ to justify with the current exceptions.
Panel Meeting Action: Reject
Panel Statement: If a mechanical connection becomes damaged or loosened during the construction of a building, it is necessary to have accessibility so it can be tightened or replaced. The exceptions to this section recognize conditions where damage is unlikely.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-121 Log #1022 NEC-P05 **Final Action: Accept in Principle**
(250.68(B))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-214
Recommendation: Revise text to read as follows:
(B) Effective Grounding Path. The connection of a grounding electrode conductor or bonding jumper to a grounding electrode shall be made in a manner that will ensure a ~~permanent~~ durable and ~~an~~ effective grounding path.
Substantiation: Our interpretation and enforcement of the NEC is supposed to be based on the dictionary definitions of common English terms, augmented by special definitions found in Article 100, and those unique to particular articles and defined at the beginning of each such article. While the NEC is not intended as a design manual for untrained persons, its language is not supposed to be based on "Hey, Bud, you should know what they intend here" translation. Saying "...the word...is generally understood in...[this] application" demands just that sort of interpretation. I don't know how commonly inexpert inspectors make the sort of mistake Mr. Schwan is trying to head off, but I do know that AHJs often rely on inadequately trained inspectors. For this reason, the Style Manual's blessing on terms that have become accepted warrants sparing use. The CMP does have a point, that while the change in the original proposal to remove the sense of "permanent" as meaning "not subject to removal" is worthwhile, the idea of using a means with integrity is worth retaining. I propose "durable," a term used elsewhere in the NEC for similar purposes, as better conveying the intent.
Panel Meeting Action: Accept in Principle
The panel action is to remove the word "permanent" and revise 250.68(B) as follows:
(B) Effective Grounding Path The connection of a grounding electrode conductor or bonding jumper to a grounding electrode shall be made in a manner that will ensure a~~n permanent and~~ effective grounding path.
The remainder of the section is unchanged.
Panel Statement: The panel agrees with the concept of removing the word "permanent" from this section and does not agree that the proposed replacement word "durable" is necessary for this section. Removing the word "permanent" addresses the concerns of the submitter, and not replacing it with any other descriptive word addresses the other concerns of subjectivity, ambiguity, enforceability, and inconsistent application of the provisions of this section by users of the Code. The panel concludes that the descriptive wording provides the performance language necessary for users without the use of the

word "permanent" or any other descriptive adjective. The panel also affirms that this action to remove the word "permanent" is consistent with similar revisions in NEC where the same concerns were raised about the use of this word.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-123 Log #599 NEC-P05 **Final Action: Accept**
(250.84(A))

Submitter: Henry A. Jenkins, Wake County, Inspections Development / Rep. N.C. Ellis Cannady Chapter of I.A.E.I
Comment on Proposal No: 5-217
Recommendation: We support the proposal.
Substantiation: None given.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-124 Log #1207 NEC-P05 **Final Action: Accept**
(250.84(A))

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 5-217
Recommendation: We support the panel's action in Accepting this Proposal as written.
Substantiation: None.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-122 Log #1151 NEC-P05 **Final Action: Accept in Principle**
(250.94)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 5-220
Recommendation: Add the following underlined text in 250.84 of Proposal 5-220:
Bonding for Other Systems. An intersystem bonding termination for connecting intersystem bonding and grounding conductors required for other systems shall be provided external to enclosures at the service equipment and at the disconnecting means for any additional buildings or structures. The intersystem bonding termination shall be accessible for connection and inspection. The intersystem bonding termin
ation shall have the capacity for connection of not less than three intersystem bonding conductors. The intersystem bonding termination device shall not be installed on an enclosure cover and shall not interfere with opening a service or metering equipment enclosure. The intersystem bonding termination shall be one of the following:
(1) A set of terminals securely mounted to the meter socket enclosure and electrically connected to the meter socket enclosure. This terminals and the enclosure shall be listed for grounding.
(2) A bonding bar near the service equipment enclosure, meter socket enclosure or raceway for service conductors. The bonding bar shall be connected with a minimum 6 AWG copper conductor to an equipment grounding conductor(s) in the service equipment enclosure, meter socket enclosure or exposed nonflexible metallic raceway.
(3) A bonding bar near the grounding electrode conductor. The bonding bar shall be connected to the grounding electrode conductor with a minimum 6 AWG copper conductor.
Exception: In existing buildings or structures where any of the intersystem bonding and grounding conductors required by 770.93, 800.100(B), 810.21(F), 820.100(B), 830.100(B) exist, installation of the Intersystem Bonding Termination is not required. An accessible means external to enclosures for connecting intersystem bonding and grounding electrode conductors shall be permitted provided at the service equipment and at the disconnecting means for any additional buildings or structures by at least one of the following means:
(1) Exposed nonflexible metallic raceways
(2) Exposed grounding electrode conductor
(3) Approved means for the external connection of a copper or other corrosion-resistant bonding or grounding conductor to the grounded raceway or equipment
FPN No. 1: A 6 AWG copper conductor with one end bonded to the grounded nonflexible metallic raceway or equipment and with 150 mm (6 in.) or more of the other end made accessible on the outside wall is an example of the approved means covered in 250.94, Exception, (3).
Retain 2005 NEC FPN No. 2 as written.
Substantiation: Often the device that is used to provide this intersystem bonding termination is installed on the cover or door of service and/or meter enclosures thus preventing their routine opening. In these cases, the only option available to properly operate or maintain this equipment is to remove the intersystem bonding termination device from the service or meter enclosure. This additional wording provides prescriptive requirements that mandate the proper installation of bonding terminations at these locations and will correlate with the actions on proposals of CMP-16 in Chapter 8.
Panel Meeting Action: Accept in Principle
Revise the proposed text to read as follows:
Add the following underlined text in 250.94 of Proposal 5-220:
"Bonding for Other Systems. An intersystem bonding termination for connecting intersystem bonding and grounding conductors required for other systems shall be provided external to enclosures at the service equipment and at the disconnecting means for any additional buildings or structures. The intersystem bonding termination shall be accessible for connection and inspection. The intersystem bonding termination shall have the capacity for connection of not less than three intersystem bonding conductors. The intersystem bonding termination device shall not interfere with opening a service or metering equipment enclosure. The intersystem bonding termination shall be one of the following:
(1) A set of terminals securely mounted to the meter ~~socket~~ enclosure and electrically connected to the meter ~~socket~~ enclosure. ~~This terminals and the enclosure shall be listed for grounding.~~ The terminals shall be listed as grounding and bonding equipment.
(2) A bonding bar near the service equipment enclosure, meter ~~socket~~ enclosure, or raceway for service conductors. The bonding bar shall be connected with a minimum 6 AWG copper conductor to an equipment grounding conductor(s) in the service equipment enclosure, meter ~~socket~~ enclosure or exposed nonflexible metallic raceway.
(3) A bonding bar near the grounding electrode conductor. The bonding bar shall be connected to the grounding electrode conductor with a minimum 6 AWG copper conductor.
Exception: In existing buildings or structures where any of the intersystem bonding and grounding conductors required by 770.93, 800.100(B), 810.21(F), 820.100(B), 830.100(B) exist, installation of the Intersystem Bonding Termination is not required. An accessible means external to enclosures for connecting intersystem bonding and grounding electrode conductors shall be permitted, provided at the service equipment and at the disconnecting means for any additional buildings or structures by at least one of the following means:
(1) Exposed nonflexible metallic raceways
(2) Exposed grounding electrode conductor
(3) Approved means for the external connection of a copper or other corrosion-resistant bonding or grounding conductor to the grounded raceway or equipment
FPN No. 1: A 6 AWG copper conductor with one end bonded to the grounded nonflexible metallic raceway or equipment and with 150 mm (6 in.) or more of the other end made accessible on the outside wall is an example of the approved means covered in 250.94, Exception, item (3)."
Retain 2005 NEC FPN No. 2 as written.
Panel Statement: Editorially correct reference in the first line. The panel concludes that the revised text adds clarity and meets the intent of the submitter. In addition, the panel incorporated the changes made by action on Comments 5-125 and 5-127.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-125 Log #1844 NEC-P05 **Final Action: Accept in Principle**
(250.94)

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 5-220
Recommendation: Remove the word "socket" from the phrase "meter socket enclosure" in the proposed 250.94(1) and 250.94(2).
Substantiation: This would bring the code language into harmony with other proposals that are currently passing, such as Proposal 5-294.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-122.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-126 Log #1962 NEC-P05 **Final Action: Reject**
(250.94)

Submitter: Elliot Rappaport, Electro Technology Consultants
Comment on Proposal No: 5-220
Recommendation: The existing text in the 2005 NEC should be indicated as Exception 2 and the exception in Proposal 5-220 should be numbered Exception 1.

Substantiation: As proposed by the CMP, the existing text from the 2005 NEC is appended to the new exception so as to apply to existing buildings or structures. The substantiation does not justify prohibiting external connections for new construction as presently permitted.
Panel Meeting Action: Reject
Panel Statement: The panel is unclear as to the recommendation of the Comment. Providing a consistent method for all new installations will help ensure that intersystem bonding is achieved.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-127 Log #566 NEC-P05 **Final Action: Accept in Principle**
(250.94(1))

Submitter: Gregory J. Steinman, Thomas & Betts Corporation
Comment on Proposal No: 5-220
Recommendation: Continue to accept the proposal in principle, but revise item 1:

(1) A set of terminals securely mounted to the meter socket enclosure and electrically connected to the meter socket enclosure. This terminals set ~~and the enclosure~~ shall be listed as ~~for~~ grounding and bonding equipment.

Substantiation: Presently, the sentence is not grammatically correct. Meter socket enclosures are not specifically listed for grounding.
Panel Meeting Action: Accept in Principle
Panel Statement: The word "set" was removed for clarity. See panel action and statement on Comment 5-122.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-128 Log #1227 NEC-P05 **Final Action: Accept**
(250.96(A))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 5-48
Recommendation: The TCC Task Group on Grounding and Bonding accepts the TCC direction to reconsider the action on proposal 5-48 with respect to text of Section 250.96(A). The Task Group agrees with the TCC note that the text needs to reflect Section 250.96(A) and remove the word "effectively" as provided in Proposal 5-48.

Suggested Action: At Section 250.96(A) of Proposal 5-48, replace the text in the proposal with the text of 2005 Section 250.96 as follows with the revision to remove the word "effectively" from this section.

(A) General Metal raceways, cable trays, cable armor, cable sheath, enclosures, frames, fittings, and other metal non–current-carrying parts that are to serve as grounding conductors, with or without the use of supplementary equipment grounding conductors, shall be ~~effectively~~ bonded where necessary to ensure electrical continuity and the capacity to conduct safely any fault current likely to be imposed on them. Any nonconductive paint, enamel, or similar coating shall be removed at threads, contact points, and contact surfaces or be connected by means of fittings designed so as to make such removal unnecessary.

Substantiation: The text at the line item covering Section 250.96(A) in Proposal 5-48 did not reflect the text in 2005 NEC Section 250.96(A) with the proposed revision to delete the word "effectively" as indicated in the proposal. This comment by the Task Group recognizes the inadvertent placement of incorrect text in the proposal at Section 250.96(A) and this comment provides the correct Section 250.96(A) text as modified by the Proposal 5-48.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-129 Log #980 NEC-P05 **Final Action: Accept in Principle**
(250.97 Exception)

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 5-224
Recommendation: Delete the "is installed" in the exception since an additional verb is not required in this text as follows:
250.97 Bonding for Over 250 Volts.
For circuits of over 250 volts to ground, the electrical continuity of metal raceways and cables with metal sheaths that contain any conductor other than service conductors shall be ensured by one or more of the methods specified for services in 250.92(B), except for (B)(1).

Exception: Where oversized, concentric, or eccentric knockouts are not encountered, or where a box or enclosure with concentric or eccentric knockouts is listed to provide a permanent, reliable electrical bond ~~is installed,~~ the following methods shall be permitted:

(1) Threadless couplings and connectors for cables with metal sheaths

(2) Two locknuts, on rigid metal conduit or intermediate metal conduit, one inside and one outside of boxes and cabinets

(3) Fittings with shoulders that seat firmly against the box or cabinet, such as electrical metallic tubing connectors, flexible metal conduit connectors, and cable connectors, with one locknut on the inside of boxes and cabinets

(4) Listed fittings

Substantiation: Delete "is installed" since the added text places two verbs into the sentence where only one is required.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-130.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-130 Log #1058 NEC-P05 **Final Action: Accept in Principle**
(250.97 Exception)

TCC Action: The Technical Correlating Committee understands that the panel meeting action text modifies the panel actions on Proposals 5-224 and 5-224a.
Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-223
Recommendation: Revise text to read as follows:
"...to provide a ~~permanent~~ durable electrical bond,...".
Substantiation: Our interpretation and enforcement of the NEC is supposed to be based on the dictionary definitions of common English terms, augmented by special definitions found in Article 100, and those unique to particular articles and defined at the beginning of each such article. While the NEC is not intended as a design manual for untrained persons, its language is not supposed to be based on "Hey, Bud, you should know what they intend here" translation. Saying "...the word...is generally understood as it relates..." demands just that sort of interpretation. I don't know how commonly inexpert inspectors make the sort of mistake Mr. Schwan is trying to head off, but I do know that AHJs often rely on inadequately trained inspectors. For this reason, the Style Manual's blessing on terms that have become accepted warrants sparing use. The CMP does have a point, that while the change in the original proposal to remove the sense of "permanent" as meaning "not subject to removal" is worthwhile, the idea of using a means with integrity is worth retaining. I propose "durable," a term used elsewhere in the NEC for similar purposes, as better conveying the intent.
Panel Meeting Action: Accept in Principle
The panel action is to remove the word "permanent" and revise 250.97 Exception as follows:
Exception: Where oversized, concentric, or eccentric knockouts are not encountered, or where a box or enclosure with concentric or eccentric knockouts is listed to provide a ~~permanent,~~ reliable ~~electrical~~ bonding connection, the following methods shall be permitted:
Panel Statement: The panel agrees with the concept of removing the word "permanent" from this section and does not agree that the proposed replacement word "durable" is necessary for this section. The action of removing the word "permanent" from this section addresses the concerns of the submitter, and not replacing it with any other descriptive word addresses the other concerns of subjectivity, ambiguity, enforceability, and inconsistent application of the provisions of this section by users of the Code. The panel concludes that the descriptive wording provides the performance requirements necessary for users without the use of the word "permanent" or any other descriptive adjective. The panel also affirms that this action to remove the word "permanent" is consistent with similar revisions in NEC where the same concerns were raised about the use of this word.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-131 Log #2069 NEC-P05 **Final Action: Accept**
(250.97 Exception)

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 5-224a
Recommendation: Delete the word "permanent" from the exception so it will read in part:
"...to provide a reliable bonding connection...".
Substantiation: The Panel, in its substantiation for the Proposal states, "The phrase "...reliable bonding connection" is the preferred requirement." The word "permanent" indicates a connection that perhaps is made with exothermic welding or an irreversible compression connection. Neither method is common for these connections in metal boxes.

See also the substantiation for Proposal 5-223.

Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-132 Log #1431 NEC-P05 **Final Action: Reject**
(250.104(B))

Submitter: Robert Torbin, Cutting Edge Solutions, LLC / Rep. Titeflex Corporation
Comment on Proposal No: 5-239
Recommendation: Revise text to read as follows:

250.104 Bonding of Piping Systems and Exposed Structural Steel.

(B) Other Metal Piping. Where installed in or attached to a building or structure, metal piping system(s), including gas piping, that is likely to become energized shall be bonded to the service equipment enclosure, the grounded conductor at the service, the grounding electrode conductor where of sufficient size, or to the one or more grounding electrodes used. The bonding jumper(s) shall be sized in accordance with 250.122, using the rating of the circuit that is likely to energize the piping system(s). ~~The equipment grounding conductor for the circuit that is likely to energize the piping shall be permitted to service as the bonding means.~~ The points of attachment of the bonding jumper(s) shall be accessible.

As determined by the authority having jurisdiction, the equipment grounding conductor for the circuit that is likely to energize the piping shall be permitted to serve as the bonding means. In geographical locations subject to high lightning activity, the authority having jurisdiction may require a single bonding connection. When a single bond is made at the service entrance, the bonding jumper shall be sized in accordance with 250.66 and connected in accordance with 250.70.

Substantiation: Corrugated stainless steel tubing (CSST) is used as gas piping extensively throughout the Untied States, and has demonstrated a propensity to become energized from nearby lightning strikes. Conventional bonding of gas piping through the equipment grounding conductor [NEC 250.104(B)] has proven inadequate (under these circumstances) to protect the CSST from arcing damage. The submitted technical article summarizes the arcing damage inflicted on gas piping caused by indirect lightning strikes. CSST manufacturers collectively report dozens of damaged systems caused by improper or inadequate bonding resulting in fire damage or loss of property. The ROP 5-239 (lightning protection) was rejected because mandatory text does not belong in the FPN. Therefore, this necessitates some modifications to 250.104(B), as recommended in the submitted change, to allow alternative methods for direct bonding of metal piping to the grounding system to insure a minimum threshold of protection from all threats (including indirect lightning strikes) that are likely to energize the piping. Current bonding of gas piping to the equipment grounding conductor will continue to be permitted. More prescriptive language is being submitted to NFPA 54 National Fuel Gas Code for the 2009 cycle.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The proposed text would add vague and unenforceable language. The phrase “geographical locations subject to high lightning activity” would be difficult to apply consistently and is one example.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-133 Log #1474 NEC-P05 **Final Action: Accept in Principle**
(250.104(B) (New))

Submitter: Mark P. Morgan, East Coast Lightning Equipment, Inc. / Rep. Lightning Safety Alliance
Comment on Proposal No: 5-239
Recommendation: Recommend the proposed FPN text have the word “shall” changed to “should”.
Substantiation: This information is necessary because of instances I have encountered where local AHJs require the mandated NFPA 780 bonding requirements to be removed, thereby preventing these properties from complying with NFPA 780 and prevent them from receiving UL Master Label Certificate.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 5-134.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-134 Log #2223 NEC-P05 **Final Action: Reject**
(250.104(B))

TCC Action: The Technical Correlating Committee directs that the comment be reported as reject because the FPN may be interpreted as a requirement, which is in violation of 3.1.3 of the NEC Style Manual. The Technical Correlating Committee also notes that the proposed FPN would add an unnecessary third reference to NFPA 780.
Submitter: Technical Committee on Lightning Protection,
Comment on Proposal No: 5-239
Recommendation: Revise the existing Fine Print Note in 250.104(B) as follows:

FPN: Bonding all piping and metal air ducts within the premises will provide additional safety. For structures with a lightning protection system, NFPA 780 requires that all grounding media on a structure be interconnected to provide a common ground potential. This interconnection includes lightning protection, electric service, telephone, and communication system grounds, as well as underground metallic piping systems. For further information see NFPA 780-2004, Standard for the Installation of Lightning Protection Systems.

Substantiation: This submission corrects the procedural error incorporated in the original proposal correctly indicated in the panel’s rejection of the original submission.
Panel Meeting Action: Accept in Principle

Retain existing FPNote following 250.104(B). Move the remaining text to a new FPN No. 3 following Section 250.106 to read as follows:

FPN No. 3: For structures with a lightning protection system, NFPA 780 requires that all grounding media on a structure be interconnected to provide a common ground potential. This interconnection includes lightning protection, electric service, telephone, and communication system grounds, as well as underground metallic piping systems. For further information, see NFPA 780-2004, Standard for the Installation of Lightning Protection Systems.

Panel Statement: The panel moved the FPN to 250.106 to consolidate all lightning protection explanatory information.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

BRETT, JR., M.: I am voting negative, I agree with the negative voter. There should only be one general FPN referencing the lightning standard, NFPA 780. If there are specific rules related to connections between the lightning installation system and the electrical system, then they should be in mandatory text and not FPNs.

MOHLA, D.: This should have been rejected by the panel. 250.106 already has two FPNs referencing to two different requirements of NFPA 780 “Standard for the Installation of Lightning Protection Systems”. Lightning protection is a separate field and requires different expertise to properly evaluate, design, and install lightning protection facilities necessary for proper protection from lightning hazards. By adding sporadic references of NFPA 780 in the National Electrical Code, other important requirements for lightning protection may be very easily overlooked resulting in a partial protection from lightning hazards. At this rate, we will soon end up adding all requirements from NFPA 780 in National Electrical Code. By multiple references to NFPA 780, an electrical contractor may be held responsible for electrical installation to comply with NFPA 780 also. There should be only one FPN referencing NFPA 780 and addition of a third FPN is going in the wrong direction.

5-135 Log #2073 NEC-P05 **Final Action: Reject**
(250.106, FPN 2)

Submitter: Chuck Mello, Underwriters Laboratories
Comment on Proposal No: 5-247
Recommendation: Revise the text to read as follows:
250.106

FPN No. 2: Metal raceways, enclosures, frames, and other non–current-carrying metal parts of electric equipment installed on a building equipped with a lightning protection system may require bonding to or spacing from the lightning protection conductors based on the calculated sideflash distances in accordance with NFPA 780-2004, Standard for the Installation of Lightning Protection Systems. ~~Separation from lightning protection conductors is typically 1.8 m (6 ft) through air or 900 mm (3 ft) through dense materials such as concrete, brick, or wood.~~

Substantiation: The panel action and the final language for FPN No. 2 do not match. The panel action was to delete the typical distance of 6 feet and replace this with “calculated sideflash distance” per NFPA 780. The only actual change that occurred in the revised text was to delete the last sentence to remove the “typical distance” reference but there was no replacement with a “calculated side flash distance”. This leaves the user no information at all instead of what could be incorrect information if the typical distance was used without qualification by true calculations. The proposed language above resolves the conflict between the panel action and the result of that action.
Panel Meeting Action: Reject
Panel Statement: Side flash calculations are already in FPN No. 1. There is no need to repeat that phrase in FPN No. 2.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-136 Log #1987 NEC-P05 **Final Action: Accept in Principle**
(250.118(2) Exception (New))

Submitter: James S. Conrad, Tyco Thermal Controls
Comment on Proposal No: 5-256
Recommendation: Although this proposal was originally submitted as an exception to 250.118(2) it would be more appropriate as an explanatory FPN in 250.120(A) to read as follows:

FPN: See the UL Guide Information on FHIT systems for grounding conductors installed in a raceway that are part of an Electrical Circuit Protective System or a fire rated cable listed to maintain circuit integrity.

Substantiation: This proposed FPN has had public review and should not be considered new material for as the concept in Proposal 5-257 was to bring an awareness for selecting the proper ground wire for fire rated circuits as outlined in the UL guide.

The UL guide information for FHIT systems states: "If not specified, the ground shall be the same as the fire-rated wire described in the system. Use of any other ground wire violates the system fire rating. As an example, THHN ground wire should not be used with a fire-rated system unless specified in the system."

Fire rated cables are used for life safety circuits in Article 700 and Article 695 and this FPN would clarify the importance of the proper type of ground wire used with these systems.

Panel Meeting Action: Accept in Principle

In the proposed text, editorially correct the term "grounding conductor" to "equipment grounding conductor" in the FPN.

Panel Statement: Editorial correction to the FPN.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

BRETT, JR., M.: I support this new fine print note (FPN) for safety reasons. I believe it would be more informative if placed in locations in the NEC where the product is permitted. However, since it was submitted for this location, and it is very important information, I am voting affirmative.

Steel conduit and tubing are recognized as equipment grounding conductors per 250.122. However, there are times that a supplemental (wire) equipment grounding conductor is specified by the designer or installer for various reasons.

In the listing for FHIT systems (electrical circuit protective systems) which are used as fire protection measures, UL has determined that where the user or designer chooses to install an enclosed equipment grounding conductor it must be sized in accordance with 250.122, AND the insulation material type must be the same as that of the fire-rated circuit integrity cable. Use of other types of insulation on the enclosed equipment grounding conductors or bare conductors can constitute a safety hazard and violates the fire-rating listing of the system in the event of a fire. Compatibility of materials in a fire-rated system is of concern to UL. Some materials can provide carbon residue that is conductive or can generate conductive gases that can cause premature failure.

I would emphasize that neither the Code nor the Listing requires a ground wire when the system is installed in metal conduit or metal tubing.

5-137 Log #1988 NEC-P05 **Final Action: Accept in Principle**
(250.118(3) (New))

Submitter: James S. Conrad, Tyco Thermal Controls
Comment on Proposal No: 5-257
Recommendation: Although this proposal was originally submitted as an exception to 250.118(3) it would be more appropriate as an explanatory FPN in 250.120(A) to read as follows:

FPN: See the UL Guide Information on FHIT systems for grounding conductors installed in a raceway that are part of an Electrical Circuit Protective System or a fire rated cable listed to maintain circuit integrity.

Substantiation: This proposed FPN has had public review and should not be considered new material for as the concept on Proposal 5-257 was to bring an awareness for selecting the proper ground wire for fire rated circuits as outlined in the UL guide.

The UL guide information for FHIT systems states: "If not specified, the ground shall be the same as the fire-rated wire described in the system. Use of any other ground wire violates the system fire rating. As an example, THHN ground wire should not be used with a fire-rated system unless specified in the system."

Fire rated cables are used for life safety circuits in Article 700 and Article 695 and this FPN would clarify the importance of the proper type of ground wire used with these systems.

Panel Meeting Action: Accept in Principle

In the proposed text, editorially correct the term "grounding conductor" to "equipment grounding conductor" in the FPN.

Panel Statement: See panel action on Comment 5-136.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

BRETT, JR., M.: See my Explanation of Affirmative Vote on Comment 5-136.

5-138 Log #1982 NEC-P05 **Final Action: Accept in Principle**
(250.118(4) Exception (New))

Submitter: James S. Conrad, Tyco Thermal Controls
Comment on Proposal No: 5-258
Recommendation: Although this proposal was originally submitted as an exception to 250.118(4) it would be more appropriate as an explanatory FPN in 250.120(A) to read as follows:

FPN: See the UL Guide Information on FHIT systems for grounding conductors installed in a raceway that are part of an electrical circuit protective system or a fire rated cable listed to maintain circuit integrity.

Substantiation: This proposed FPN has had public review and should not be considered new material for as the concept in Proposal 5-257 was to bring an awareness for selecting the proper ground wire for fire rated circuits as outlined in the UL guide.

The UL guide information for FHIT systems states: "If not specified, the ground shall be the same as the fire-rated wire described in the system. Use of any other ground wire violates the system fire rating. As an example, THHN ground wire should not be used with a fire-rated system unless specified in the system."

Fire rated cables are used for life safety circuits in Article 700 and Article 695 and this FPN would clarify the importance of the proper type of ground wire used with these systems.

Panel Meeting Action: Accept in Principle

In the proposed text, editorially correct the term "grounding conductor" to "equipment grounding conductor" in the FPN.

Panel Statement: See panel action and statement on Comment 5-136.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

BRETT, JR., M.: See my Explanation of Affirmative Vote on Comment 5-136.

5-139 Log #493 NEC-P05 **Final Action: Accept**
(250.119)

Submitter: Milton Dean, North Carolina Department of Transportation
Comment on Proposal No: 5-265
Recommendation: I concur with the panel's statement. While the submitter points out there is a UL lisiting for traffic signal cable, he fails to acknowledge that no other UL standards exist for other traffic signal components.

Substantiation: The NEC requires equipment to be approved by the authority having jurisdiction. Most authorities require listing or labeling by a third party testing agency. In North Carolina, we request electrical inspections of the service entrance conductors and the disconnecting means. Traffic signal equipment and its installation is inspected by Dept. of Transportation personnel.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-140 Log #1966 NEC-P05 **Final Action: Accept in Principle**
(250.119 Exception (New))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 5-264
Recommendation: This Proposal should have been Accepted or Accepted in Principle. If the panel is concerned about the proposal being overly broad, the following revised text would address that issue and still resolve the conflict with long-standing standardized color codes in signaling and communications:

Exception: Where equipment is connected by a multiconductor cable and is not required to be grounded in accordance with 250.112(1) or Chapter 8, the color green may be used for other than grounding conductors.

Substantiation: Standard color-coding for Class 2 thermostat circuits and cables uses green as the ungrounded conductor that controls the fan in HVAC equipment. This has been a standardized practice for decades. Also, green is used as identification in many communications circuits and cables. For example, Cat 5 cable includes a green pair that is not intended for use as grounding conductors. This Cat 5 cable is permitted to be used as a substitute for Class 2 or 3 cable or for fire alarm cable according to Articles 725 and 760. No substantiation to overturn these long-standing standards and practices was ever submitted when this section was revised in the 2005 NEC. It appears that this problem was not even considered. As a result, installers and inspectors of such installations are forced to ignore either the NEC or the installation instructions for listed equipment that uses such cables and color codes. See also the comment on negative by Mr. Dobrowsky. The language referring to Chapter 8 is probably not necessary as this requirement does not apply there anyway according to 90.3.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 5-141.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

HAMMEL, D.: See my explanation of affirmative vote on Comment 5-141.

5-141 Log #603 NEC-P05 **Final Action: Accept in Principle**
(250.119(D) (New))

Submitter: Henry A. Jenkins, Wake County, Inspections Development
Comment on Proposal No: 5-265
Recommendation: Add a new subsection (D) to 250.119 as follows:
(D) Circuits of Less than 50 Volts. Circuits of less than 50 volts shall be permitted to use a conductor with green insulation or a conductor with green insulation with one or more yellow stripes for other than grounding purposes.
Substantiation: While the submitter of Proposal 5-265 has identified an issue with low voltage traffic signal systems using a green conductor, there are many other low voltage systems that use a green insulated conductor for low voltage power applications. For example, air conditioner thermostat circuit wiring uses a green insulated conductor as the low voltage power conductor as the "hot" conductor for the A/C fan supply. This color coding in T-Stat wiring and the associated cable has been used for this function for many years without any problem mistaking this conductor as a grounding conductor. The added text to 250.119 in the 2005 NEC would not permit this green conductor to be used. There is similar wording for grounded conductors in 200.7(B) permitting the white, gray, or white with three continuous colored striped conductor to be used for other than the grounded conductor. This same permission must be applied to the green conductor and was probably just an oversight by Panel 5 during the 2005 process. This change will not adversely affect safety since it has been done in various systems for many years without any adverse problems. This new text would not be "new" material since the issue was actually dealt with in this proposal but rejected by the panel. This proposed text will permit the use of this green insulated conductor for any low voltage system of less than 50 volts, including traffic signaling systems installed as premises wiring.
Panel Meeting Action: Accept in Principle
Add a new exception to 250.119 (main body) to read as follows:
Exception: Power limited, Class 2, or Class 3 circuit cables containing only circuits operating at less than 50 volts shall be permitted to use a conductor with green insulation for other than equipment grounding purposes.
Panel Statement: The addition of this exception addresses the submitter's concerns.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
HAMMEL, D.: I agree with the panel action to add an exception to permit the use of conductors with green insulation for other than equipment grounding in limited energy installations only. While it is true that it has been standard practice to use green as part of the color-coding for Class 2 and Class 3 circuit conductors, it is also true that it has been standard practice to use conductors with green insulation for equipment grounding ONLY. It is an important safety practice to use conductors with green insulation for only equipment grounding when installing lighting, power and, Class 1 remote control circuits.

5-142 Log #1674 NEC-P05 **Final Action: Reject**
(250.120(B))

Submitter: Phil Simmons, Olympia, WA
Comment on Proposal No: 5-269
Recommendation: Accept this Proposal.
Substantiation: Experience has shown that aluminum conductors fail at a high rate when installed in direct-burial applications. When the bad section of the aluminum conductor is dug up, it is found the aluminum conductor has deteriorated and has become a white powder. This white powder is not conductive and as a result, the circuit opens.
If this happens to energized conductors, there will be some indication of the problem as equipment will not work properly. When this happens to an equipment grounding conductor, the conductor fails with no indication of an open circuit until the conductor is called upon to carry fault current and it doesn't. This open circuit can result in equipment being at a dangerous voltage above ground if there is a ground fault to equipment beyond the point of the break in the aluminum conductor.
This issue was recently mentioned to a group of journeyman electricians. One of them volunteered that they make repairs to failed aluminum conductors every week so this is a widespread problem.
The panel stated when rejecting the proposal, "Aluminum conductors with insulation suitable for direct burial are listed for that purpose. As with all conductors, care in handling and installation by qualified persons is also required to have a Code compliant installation. Any conductor directly buried with damaged insulation can experience failure under different soil conditions." The issue here is history has proven the aluminum conductor fails with great regularity in spite of code compliant installations. It is fallacy to assume every failure is due to faulty installations. An associate in the industry recently stated their installation of direct-burial aluminum conductors failed within a few years in spite of carefully embedding the conductors in select backfill.
This proposal needs to be accepted to ensure the effective ground-fault return path required by 250.4.
Panel Meeting Action: Reject
Panel Statement: No field evidence has been provided to indicate that properly installed insulated aluminium conductors listed for direct burial are not suitable for use in that application.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
BRENDER, D.: The original proposal and this comment have identified a safety issue that could be easily addressed. It has long been recognized that aluminum conductors corrode rapidly in the presence of moisture. Pinhole leakage in the outer covering of underground cables is also a recognized mode of failure. History has shown that aluminum conductors in direct burial applications fail with regularity, irrespective of listing or compliance with installation recommendations.
While loss of a phase conductor would normally not cause a safety concern, loss of the grounding conductor will not cause operation of the overcurrent device and will cause a substantial safety hazard. When called upon to handle fault current, the aluminum grounding conductor will simply not be useful.
Adoption of the proposal and acceptance of this Comment will easily and inexpensively address this potential safety hazard.

5-143 Log #2349 NEC-P05 **Final Action: Accept in Principle**
(250.122)

Submitter: Alan Manche, Square D Company
Comment on Proposal No: 5-274
Recommendation: Revise NEC 250.122 with the additions (underlined) and deletions (strike through) as shown. The entire text of 250.122(A) is shown for clarity, but only those changes shown underlined or strike through are part of this proposal.
250.122 Size of Equipment Grounding Conductors.
(A) General. Copper, aluminum, or copper-clad aluminum equipment grounding conductors of the wire type shall not be smaller than shown in Table 250.122 but shall not be required to be larger than the circuit conductors supplying the equipment. Where the conductor supplying the equipment is smaller than 14 AWG, the equipment grounding conductor shall not be required to be larger than the circuit conductor.
Substantiation: I agree with the panel's position on this matter, however, the conjunction "but" leaves it unclear as to whether the minimum is a number #14 as is found in Table 250.122 or if it can be a size less when the conductors are #16. It conveys that it must be at least as larger as a #14 but not more than the circuit conductor. In essence you can not drop below #14 which does not permit you to reduce to a #16 or smaller where the circuit conductors are smaller. Based on the present interpretation of the panel, I could argue that the wording requires you to use #14 in Class 2 and 3 wiring means.
Panel Meeting Action: Accept in Principle
Revise the first sentence of 250.122(A) to read as follows:
250.122 Size of Equipment Grounding Conductors.
(A) General. Copper, aluminum, or copper-clad aluminum equipment grounding conductors of the wire type shall not be smaller than shown in Table 250.122, but in no case shall ~~not~~ they be required to be larger than the circuit conductors supplying the equipment.
Panel Statement: This change addresses the concerns of the submitter.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-144 Log #709 NEC-P05 **Final Action: Reject**
(250.122(A))

Submitter: Dean Negrelli, Wiremold/Legrand
Comment on Proposal No: 5-272
Recommendation: The Panel should accept in principle and add the words "Listed (Classified)" before "cable tray" in the second sentence as follows (note that the text is taken from 2008 ROP Draft):
Where a Listed (Classified) cable tray, a raceway, or a cable armor or sheath is used as the equipment grounding conductor, as provided in 250.118 and 250.134(A), it shall comply with 250.4(A)(5) or (B)(4). [ROP 5-272]
Substantiation: Only cable tray Listed (Classified) by a qualified testing laboratory should be used as an equipment grounding conductor. Listing/Classification ensures the cable tray has been investigated for this purpose. Listing/Classification also ensures the appropriate instructions and hardware are provided to create a reliable equipment grounding conductor.
Panel Meeting Action: Reject
Panel Statement: Section 250.118(11) requires cable tray used as an equipment grounding conductor to meet the requirements of 392.7. In 392.7 the term used for sections of cable tray is identified. There are also requirements for fittings and cross-sectional area. Including cable tray in 250.122(A) is mandating the performance requirements of 250.4. The point of the second sentence in 250.122(A) is to make sure that the equipment grounding conductors that are not of the wire type meet the performance requirements of 250.4.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-145 Log #1057 NEC-P05 **Final Action: Reject**
(250.122(A))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 5-272
Recommendation: Revise text to read as follows:
"Where ~~a~~ cable tray, ~~a~~ raceway, ~~a~~ cable armor, or cable sheath, that qualifies as an equipment-grounding conductor in accordance with 250.118...".
Substantiation: While Mr. Daniel Leaf has a point in adding this means of grounding, it is patently true that not all raceway, or cable armor installations constitute suitable grounds-not just cable trays. At first, it seemed that the CMP majority was right and Messrs. Chuck Mello and Martin Brett were worrying unnecessarily. However, on reflection, I believe the reminder is worthwhile, but a more-general reminder. I have come on too many installers who assumed that any armor must be a good and legal ground. Their hearing about the new type of MC cable, I fear, will only add to their confusion. Deletion of the "a"s is just an editorial suggestion for tighter writing. The particular language I suggest here is the TCC's, from 3-5 Log #1532.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-144.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-146 Log #2078 NEC-P05 **Final Action: Reject**
(250.122(A))

Submitter: Chuck Mello, Underwriters Laboratories
Comment on Proposal No: 5-272
Recommendation: Revise text as follows:
250.122(A) General. Copper, aluminum, or copper-clad aluminum equipment grounding conductors of the wire type shall not be smaller than shown in Table 250.122 but shall not be required to be larger than the circuit conductors supplying the equipment. Where a raceway or a cable armor or sheath or cable tray listed for the purpose is used as the equipment grounding conductor, as provided in 250.118 and 250.134(A), it shall comply with 250.4(A)(5) or (B)(4).
Substantiation: The panel should not have accepted this change without qualification. Cable tray is suitable as an equipment-grounding conductor only when Listed (Classified) and when installed with the instructions, hardware and accessories provided or specified by the manufacturer. As worded with this change, cable tray has been made equivalent to raceways where no such listing (Classification) is necessary and may lead to confusion and unsafe installations. At most the panel should have Accepted in Principle and added the appropriate qualifiers as stated above. Otherwise the panel should reject the proposal since it is incomplete and may allow unsafe installations.
Panel Meeting Action: Reject
Panel Statement: The panel assumes that this comment is related to Proposal 5-272. See panel action and statement on Comment 5-144.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-147 Log #270 NEC-P05 **Final Action: Reject**
(250.122(B))

Submitter: Dennis Downer, Morrisville, VT
Comment on Proposal No: 5-275
Recommendation: Add the following underlined text to Article 250.122(B).
(B) Increased in Size. Where ungrounded conductors are increased in size to compensate for voltage drop or for any other reason related to proper circuit operation, equipment grounding conductors, where installed, shall be increased in size proportionately according to circular mil area of the ungrounded conductors.
Substantiation: There is no electrical theory to the requirement to increase the EGC if one designs a feeder and installs a larger conductor than is required for the purpose of future usage.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The addition of the term "proper circuit operation" is vague and unenforceable.
The feeder design in the substantiation is incorrect. The panel agrees that inadequate substantiation was submitted with the proposal, and it should be rejected on that basis. The panel concludes that any adjustment in size of the ungrounded circuit conductors can adversely affect the safety circuit of the system that includes the equipment grounding conductor. To eliminate any possibility of an inadequately sized equipment grounding conductor that does not meet the performance requirements of 250.4, the panel concludes that whenever the ungrounded circuit conductors are increased in size, the equipment grounding conductor must be adjusted in size proportionately. See panel action on Comment 5-152.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-148 Log #335 NEC-P05 **Final Action: Reject**
(250.122(B))

Submitter: Dennis Downer, IBM / Rep. Inspector Member of IAEI
Comment on Proposal No: 5-276
Recommendation: Revise text to read as follows:
(B) Increased in Size. Where ungrounded conductors are increased in size to compensate for voltage drop, correction factors for ambient temperature, correction factors for more than three current carrying conductors, or for any other reason related to proper circuit operation, equipment grounding conductors, where installed, shall be increased in size proportionately according to circular mil area of the ungrounded conductors.
Substantiation: The 1999 NEC called this article Adjustment for Voltage Drop, stating where conductors are adjusted for voltage drop the EGC shall be adjusted proportionately. In 2002, it was changed to Increase in Size with no exception.
I would agree with the explanation of the negative vote, that the resistance would rise and, therefore, shouldn't the EGC be increased for the same reason, to carry back a fault when needed. Also, the same consideration should be given to adjustment factors for more than three wires in a conduit, where the wire size is increased rather than decrease the OCPD. And, also for voltage drop, same reasons as above, increased wire size, which was what this section was called in the 1999 NEC.
There is also no electrical theory for this requirement to increase the EGC if one designs a feeder and installs a larger conductor than is required for the purpose of future usage, an example is as follows:
Design Scope
For economical reasons a feeder is to be designed for 200 amps to accommodate any future tool/equipment which can utilize the full 200 amp feeder. An existing 100A tool/equipment which is being utilized today will be connected to the designed new feeder for the future 200 amp loads, but we will protect/fuse the feeder for 100 amps.
- Per Table 310.16, a 200 amp feeder at 75°C requires the phase conductors to be #3/0 AWG Cu (167,800 cir mils)
- Per Table 250.122, the ground conductor shall be a #6 AWG Cu (26,240 cir mils)

Question
Per 250.122(B) "Where ungrounded conductors are increased in size..." Does the ground wire need to be increased in size if the 200 amp feeder is fused at 100 amps as shown below?
- 100 amp feeder - per Table 310.16 phase conductors is only required to be #3 AWG Cu (52,620 cir mils)
- Per Table 250.122, the ground conductor shall be 8 AWG Cu (16,510 cir mils)
- Size Ratio: #3/0 (167,800 cir mils) / #3 (52,620 cir mils) = 3.19
- #8 AWG Cu (16,510 cir mils) x 3.19 = 52,649 cir mils
- Therefore, a #2 AWG Cu Ground is required on the new 200 amp feeder which will presently be fused at 100 amps. Please verify.

If the above is a correct assumption, a new 200 amp feeder fused with a 200 amp fuse will require only a #6 AWG Cu ground conductor. However, a new 200 amp feeder fused with a 100 amp fuse must have a #2 AWG Cu Ground wire. There is no electrical theory or reason why this would be a requirement.
Note: If an equipment grounding conductor is not installed in the conduit, and the conduit is utilized as the equipment grounding conductor, can the 200 amp feeder (3/0 AWG Cu cable) be fused with a 100 amp fuse? By the language in 250.122(B) today this only applies to where an EGC is installed.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-147.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-149 Log #388 NEC-P05 **Final Action: Reject**
(250.122(B))

Submitter: Dennis Downer, IBM
Comment on Proposal No: 5-276
Recommendation: Revise as follows:
(B) Increased in Size. Where ungrounded conductors are increased in size ~~for reasons other than application of ampacity adjustments factors~~ to compensate for voltage drop, correction factors for ambient temperature, correction factors for more than three current carrying conductors, or for any other reason related to proper circuit operation, equipment grounding conductors where installed, shall be increased in size proportionately according to circular mil area of the ungrounded conductors.
Substantiation: The submitter's language change and substantiation does not meet the intent of ampacity adjustments and does not address the total issue.
The 1999 NEC called this article Adjustment for Voltage Drop, stating where conductors are adjusted for voltage drop, the EGC shall be adjusted proportionately.

In 2002 it was changed to increase in size with no exceptions. I agree with the explanation of the negative vote that the circuit resistance will rise due to the heating affect and therefore shouldn't the EGC be increased for the same reason, to carry back any fault current when needed to trip the OCPD at the proper time interval. This same consideration should be given to adjustment factors for more than three wires in a conduit, where the wire size is increased rather than decrease the OCPD, and also for voltage drop, where the wire size is increased and the OCDP remains the size, which is what this section was intended for and was called in the 1999 NEC.

There is also no electrical theory for this requirement to increase the EGC if one designs a feeder and installs a larger conductor than is required for the purpose of future usage, an example is shown below:

Design Scope

For economical reasons a feeder is to be designed for 200 Amps to accommodate any future tool/equipment which can utilize the full 200 Amp feeder. An existing 100A tool/equipment which is being utilized today will be connected to the designed new feeder for the future 200 Amp loads, but we will protect/fuse the feeder for 100 Amps.

- Per Table 310.16, a 200 Amp feeder at 75 degree C requires the phase conductors to be #3/0 AWG Cu (167,800 cir mils)
- Per Table 250.122, the ground conductor shall be a #6 AWG Cu (26,240 cir mils)

Question

Per 250.122(B, "Where ungrounded conductors are increased in size..." Does the ground wire need to be increased in size if the 200 Amp Feeder is fused at 100 Amps as shown below?

- 100 Amp Feeder - Per Table 310.16 phase conductor is only required to be #3 AWG Cu (52,620 cir mils)
- Per Table 250.122, the ground conductor shall be 8 AWG Cu (16,510 cir mils)
- Size Ratio: #3/0 (167,800 cir mils)/#3 (52,620 cir mils) = 3.19
- #8 AWG CU (16,510 cir mils) x 3.19 = 52,649 cir mils
- Therefore a #2 AWG Cu Ground is required on the new 200 Amp feeder which will presently be fused at 100 Amps. Please verify.

If the above is a correct assumption, a new 200 Amp feeder fused with a 200 Amp fuse will require only a #6 AWG Cu ground conductor. However, a new 200 Amp feeder fused with a 100 Amp fuse must have a #2 AWG Cu Ground wire. There is no electrical theory or reason why this would be a requirement.

Note: If an equipment grounding conductor is not installed in the conduit, and the conduit is utilized as the equipment grounding conductor, can the 200 Amp feeder (3/0 AWG Cu Cable) be fused with a 100 Amp Fuse? By the language in 250.122(B) today, this only applies to where an EGC is installed.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 5-147.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-150 Log #800 NEC-P05 **Final Action: Reject**
(250.122(B))

Submitter: Richard E. Loyd, Sun Lakes, AZ
Comment on Proposal No: 5-276
Recommendation: Revise this proposal as follows:
250.122(B) Increased in Size. Where ungrounded conductors are increased in size for reasons other than application of ampacity adjustments factors **in** 310.15(B)(2**)**, equipment grounding conductors,----------
Substantiation: The proponents substantiation is correct and the addition of the correct NEC reference 310.15(B)(2) will add clarity for the user.

Temperature rise also increases the impedance in a circuit and a larger EGC may be needed, lack of design is not a good reason to allow the installer to install a minimum size EGC from Table 250.122 that may or may not provide a low enough impedance path for the fault to cause the overcurrent device to trip before the wiring and or equipment is damaged excessively.

The safety factors contained in the present text of 250.122(B) may be justified is some cases. Grounding books such as Soares and Simmons Electrical Grounding and Bonding are available with text and tables to assist the designer in making safe and correct designs. Also free "GEMI" software is available for making simple calculations to assist the designer or installer. Please reconsider and and accept the addition of the reference.

Panel Meeting Action: Reject
Panel Statement: Since Comment 5-152 rejects Proposal 5-276, this revision is no longer necessary.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-151 Log #981 NEC-P05 **Final Action: Accept in Principle**
(250.122(B))

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 5-276
Recommendation: Delete the added text as follows:
250.122 Size of Equipment Grounding Conductors
(B) Increased in Size. Where ungrounded conductors are increased in size ~~for reasons other than application of ampacity adjustments factors,~~ equipment grounding conductors, where installed, shall be increased in size proportionately according to circular mil area of the ungrounded conductors.
Substantiation: If ungrounded conductors are increased for any reason, even for ampacity adjustment factors, the resistance of the ungrounded conductors are decreased and the appropriate equipment grounding conductor should also be proportionately increased. There wasn't any technical information provided in the substantiation to justify not requiring an increased equipment grounding conductor when an adjustment factor is applied.
Panel Meeting Action: Accept in Principle
Panel Statement: Since Comment 5-152 rejects Proposal 5-276, this revision is no longer necessary.
See panel action on Comment 5-152.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-152 Log #1673 NEC-P05 **Final Action: Accept**
(250.122(B))

Submitter: Phil Simmons, Olympia, WA
Comment on Proposal No: 5-276
Recommendation: Reject this Proposal.
Substantiation: This proposal was accepted with inadequate substantiation. It is obvious that equipment grounding conductors are subject to the same conditions of use as the circuit conductors. If the circuit conductors require derating for conditions of use such as high ambient temperatures or excessive number of conductors, and, as a result, larger conductors are required, the equipment grounding conductors must also be adjusted in size. This is a fairly simple physical law.

As temperatures rise, the resistance of any conductor increases. This increased circuit resistance decreases fault current, and may cause the overcurrent device to open later than planned, or not open at all. There were no calculations or supporting data submitted with the proposal to show the proposed change would represent safe practice.

It is also obvious that not all ampacity adjustments result in an increase in circuit conductor sizes. Often, this is due to derating starting from the 90°C ampacity of the conductors. However, where ampacity adjustments of circuit conductors result in an increase in size, the equipment grounding conductor must also be increased in size as has been required in the Code for safety.

Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-153 Log #1910 NEC-P05 **Final Action: Accept in Principle**
(250.122(D))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 5-284
Recommendation: Accept the proposal, or, at a minimum, revise the paragraph as follows:

(D) Motor Circuits. Where the overcurrent device consists of an instantaneous-trip circuit breaker or motor short-circuit protector, as allowed in 430.52, the equipment grounding conductor shall be permitted to be sized not smaller than that given by Table 250.122 using the maximum permitted size of a time-delay fuse selected for short-circuit and ground-fault protection in accordance with 430.52(C)(1) Exception No. 1.

Substantiation: This comment works from information provided in the comments in the voting. It clarifies that the dual-element fuse parameter is based on the next higher standard size rule, which is usually how such fuses are actually selected in the field.

Panel Meeting Action: Accept in Principle
Delete the present language in paragraph (D). Add new language to the section as follows:

(D) Motor Circuits. Equipment grounding conductors for motor circuits shall be sized in accordance with (D)(1) or (D)(2).

(1) General. The equipment grounding conductor size shall not be smaller than determined by 250.122(A) based on the rating of the branch circuit short-circuit and ground-fault protective device.

(2) Instantaneous-Trip Circuit Breaker and Motor Short-Circuit Protector. Where the overcurrent device is an instantaneous-trip circuit breaker or a motor short-circuit protector, the equipment grounding conductor shall be sized not smaller than that given by 250.122(A) using the maximum permitted rating of a dual element time-delay fuse selected for branch-circuit short-circuit and ground-fault protection in accordance with 430.52(C)(1), Exception No. 1.
Panel Statement: The proposed comment was restructured to comply with the NEC Style Manual. The revised text meets the submitter's intent.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-154 Log #341 NEC-P05 **Final Action: Reject**
(250.146(A))

Submitter: Bryan P. Holland, City of North Port
Comment on Proposal No: 5-298
Recommendation: Revise proposal to state:
At least one of the insulated retaining washers shall be removed from receptacles that... OR, At least one of the retaining washers of insulated materials shall be removed from receptacles that...
Substantiation: The revised wording meets both the intent of the original proposal while also resolving the statement made by the panel.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its original action and statement on this proposal and concludes that the additional revision proposed on this comment does not add clarity or improve the usability of this section.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-155 Log #337 NEC-P05 **Final Action: Accept**
(250.146(D))

Submitter: Michael J. Johnston, Plano, TX
Comment on Proposal No: 5-301a
Recommendation: Continue to accept the proposal but revise the last sentence as follows:
This equipment grounding conductor shall be permitted to pass through one or more panelboards~~, boxes, wireways, or other enclosures~~ without connection to the panelboard grounding terminal as permitted in 408.40, Exception, so as to terminate within the same building or structure directly at an equipment grounding conductor terminal of the applicable derived system or service. Where installed in accordance with the provisions of this section, this equipment grounding conductor shall also be permitted to pass through boxes, wireways, or other enclosures without being connected to such enclosures.
Substantiation: The revised wording does not add new information. The proposal, as accepted, inadvertently created a wording issue with the existing text. By adding the new sentence, the concept of equipment grounding conductors through enclosures other than panelboards alone, is retained which was the original intent of the proposal. The comment is intended to be editorial revisions for clarity. Adding the word "equipment" provides clarification for users as to which conductor is referenced in these requirements, since the term "grounding conductor" is a specifically defined term.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-156 Log #2084 NEC-P05 **Final Action: Reject**
(250.146(D))

Submitter: Chuck Mello, Underwriters Laboratories
Comment on Proposal No: 5-304
Recommendation: Revise the text as accepted by the panel on proposal 5-310a to read as follows:
250.146 (D) Isolated Ground Terminal Receptacles. Where installed for the reduction of electrical noise (electromagnetic interference) on the grounding circuit, a receptacle in which the grounding terminal is purposely insulated from the receptacle mounting means shall be permitted. The receptacle grounding terminal shall be connected to a~~n~~ insulated dedicated equipment grounding conductor run with the circuit conductors. This dedicated equipment grounding conductor shall be permitted to pass through one or more panelboards, boxes, wireways, or other enclosures without a connection to the panelboard equipment grounding terminal bar as permitted in 408.40, Exception, so as to terminate within the same building or structure directly at an equipment grounding conductor terminal of the applicable derived system or service.
FPN: Use of an ~~isolated~~ dedicated equipment grounding conductor does not relieve the requirement for grounding the raceway system and outlet box.
Substantiation: The panel should reconsider the action and not reject the entire proposal outright. The receptacles can continue to be referred to as "isolated grounding receptacles" since the yoke is in fact isolated from the green equipment grounding screw provided for connecting the third (grounding) receptacle sleeve. The submitter has provided good substantiation that the term "Isolated" has created Issues and unsafe Installations In the field due to the misunderstanding of the Intended meaning of the word "Isolated".
The change to the fine print note should be further considered and possibly use the term "dedicated" in place of "isolated" when referring to the equipment grounding conductor. In the 2002 cycle the term "dedicated" was suggested and the panel statement at that time indicated that dedicated could be inferred to mean a separate equipment grounding conductor for each receptacle. The term dedicated means "to set apart for a definite use" (Websters New Collegiate Dictionary), which is exactly what is intended. The "dedicated equipment grounding conductor" is set apart from the required equipment grounding conductor for a definite use limiting electronic noise interference. The confusion in the industry indicated by the submitter is in dealing with the insulated green wire that comes from the isolated grounding receptacle. The term "isolated" is a poor word to use and has caused great confusion and down right dangerous installations to be completed. I believe the panel action should have been to Accept in Principle and In Part. The above revised language should resolve at least some of the problems encountered. The word "equipment" was added in one location to better clarify the wording in that part since it is the equipment grounding conductor that is being referred to in this case.
Panel Meeting Action: Reject
Panel Statement: The new word "dedicated" provides no benefit to the clarity and usability of this section. The conductor used to connect to the terminal of an isolated ground receptacle is an insulated equipment grounding conductor. It has to be installed to meet the applicable provisions for this type of installation. The panel concludes that introducing an additional and undefined term in this section is not necessary and is unsubstantiated.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
MELLO, C.: The panel's statement does not address the issue nor the substantiation. The statement that the conductor connected to the isolated ground terminal is an "insulated equipment grounding conductor" infers that the required equipment grounding conductor that connects to the raceway, box and other equipment is not insulated or would not be permitted to be insulated. This conductor being insulated is part of the requirement in 250.146(D) has nothing to do toward a solution to the poorly applied term "isolated". The term dedicated is clearly defined in Webster's dictionary, as brought out in the comment's substantiation, and in accordance with the NEC Style Manual any term not specifically defined in the Code uses standard dictionary definitions. It should be pointed out that the term "dedicated" is used in the NEC 35 times without specific definition. It is used in various contexts such as "dedicated branch circuit", "dedicated space", and "dedicated strut" among others. If the term dedicated, meaning "for a specific purpose or use" is understood for these 35 applications, how can the panel say the term is "undefined" and would not be understood to differentiate the "insulated equipment grounding conductor" installed for a special purpose from the one required to meet the required raceway, equipment and other equipment grounding requirements? The original proposal submitter has over several cycles provided substantiation of a problem with the term "isolated" and has provided evidence of serious safety issues because of misunderstanding of that term.

5-157 Log #401 NEC-P05 **Final Action: Reject**
(250.157)

Submitter: Daniel Leaf, Seneca, SC
Comment on Proposal No: 5-312
Recommendation: Accept the proposal.
Substantiation: Where multiple derived systems are installed, there is no code provision for a common grounding electrode conductor with taps. Since it is not specifically allowed or disallowed code users have no guidance. There may be installations where, for example, two generators are installed to provide for varying loads, or a back-up system in case of malfunction or maintenance and repair.
Panel Meeting Action: Reject
Panel Statement: There is no demonstrated need for such a provision. There is no technical evidence that installations following the present requirements are unsafe.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-158 Log #520 NEC-P05 **Final Action: Reject**
(250.166(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-311
Recommendation: Accept the proposal.
Substantiation: If the largest conductor is 2 AWG copper, an aluminum 2 AWG conductor may be used per the present text. Which infers a difference in conductivity is irrelevant. Table 250.66 for ac systems applies to different sizes for copper and aluminum which infers conductivity is not equal.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its original action and statement on this proposal. No additional substantiation has been provided to indicate this revision is necessary in response to any problems or conflicts in the field with regard to application of this section to dc systems. The proposal was not editorial and did not add clarity to this requirement.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-159 Log #519 NEC-P05 **Final Action: Accept**
(250.168)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 5-313
Recommendation: Accept as revised:
Direct Current System Bonding Jumper. For direct-current systems that are to be grounded an unspliced bonding jumper shall be used to connect the equipment grounding conductor(s) to the grounded conductor at the source or the first system disconnecting means where the system is grounded. ~~For direct current systems~~ The size of the bonding jumper shall not be smaller than the system grounding electrode conductor specified in 250.166 and shall comply with the provisions of 250.28(A), (B), and (C).
Substantiation: 250.168 prescribes the size for a bonding jumper, but there is no section that REQUIRES one. Is it optional? Without a bonding jumper there is no effective ground-fault current path required by 250.2. 250.28 doesn't seem to apply since (D) of that section refers to Table 250.66 which is for ac systems. 250.34(C) doesn't cover dc generators since it relates to grounding in 250.26 for ac systems.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-160 Log #1502 NEC-P05 **Final Action: Accept**
(250.184(A)(1))

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc
Comment on Proposal No: 5-316
Recommendation: Technical Correlating Committee Task Group on the definition of "Neutral Conductor" concurs with the panel action on this proposal.
Substantiation: This comment was developed by the Technical Correlating Committee (TCC) Task Group (TG) on the definition of "Neutral Conductor." Task Group members were: Jeffrey Boksiner (Chair) (CMP 5, TCC), Paul Dobrowsky (CMP 5), Walter Skuggevig (CMP 5), Doug White (CMP 5), Michael Toman (CMP 2, TCC), Bob Wilkinson (CMP2), Jim Daly (CMP 6, CMP 7, TCC), Bill Laidler (CMP 6), and Oran Post (CMP 6). The TCC directed that the action on this proposal be sent to the TG for review and comment.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-161 Log #1682 NEC-P05 **Final Action: Reject**
(250.184(A)(1) Exception No. 1, No. 2, and No. 3)

Submitter: Donald W. Zipse, Electrical Forensics, LLC
Comment on Proposal No: 5-318
Recommendation: Delete Section 250.184(A)(1) Exception No. 1, Exception No. 2, and Exception No. 3.
Substantiation: Please read Mr. Elliott Rappaport's Explanation of Negative vote. It appears that he understands the dangers involved.
Please continue your Panel Statements as I assure you I will address all of them in the next cycle.
Let us look at 250.184(A)(1), Exception No. 1, which states, "Bare copper conductors shall be permitted to be used for the neutrals of service entrances and the neutral of direct-buried portions of feeders." This allows bare conductors for certain applications.
Now look at 250.184(B)(7), which states, "The neutral, where provided, shall be insulated and isolated from earth except at one location."
It sure seems to me that there is a conflict between the two statements.
In addition, first thing is there is no single point grounded system when it comes to utility services since the utility grounds the neutral at the transformer and possibly again at the meter. In addition the NEC requires the neutral to be grounded at the service entrance. **SO WHERE IS THIS SINGLE POINT GROUNDED ELECTRICAL (service) SYSTEM? Only when the system originates after the service with the installation of another transformer.** It would be great if the panel could have the ability to look at the total electrical circuit instead of thinking with blinders on and compartmentalize the circuit to fit their desires.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree that a conflict exists between the statements pointed out by the submitter. The exceptions in 250.184(A)(1) apply to the insulation level of the neutral conductor. Paragraphs (B) and (C) specify two different ways the neutral conductor can be grounded and provide for options for the desired engineering design. Specifically 250.184(B)(7) would set neutral insulation requirements that would not allow the exceptions in 250.184(A)(1) only where the option of single point grounding is chosen. Therefore, the single point grounded system referenced in 250.184(B), if chosen, is the system that is grounded at the service or at a separately derived system. Furthermore, the NEC does not cover installations under the exclusive control of an electric utility.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
MOHLA, D.: Submitter is correct about the possible conflict between 250.184(A)(1) and 250.184(B)(7).
250.184(A) and 250.184(B)(7) both require that neutral conductor be insulated.
250.184(A)(1) Exceptions allow bare neutral conductors in certain cases.
251.184(B)(7) does not allow any exceptions to insulated neutral requirements.
The Panel statement indicates bare neutral is not allowed when single point grounding system is utilized. So by default only place bare copper neutral can be used is when multi grounded Neutral system is utilized.
This is not very clear in the text and to the users and is a source of conflict.

ARTICLE 280 — SURGE ARRESTERS

5-162 Log #975 NEC-P05 **Final Action: Accept in Principle**
(280)

TCC Action: The Technical Correlating Committee directs that NFPA staff update the references to the standards as provided in the affirmative comments on vote.
Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 5-335
Recommendation: Revise as follows:
ARTICLE 280 Surge Arresters, Over 1 kV
I. General
280.1 Scope. This article covers general requirements, installation requirements, and connection requirements for surge arresters installed on premises wiring systems over 1 kV.
280.2 Uses Not Permitted. A surge arrester shall not be installed where the rating of the surge arrester is less than the maximum continuous phase-to ground power frequency voltage available at the point of application.
280.3 Number Required. Where used at a point on a circuit, a surge arrester shall be connected to each ungrounded conductor. A single installation of such surge arresters shall be permitted to protect a number of interconnected circuits, provided that no circuit is exposed to surges while disconnected from the surge arresters.
280.4 Surge Arrester Selection. The surge arresters shall comply with all of the following:
(A) Rating. The rating of a surge arrester shall be equal to or greater than the maximum continuous phase-to-ground voltage available at the point of application.
(B) Silicon Carbide Types. The rating of a silicon carbide-type surge arrester shall be not less than 125 percent of the maximum continuous phase-to-ground voltage available at the point of application.
FPN No. 1: For further information on surge arresters, see ANSI/IEEE C62.1-1989, Standard for Gapped Silicon-Carbide Surge Arresters for AC Power Circuits; ANSI/IEEE C62.2-1987, Guide for the Application of Gapped Silicon-Carbide Surge Arresters for Alternating-Current Systems; ANSI/IEEE C62.11-1999, Standard for Metal-Oxide Surge Arresters for Alternating-Current Power Circuits (> 1kV); and ANSI/IEEE C62.22-1997, Guide for the Application of Metal-Oxide Surge Arresters for Alternating-Current Systems.
II. Installation
280.11 Location. Surge arresters shall be permitted to be located indoors or outdoors. Surge arresters shall be made inaccessible to unqualified persons, unless listed for installation in accessible locations.

280.12 Routing of Surge Arrester Grounding Conductors. The conductor used to connect the surge arrester to line, bus, or equipment and to a grounding conductor connection point as provided in 280.21 shall not be any longer than necessary and shall avoid unnecessary bends.

III. Connecting Surge Arresters

280.21 Connection. The arrester grounding conductor shall be connected to one of the following:

(1) Grounded service conductor
(2) Grounding electrode conductor
(3) Grounding electrode for the service
(4) Equipment grounding terminal in the service equipment

280.23 Surge-Arrester Conductors. The conductor between the surge arrester and the line and the surge arrester and the grounding connection shall not be smaller than 6 AWG copper or aluminum.

280.24 Interconnections.

The grounding conductor of a surge arrester protecting a transformer that supplies a secondary distribution system shall be interconnected as specified in 280.24(A), (B), or (C).

(A) Metallic Interconnections. A metallic interconnection shall be made to the secondary grounded circuit conductor or the secondary circuit grounding conductor provided that, in addition to the direct grounding connection at the surge arrester, the following occurs:

(1) Grounded Conductor Connection to Grounding. The grounded conductor of the secondary has elsewhere a grounding connection to a continuous metal underground water piping system. ~~However,~~ In urban water-pipe areas where there are at least four water-pipe connections on the neutral conductor and not fewer than four such connections in each mile of neutral conductor, the metallic interconnection shall be permitted to be made to the secondary neutral conductor with omission of the direct grounding connection at the surge arrester.

(2) Grounded Conductor Part of Multi-Ground Neutral. The grounded conductor of the secondary system is a part of a multi-ground neutral system or static wire of which the primary neutral conductor or static wire has at least four ground connections in each mile of line in addition to a ground at each service.

(B) Through Spark Gap or Device. Where the surge arrester grounding conductor is not connected as in 280.24(A) or where the secondary is not grounded as in 280.24(A) but is otherwise grounded as in 250.52, an interconnection shall be made through a spark gap or listed device as follows:

(1) Ungrounded or Uni-Grounded Primary Systems. For ungrounded or uni-grounded primary systems, the spark gap or listed device shall have a 60-Hz breakdown voltage of at least twice the primary circuit voltage but not necessarily more than 10 kV, and there shall be at least one other ground on the grounded conductor of the secondary that is not less than 6.0 m (20 ft) distant from the surge arrester grounding electrode.

(2) Multi-Grounded Neutral Primary Systems. For multi-grounded neutral primary systems, the spark gap or listed device shall have a 60-Hz breakdown of not more than 3 kV, and there shall be at least one other ground on the grounded conductor of the secondary that is not less than 6.0 m (20 ft) distant from the surge arrester grounding electrode.

(C) By Special Permission. An interconnection of the surge arrester ground and the secondary neutral conductor, other than as provided in 280.24(A) or (B), shall be permitted to be made only by special permission.

280.25 Grounding Conductor Connections and Enclosures. Except as indicated in this article, surge arrester grounding conductor connections shall be made as specified in Article 250, Parts III and X. Grounding conductors installed in metal enclosures shall comply with 250.64(E).

Substantiation: Added titles where needed at all headings in accordance with the NEC Style Manual and made one correction to text of deleting the word "however" since this is not Code language.

Panel Meeting Action: Accept in Principle

Revise 2008 NEC ROP Draft of Article 280 to read as follows:

Article 280 Surge Arresters, Over 1 kV

I. General

280.1 Scope. This article covers general requirements, installation requirements, and connection requirements for surge arresters installed on premises wiring systems over 1 kV.

280.2 Uses Not Permitted. A surge arrester shall not be installed where the rating of the surge arrester is less than the maximum continuous phase-to-ground power frequency voltage available at the point of application.

280.3 Number Required. Where used at a point on a circuit, a surge arrester shall be connected to each ungrounded conductor. A single installation of such surge arresters shall be permitted to protect a number of interconnected circuits, provided that no circuit is exposed to surges while disconnected from the surge arresters.

280.4 Surge Arrester Selection. The surge arresters shall comply with 280.4(A) and (B).

(A) **Rating.** The rating of a surge arrester shall be equal to or greater than the maximum continuous ~~phase-to-ground~~ operating voltage available at the point of application.

(1) Solidly Grounded Systems. The maximum continuous operating voltage shall be the phase-to-ground voltage of the system.

(2) Impedance or Ungrounded System. The maximum continuous operating voltage shall be the phase-to-phase voltage of the system.

(B) Silicon Carbide Types. The rating of a silicon carbide-type surge arrester shall not be less than 125 percent of the rating specified in 280.4(A).~~of the maximum continuous phase-to-ground voltage available at the point of application.~~

FPN No. 1: For further information on surge arresters, see ANSI/IEEE C62.1-1989, Standard for Gapped Silicon-Carbide Surge Arresters for AC Power Circuits; ANSI/IEEE C62.2-1987, Guide for the Application of Gapped Silicon-Carbide Surge Arresters for Alternating-Current Systems; ANSI/IEEE C62.11-1999, Standard for Metal-Oxide Surge Arresters for Alternating-Current Power Circuits (>1 kV); and ANSI/IEEE C62.22-1997, Guide for the Application of Metal-Oxide Surge Arresters for Alternating-Current Systems.

FPN No. 2: The selection of a properly rated metal oxide arrester is based on considerations of maximum continuous operating voltage and the magnitude and duration of overvoltages at the arrester location as affected by phase-to ground faults, system grounding techniques, switching surges, and other causes. See the manufacturer's application rules for selection of the specific arrester to be used at a particular location.

280.5 Listing. A surge arrester shall be a listed device.

II. Installation

280.11 Location. Surge arresters shall be permitted to be located indoors or outdoors. Surge arresters shall be made inaccessible to unqualified persons, unless listed for installation in accessible locations.

280.12 Routing of Surge Arrester Grounding Conductors.

The conductor used to connect the surge arrester to line, bus, or equipment and to a grounding conductor connection point as provided in 280.21 shall not be any longer than necessary and shall avoid unnecessary bends.

III. Connecting Surge Arresters

280.21 Connection. The arrester grounding conductor shall be connected to one of the following:

(1) Grounded service conductor
(2) Grounding electrode conductor
(3) Grounding electrode for the service
(4) Equipment grounding terminal in the service equipment

280.23 Surge-Arrester Conductors. The conductor between the surge arrester and the line and the surge arrester and the grounding connection shall not be smaller than 6 AWG copper or aluminum.

280.24 Interconnections. The grounding conductor of a surge arrester protecting a transformer that supplies a secondary distribution system shall be interconnected as specified in 280.24(A), (B), or (C).

(A) Metallic Interconnections. A metallic interconnection shall be made to the secondary grounded circuit conductor or the secondary circuit grounding conductor provided that, in addition to the direct grounding connection at the surge arrester, the following occurs:

(1) ~~**Grounded Conductor Connection to Grounding**~~ **Additional Grounding Connection**. The grounded conductor of the secondary has elsewhere a grounding connection to a continuous metal underground water piping system. ~~However~~, In urban water-pipe areas where there are at least four water pipe connections on the neutral conductor and not fewer than four such connections in each mile of neutral conductor, the metallic interconnection shall be permitted to be made to the secondary neutral conductor with omission of the direct grounding connection at the surge arrester.

(2) ~~**Grounded Conductor Part of Multi-Grounded Neutral**~~ **Multi-Grounded Neutral System Connection.** The grounded conductor of the secondary system is a part of a multi-grounded neutral system or static wire of which the primary neutral conductor or static wire has at least four grounding connections in each mile of line in addition to a grounding connection at each service.

(B) Through Spark Gap or Device. Where the surge arrester grounding conductor is not connected as in 280.24(A) or where the secondary is not grounded as in 280.24(A) but is otherwise grounded as in 250.52, an interconnection shall be made through a spark gap or listed device as follows:

(1) **Ungrounded or Uni-Grounded Primary System**. For ungrounded or uni-grounded primary systems, the spark gap or listed device shall have a 60-Hz breakdown voltage of at least twice the primary circuit voltage but not necessarily more than 10 kV, and there shall be at least one other ground on the grounded conductor of the secondary that is not less than 6.0 m (20 ft) distant from the surge arrester grounding electrode.

(2) **Multi-Grounded Neutral Primary System**. For multi-grounded neutral primary systems, the spark gap or listed device shall have a 60-Hz breakdown of not more than 3 kV, and there shall be at least one other ground on the grounded conductor of the secondary that is not less than 6.0 m (20 ft) distant from the surge arrester grounding electrode.

(C) By Special Permission. An interconnection of the surge arrester ground and the secondary neutral conductor, other than as provided in 280.24(A) or (B), shall be permitted to be made only by special permission.

280.25 Grounding Conductor Connections and Enclosures.

Except as indicated in this article, surge arrester grounding conductor connections shall be made as specified in Article 250, Parts III and X. Grounding conductors installed in metal enclosures shall comply with 250.64(E).

Panel Statement: The panel revised the proposed titles to clarify the contents of the section and revised the text in 280.24(A)(2) to clarify the types of connections. This comment also incorporates the changes from Comment 5-163 and adds the word "operating" to be technically correct.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

MELLO, C.: Subsequent to the panel meeting it was noted that the two ANSI/IEEE references in 280.4 FPN No. 1 for Gapped Silicon-Carbine Surge Arresters for AC Power Circuits are more than ten years old and in fact have been withdrawn without replacement by IEEE in March 2000. These are ANSI/IEEE C62.1-1989(r1994) and ANSI/IEEE C62.2-1987(r1994). The fine print note for Gapped Silicon-Carbide Surge Arresters has been part of Article 280 for a number of cycles and was added at some point in the past because it provided some additional information for users. It is our belief that since that time, the use of these devices has been greatly reduced in favor of the much more predominate metal-oxide surge arresters in use today. In view of the regulations on FPN references, and the fact that IEEE has withdrawn the two referenced standards without replacements, we conclude that removing these two references from Section 280.4 FPN no. 1 does not harm the application of the NEC. The only requirement specifically applicable to the gapped silicon-carbide surge arresters is in 280.4(B) is which requires a rating of 125% of the maximum operating voltage and the information in the FPN does nothing to add or enhance understanding of this fairly simple requirement. For the remaining two references, the edition dates need to be updated as follows: ANSI/IEEE C62.11 should be updated to the 2005 edition and the ANSI/IEEE C62.22 should be updated to the 1997 edition date.

MOHLA, D.: Article 280

Surge Arresters, Over 1kV

The text in this article accepted by the panel during the proposal and comment stages will result in problems for the manufacturers, contractors, user, and Inspection communities. Due to procedural issues involved, the text cannot be revised at this stage by the panel.

Some of the concerns with the current text are listed below:

1. Text stipulates use of Silicon Carbide arresters which is an obsolete technology and has not been manufactured since early 1990's.
2. UL has no manufacturers listed under category of Surge Arresters 1000 Volts and higher (VZQK).
3. IEEE Standards C62.1 & C62.2 have been withdrawn by IEEE since March 2000 due to the fact that technology used in these standards is obsolete.

280.4 states: "The Surge Arresters shall comply with 280.4(A) and (B).

280.4(B) mentions only one specific type of surge arrester "Silicon-Carbide Types".

Silicon Carbide types refer to an obsolete technology type and have not been manufactured since early 1990's. This was based on an IEEE standard C62.1 - 1989 (R 1994) "Standard for Gapped Silicon-Carbide Surge Arresters for AC Power Circuits" which was withdrawn in March 2000.

280.4(B) not only refers to an obsolete technology by name which is not available in the market, but it does not mention the current Metal Oxide technology used for manufacturing of Surge Arresters except in the FPN.

Since Silicon-Carbide is only technology mentioned by name, a user may be inclined to specify this technology without realizing that this is no longer available.

Substantiation submitted with Proposal 5-335 indicated that surge arresters will be evaluated to IEEE C62.11 (1999).

C62.11 -1999 is titled "Standard for Metal Oxide Surge Arresters for Alternating Current Power Circuits (>1 kV).

If surge arresters are going to be evaluated under C62.11, which is Metal Oxide technology, then Silicon-Carbide technology should not be listed in the title.

280.5 Listing. A surge arrester shall be a listed device. This new requirement to NEC 2005 was added during the proposal stage by a proposal submitted by UL.

To the best of my knowledge, there is no manufacturer who is listed by UL for Surge Arresters for 1 kV and over application.

FPN 1 & 2 Reference IEEE C62.1 and C62.2 which has been withdrawn since 2000 due to obsolete technology.

Recommendation

As a minimum, the following actions need to be taken to provide a credible document to the users.

1. Delete 280.5 Listing requirements for Surge Arresters 1 kV and over.
2. Add Metal Oxide to the title of 250.84(B) by changing to "Metal Oxide or Silicon-Carbide Type".
3. Delete references to obsolete IEEE Standards C62.1 and C62.2 which have been withdrawn since March 2000 due to obsolete Silicon-Carbide technology.

5-163 Log #2319 NEC-P05 **Final Action: Accept in Principle**
(280.4(A))

Submitter: David Beach, Gresham, OR

Comment on Proposal No: 5-335

Recommendation: Revise text to read as follows:

(A) The rating of a surge arrester shall be equal to or greater than the maximum continuous ~~phase-to-ground~~ voltage available at the point of application.

(1) Solidly grounded systems. The maximum continuous voltage shall be the phase-to-ground voltage of the system.

(2) Impedance- or ungrounded system. The maximum continuous voltage shall be the phase-to-phase voltage of the system.

Substantiation: Phase-to-ground rated arresters are only suitable for use on solidly grounded systems, phase-to-phase rated arresters must be used on systems that are ungrounded or grounded through an impedance. The presence of a standing phase-to-ground fault will expose the arresters on the other phases to phase-to-phase voltages and this can have potentially catastrophic results if the arrester is only rated for phase-to-ground voltage.

Panel Meeting Action: Accept in Principle

Revise text to read as follows:

(A) The rating of a surge arrester shall be equal to or greater than the maximum continuous ~~phase-to-ground~~ operating voltage available at the point of application.

(1) Solidly Grounded Systems. The maximum continuous operating voltage shall be the phase-to-ground voltage of the system.

(2) Impedance or ungrounded system. The maximum continuous operating voltage shall be the phase-to-phase voltage of the system.

Panel Statement: The word "operating" was added to be technically correct.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-164 Log #1234 NEC-P05 **Final Action: Accept**
(280.12, 280.21, 280.22, 280.25, 280.21(B), 285.21(B))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY

Comment on Proposal No: 5-337

Recommendation: Continue to accept the TCC Grounding and Bonding Task Group proposal 5-337 as modified and revised by the actions of CMP-5.

Substantiation: The CMP-5 revisions to the proposal have been made for clarity and continue to be consistent with the Grounding and Bonding Task Group's original initiatives. It is understood that these revisions apply to both Articles 280 and 285. These articles have been restructured and reorganized as a result of action on Proposals 5-335 and 5-340 and would require correlation of these revisions resulting from CMP-5 actions on this proposal.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-165 Log #1503 NEC-P05 **Final Action: Accept**
(280.24(A)(1))

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc

Comment on Proposal No: 5-344

Recommendation: Technical Correlating Committee Task Group on the definition of "Neutral Conductor" concurs with the panel action on this proposal.

Substantiation: This comment was developed by the Technical Correlating Committee (TCC) Task Group (TG) on the definition of "Neutral Conductor." Task Group members were: Jeffrey Boksiner (Chair) (CMP 5, TCC), Paul Dobrowsky (CMP 5), Walter Skuggevig (CMP 5), Doug White (CMP 5), Michael Toman (CMP 2, TCC), Bob Wilkinson (CMP2), Jim Daly (CMP 6, CMP 7, TCC), Bill Laidler (CMP 6), and Oran Post (CMP 6). The TCC directed that the action on this proposal be sent to the TG for review and comment.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

5-166 Log #1504 NEC-P05 **Final Action: Accept**
(280.24(A)(2))

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc
Comment on Proposal No: 5-345
Recommendation: Technical Correlating Committee Task Group on the definition of "Neutral Conductor" concurs with the panel action on this proposal.
Substantiation: This comment was developed by the Technical Correlating Committee (TCC) Task Group (TG) on the definition of "Neutral Conductor." Task Group members were: Jeffrey Boksiner (Chair) (CMP 5, TCC), Paul Dobrowsky (CMP 5), Walter Skuggevig (CMP 5), Doug White (CMP 5), Michael Toman (CMP 2, TCC), Bob Wilkinson (CMP2), Jim Daly (CMP 6, CMP 7, TCC), Bill Laidler (CMP 6), and Oran Post (CMP 6). The TCC directed that the action on this proposal be sent to the TG for review and comment.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

5-167 Log #1505 NEC-P05 **Final Action: Accept**
(280.24(C))

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc
Comment on Proposal No: 5-346
Recommendation: Technical Correlating Committee Task Group on the definition of "Neutral Conductor" concurs with the panel action on this proposal.
Substantiation: This comment was developed by the Technical Correlating Committee (TCC) Task Group (TG) on the definition of "Neutral Conductor." Task Group members were: Jeffrey Boksiner (Chair) (CMP 5, TCC), Paul Dobrowsky (CMP 5), Walter Skuggevig (CMP 5), Doug White (CMP 5), Michael Toman (CMP 2, TCC), Bob Wilkinson (CMP2), Jim Daly (CMP 6, CMP 7, TCC), Bill Laidler (CMP 6), and Oran Post (CMP 6). The TCC directed that the action on this proposal be sent to the TG for review and comment.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 285 — TRANSIENT VOLTAGE SURGE SUPPRESSORS: TVSSS

5-168 Log #2351 NEC-P05 **Final Action: Accept in Principle in Part (285)**

TCC Action: The Technical Correlating Committee advises that article scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee accepts the panel action.
Submitter: Alan Manche, Square D Company
Comment on Proposal No: 5-349
Recommendation: Revise the proposed text as indicated below. The entire text is shown for clarity with only new text indicated with an underline and deleted text shown with a strikethrough.

ARTICLE 285 Surge Protective Devices (SPDs) 1kV or less

I. General

285.1 Scope. This article covers general requirements, installation requirements, and connection requirements for SPDs (surge arresters and transient voltage surge suppressors (TVSS)) permanently installed on premises wiring systems 1 kV or less.

FPN: Transient Voltage Surge Suppressors (TVSSs) are also known as Type 2 and 3 SPDs.

285.3 Uses Not Permitted. A SPD (surge arrester or TVSS) device shall not be installed in the
following:

(1) Circuits exceeding 1 kV volts

(2) On ungrounded systems, impedance grounded systems, or corner grounded delta systems unless listed specifically for use on these systems.

(3) Where the rating of the SPD (surge arrester or TVSS) is less than the maximum continuous
phase-to-ground power frequency voltage available at the point of application

FPN: For further information on SPDs (TVSSs), see NEMA LS 1-1992, Standard for Low Voltage Surge Suppression Devices. The selection of a properly rated SPD (TVSS) is based on criteria such as maximum continuous operating voltage, the magnitude and duration of overvoltages at the suppressor location as affected by phase-to-ground faults, system grounding techniques, and switching surges.

285.4 Number Required. Where used at a point on a circuit, the SPD (sure arrester or TVSS) shall be connected to each ungrounded conductor.

285.5 Listing. A SPD (surge arrester or TVSS) shall be a listed device.

285.6 Short Circuit Current Rating. The SPD (surge arrester or TVSS) shall be marked with a short circuit current rating and shall not be installed at a point on the system where the available fault current is in excess of that rating. This marking requirement shall not apply to receptacles.

II. Installation

285.11 Location. SPDs (surge arresters or TVSSs) shall be permitted to be located indoors or
outdoors and shall be made inaccessible to unqualified persons, unless listed for installation in accessible locations.

285.12 Routing of Connections. The conductors used to connect the SPD (surge arrester or TVSS) to the line or bus and to ground shall not be any longer than necessary and shall avoid unnecessary bends.

III. Connecting SPDs (Surge arrester or TVSS)

285.21 Connection. Where a SPD (surge arrester or TVSS) device is installed, it shall comply
with 285.23 through 285.28.

285.23 Type 1 SPDs (Surge Arrester). Type 1 SPDs shall be installed in accordance with

285.23(A) ~~and 285.23(B)~~

(A) Installation. Type 1 SPDs (surge arresters) shall installed as follows:

(1) Type 1 SPDs (surge arresters) shall be permitted to be connected to the supply side of the
service disconnect as permitted in 230.82(4) or

(2) Type 1 SPDs (surge arresters) shall be permitted to be connected as specified in 285.24.

~~(B) At the Service. When installed at services, the grounding conductor of a Type 1 SPD shall be connected to one of the following:~~

~~(1) Grounded service conductor~~

~~(2) Grounding electrode conductor~~

~~(3) Grounding electrode for the service~~

~~(4) Equipment grounding terminal in the service equipment~~

285.24 Type 2 SPDs (TVSS). Type 2 SPDs (TVSS) shall be installed in accordance with 285.24(A) through 285.24(C).

(A) Service Supplied Building or Structure. Type 2 SPDs (TVSS) shall be connected anywhere on the load side of a service disconnect overcurrent device required in 230.91, unless installed in accordance with 230.82(8).

(B) Feeder Supplied Building or Structure. Type 2 SPDs (TVSS) shall be connected at the building or structure ~~in accordance with (1) or (2)~~ anywhere on the load side of the first overcurrent device at the building or structure.

~~(1) Anywhere on the load side of the first overcurrent device where the main disconnect for the building or structure consists of a circuit breaker or fused disconnect switch.~~

~~(2) Anywhere on the load side of a branch circuit overcurrent protective device in the first panel where the building or structure main disconnect does not contain an overcurrent protective device.~~

(C) Separately Derived System. The SPD (TVSS) shall be connected on the load side of the first overcurrent device in a separately derived system.

285.25 Type 3 SPDs (TVSS). Type 3 SPDs (TVSSs) shall be permitted to be installed anywhere on the load side of branch circuit overcurrent protection up to the equipment served, provided the connection is a minimum 10 m (30 ft.) of conductor distance from the service ~~panel~~ disconnect. ~~or separately derived system.~~

285.26 Conductor Size. Line and grounding conductors shall not be smaller than 14 AWG copper or 12 AWG aluminum.

285.27 Connection Between Conductors. A SPD (surge arrester or TVSS) shall be permitted to be connected between any two conductors — ungrounded conductor(s), grounded conductor, grounding conductor. The grounded conductor and the grounding conductor shall be interconnected only by the normal operation of the SPD (surge arrester or TVSS) during a surge.

285.28 Grounding Conductor Connections and Enclosures. Except as indicated in this article, SPD grounding connections shall be made as specified in Article 250, Part III. Grounding conductors installed in metal enclosures shall comply with 250.64(E).

Substantiation: A number of items are addressed in the proposed text changes.

1) Include "(surge arrester and TVSS)" after SPD as indicated in the proposed text above. The third edition of the UL 1449 product standard has recently been published with an effective date for compliance nearly three years away. Therefore, the 2008 NEC can not simply drop the TVSS and surge arrester terminology as products are still currently being manufactured using this terminology and will remain in the distributor pipeline for some time to come beyond January 1, 2008. A familiar terminology change nearly identical to this change was the revision of "light fixture" to "luminaire." This proposed text change follows the same logic to ensure a transition to the new terminology that will be transparent to the industry from the aspect of product availability being compliant with Article 285.

2) The new text in 285.23(B) is unnecessary. Do we need to explain where the grounded conductor can be installed for all other devices or circuits in the NEC? There is no guidance where to connect the grounding conductor at locations other than the service, so why is guidance required here? This actually permits (misguides) the installer to possibly connect the grounding conductor of the SPD to the grounded service conductor terminal in the equipment without any consideration if it is on an ungrounded system. Delete this new text.

3) The proposed revised text in 285.24(B) prohibits an SPD from being installed on the load side of the first feeder overcurrent device on the load side of the building disconnect. The existing text addresses where the SPD can be installed, however, it may be clarified by adding the word "anywhere" so as to not be interpreted that it must be immediately at the structure disconnect.

4) The location of the Type 3 SPD is based on the exposure to the surge protection environment, specifically lightning. By making sure 10ft of conductor is between the SPD and where it can be exposed to a lightning surge inherently protects the Type 3 SPD as outlined. The "separately derived system" text should be deleted. This would permit a Type 3 SPD to be installed outside 10 feet from a transformer or generator and still be exposed to the surge environment intended for a Type 1 SPD, exposing the Type 3 SPD to an unintended environment.

Panel Meeting Action: Accept in Principle in Part

Revise the proposed text as indicated below. The entire text is shown for clarity, with only new text indicated with an underline and deleted text shown with a strikethrough.

ARTICLE 285 Surge Protective Devices (SPDs) 1 kV or less

I. General

285.1 Scope. This article covers general requirements, installation requirements, and connection requirements for SPDs (surge arresters and transient voltage surge suppressors (TVSS)) permanently installed on premises wiring systems 1 kV or less.

FPN No 1: Surge arresters less than 1 kV are also known as Type 1 SPDs

FPN No. 2: Transient voltage surge suppressors (TVSSs) are also known as Type 2 and Type 3 SPDs.

285.3 Uses Not Permitted. A SPD (surge arrester or TVSS) device shall not be installed in the
following:

(1) Circuits exceeding 1 kV

(2) On ungrounded systems, impedance grounded systems, or corner grounded delta systems unless listed specifically for use on these systems.

(3) Where the rating of the SPD (surge arrester or TVSS) is less than the maximum continuous
phase-to-ground power frequency voltage available at the point of application

FPN: For further information on SPDs (TVSSs) ; see NEMA LS 1-1992, Standard for Low Voltage Surge Suppression Devices. The selection of a properly rated SPD (TVSS) is based on criteria such as maximum continuous operating voltage, the magnitude and duration of overvoltages at the suppressor location as affected by phase-to-ground faults, system grounding techniques, and switching surges.

285.4 Number Required. Where used at a point on a circuit, the SPD (surge arrester or TVSS) shall be connected to each ungrounded conductor.

285.5 Listing. A SPD (surge arrester or TVSS) shall be a listed device.

285.6 Short Circuit Current Rating. The SPD (surge arrester or TVSS) shall be marked with a short-circuit current rating and shall not be installed at a point on the system where the available fault current is in excess of that rating. This marking requirement shall not apply to receptacles.

II. Installation

285.11 Location. SPDs (surge arresters or TVSSs) shall be permitted to be located indoors or
outdoors and shall be made inaccessible to unqualified persons, unless listed for installation in accessible locations.

285.12 Routing of Connections. The conductors used to connect the SPD (surge arrester or TVSS) to the line or bus and to ground shall not be any longer than necessary and shall avoid unnecessary bends.

III. Connecting SPDs (Surge arrester or TVSS)

285.21 Connection. Where a SPD (surge arrester or TVSS) device is installed, it shall comply
with 285.23 through 285.28.

285.23 Type 1 SPDs (Surge Arrester). Type 1 SPDs shall be installed in accordance with
285.23(A) and 285.23(B)

(A) Installation. Type 1 SPDs (surge arresters) shall installed as follows:

(1) Type 1 SPDs (surge arresters) shall be permitted to be connected to the supply side of the
service disconnect as permitted in 230.82(4) or

(2) Type 1 SPDs (surge arresters) shall be permitted to be connected as specified in 285.24.

(B) At the Service. When installed at services, the grounding conductor of a Type 1 SPD shall be connected to one of the following:

(1) Grounded service conductor

(2) Grounding electrode conductor

(3) Grounding electrode for the service

(4) Equipment grounding terminal in the service equipment

285.24 Type 2 SPDs (TVSS). Type 2 SPDs (TVSS) shall be installed in accordance with 285.24(A) through 285.24(C).

(A) Service Supplied Building or Structure. Type 2 SPDs (TVSS) shall be connected anywhere on the load side of a service disconnect overcurrent device required in 230.91, unless installed in accordance with 230.82(8).

(B) Feeder Supplied Building or Structure. Type 2 SPDs (TVSS) shall be connected at the building or structure ~~in accordance with (1) or (2)~~ anywhere on the load side of the first overcurrent device at the building or structure.

~~(1) Anywhere on the load side of the first overcurrent device where the main disconnect for the building or structure consists of a circuit breaker or fused disconnect switch.~~

~~(2) Anywhere on the load side of a branch circuit overcurrent protective device in the first panel where the building or structure main disconnect does not contain an overcurrent protective device.~~

(C) Separately Derived System. The SPD (TVSS) shall be connected on the load side of the first overcurrent device in a separately derived system.

285.25 Type 3 SPDs (TVSS). Type 3 SPDs (TVSSs) shall be permitted to be installed anywhere on the load side of branch circuit overcurrent protection up to the equipment served, provided the connection is a minimum 10 m (30 ft.) of conductor distance from the service ~~disconnect panel~~ or separately derived system disconnect.

285.26 Conductor Size. Line and grounding conductors shall not be smaller than 14 AWG copper or 12 AWG aluminum.

285.27 Connection Between Conductors. A SPD (surge arrester or TVSS) shall be permitted to be connected between any two conductors — ungrounded conductor(s), grounded conductor, grounding conductor. The grounded conductor and the grounding conductor shall be interconnected only by the normal operation of the SPD (surge arrester or TVSS) during a surge.

285.28 Grounding Conductor Connections and Enclosures. Except as indicated in this article, SPD grounding connections shall be made as specified in Article 250, Part III. Grounding conductors installed in metal enclosures shall comply with 250.64(E).

Panel Statement: The panel accepts in principle the concept to bridge the terminology from surge arresters and TVSS to the surge protective devices. A new FPN No. 1 was added to 285.1 to explain Type 1 SPDs. The panel does accept the revision of the text in 285.24(B), to simplify the requirements in this part.

The panel does not accept the deletion of 285.23(B), as this text was from the existing 2005 NEC and there was inadequate technical substantiation to remove this text. The panel concludes that while possibly redundant, it does provide guidance to users for this specific installation.

The panel does not accept the deletion of the separately derived system for Type 3 SPDs, as the requirement for 30 feet of conductor length is necessary from the listing. There are possible cases where a separately derived system installed outdoors and subject to lightning may not have that 30 feet of conductor length before the installation of the Type 3 SPD; therefore this requirement was determined to be necessary. The Type 3 SPD cannot be installed outdoors, as the listing and markings provided requires use in indoor applications only.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

ARTICLE 300 — WIRING METHODS

3-3 Log #1084 NEC-P03 **Final Action: Accept**
(300.3)

Submitter: Jim Pauley, Square D Company

Comment on Proposal No: 3-8

Recommendation: Continue to Reject the Proposal.

Substantiation: This comment is intended to address some of the issues raised by Mr. Guida's negative comment and to add additional information to support the panel's rejection of this proposal.

The reference to issues associated with 210.4 is correct. The product described by Mr. Guida in his comment is frequently used in residential applications where multi-wire branch circuits are present and the wiring arrangement does, in fact, introduce a code violation for these circuits. He is correct in his comment that 210.4 would not apply if multi-wire branch circuits are not involved.

However, there is a more serious issue that occurs with what would be permitted by this proposal. This issue relates to the disconnection/isolation of the circuit. To actually isolate a branch circuit, you need to disconnect the ungrounded conductor (i.e. turn of the CB) and disconnect the grounded conductor from the terminal bar (this is why you can only have one grounded conductor per terminal in panelboards – 408.41). With the arrangement described, the ungrounded conductor "disconnect" is in the "sub panel" and the grounded conductor "disconnect" for that branch circuit is in a separate panel. This creates an unacceptable and potentially unsafe situation since the disconnects are not located in the same place.

Part of the intent of 300.3 is certainly related to the magnetic heating effects associated with grouping/routing of conductors. However, the panel should not ignore that the section is also depended on to ensure that other problematic situations such as the disconnect issue noted above does not occur as well. If the panel allowed this as a new permission in 300.3, it then forces changes to be made in other parts of the code to compensate for the hole that opens. This change should not be made.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-4 Log #2254 NEC-P03 **Final Action: Reject**
(300.3(B)(1) Exception)

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 3-11
Recommendation: The proposal should be accepted.
Substantiation: The panel rejected this proposal with the statement that isolated phase installations would not be permitted if the exception to 300.3(B)(1) were to be deleted. I disagree. The exception is not needed as isolated phase installations are permitted by the wording in 300.3(B)(3). The exception adds nothing to the understanding of the code.
Panel Meeting Action: Reject
Panel Statement: Section 300.3(B)(1) Exception must remain in the NEC as a very specific application where paralleled conductors are installed in an underground installation with special permission to install isolated phase installations (all of one phase) in a nonmetallic conduit. These underground duct banks are installed in this manner to permit easy installation of these paralleled conductors on cable racks in a concrete manhole. Without this exception, some AHJs might have problems with acceptance of this type of installation. Leaving it in the NEC provides clear direction on this application.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-5 Log #1626 NEC-P03 **Final Action: Accept in Principle**
(300.3(D) (New))

Submitter: Paul J. Casparro, Scranton Electricians JATC / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 3-13
Recommendation: This Proposal should be Accepted.
Substantiation: The panel statement states that sections 310.8 and 310.13 address the requirement for the cables to be suitable for the location in which they are installed. These sections only cover the types of insulations that may be used in each of the given locations. The only specific location that is addressed by this section is exposure to direct sunlight. This section does not give any indication of the definition of dry and wet locations. The editorial text following the definition of wet locations in the 2005 NEC Handbook states: "It is intended that the inside of a raceway in a wet location or a raceway installed underground be considered a wet location. Therefore, any conductors contained therein would be required to be suitable for wet locations."
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 3-20a (Log# CC300).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13
Comment on Affirmative:
CASPARRO, P.: See my explanation of vote on Comment 3-20a.

3-6 Log #1804 NEC-P03 **Final Action: Accept in Principle**
(300.3(D) (New))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 3-13
Recommendation: Accept the proposal as modified below.
(D) Listing. Cables and insulated conductors installed in ~~enclosures or~~ raceways shall be listed for use in wet locations where the ~~enclosures or~~ raceways are in wet locations.
Substantiation: By removing the words "enclosure or" its limits the requirement to the conductors in raceways and eliminate the need to have wet location listed conductors in the enclosures. The inside of an enclosure should not be considered as a wet location especially if the enclosure contains electrical components. This would mean having wet location listed electrical components inside an enclosure that is listed for a wet location. I agree with Mr. Caspaaro in his Explanation of Negative that Article 310 does not clearly or adequately define that the inside of the a raceway installed in a wet location is also a wet location. This explanation is more appropriate for Article 300.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 3-20a (Log# CC300).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13
Comment on Affirmative:
CASPARRO, P.: See my explanation of vote on Comment 3-20a.

3-7 Log #1970 NEC-P03 **Final Action: Accept in Principle**
(300.3(D))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 3-13
Recommendation: This Proposal should have been Accepted.
Substantiation: This proposal addresses a very common interpretation problem and belongs in Article 300 since Article 300 covers all wiring methods. Many people think the inside of a raceway or box is a different type of location than the outside of the same enclosure. A similar proposal was accepted in the 1999 NEC and then relocated in the 2002 NEC, but that section (300.5) only covers underground installations. This proposal covers all installations and all locations and is needed for clarity and uniformity. In fact, acceptance of this proposal would make the existing rule of 300.5(B) unnecessary. The panel should give more consideration to the comment on negative by Mr. Casparro. This proposal does not duplicate anything in Article 310. Article 310 requires conductors installed in wet locations to be of certain types, but does not help clarify where the wet locations are. The definition of wet locations does not help either because of the misconception that inside the enclosure may be a different location than outside the enclosure.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 3-20a (Log# CC300).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13
Comment on Affirmative:
CASPARRO, P.: See my explanation of vote on Comment 3-20a.

3-8 Log #1837 NEC-P03 **Final Action: Hold**
(300.4)

TCC Action: The Technical Correlating Committee directs that this comment and Proposal 3-32 be reported as "hold".
The Technical Correlating Committee will appoint a Task Group, including members from Code-Making Panels 1, 3, and 9, to review and correlate this issue during the 2011 code cycle.
The Technical Correlating Committee notes that Code-Making Panel 9 rejected the concept in Proposal 9-38.
In addition, the concept proposed applies beyond Chapter 3 related requirements.
Submitter: John Smith, Wire Guard, Inc.
Comment on Proposal No: 3-32
Recommendation: Add new text as follows:
300.4 Protection Against Physical Damage.
(G) Conductors Inside Electrical Boxes. Conductors, inside electrical boxes, subject to physical damage from router bits, sheet rock saws, and knives, and nonconductive coatings; such as drywall mud, paint, lacquer and enamel, must be protected during the construction process by means of a rigid cover, plate, or insert of a thickness and strength as to prohibit penetration by the above mentioned items.
Substantiation: I have been an electrician for over 30 years. During this time, I have encountered thousands of wires inside the electrical box damaged by sheetrock routers, knives, saws, mud, paint, enamel, and lacquer.
Furthermore, I have received many calls from homeowners complaining of "the smell of burning wires" or "a receptacle or switch that doesn't work". What I inevitably find are damaged wires inside the electrical box. The insulation on the wires has melted due to excessive heat because the amperage rating of the wires has been compromised or lessened as a result of a nick or cut in the wires. If the homeowner hadn't noticed the "smell of burning wires" or "that the switch or receptacle was not operational", the damaged wire would have eventually caused a fire.
Per the US Home Product Report, Appliances & Equipment, 01/02 issued by the NFPA's Fire Analysis & Research, Quincy, MA:
The number one cause of an "Electrical Distribution Equipment" fire is a short circuit or a ground fault. Damaged conductors cause short circuits and ground faults. When the conductors are damaged the amperage rating of the conductor is compromised or lessened. This results in overheating, which results in the fire.
The form of material first ignited from an "Electrical Distribution Equipment" fire is the electrical wire or cable insulation.
There are codes in place that provide for the Integrity of Electrical Equipment and Connections 110.12(C) and Protection Against Physical Damage 300.4(A-F).
These codes specifically protect the wire at all points of vulnerability from the distribution panel up to, but not including, the point where the wires are inserted into the electrical box.
There is no code that specifically ensures the protection of the conductors after they are inserted in the electrical box.
Once the conductors are inserted in the electrical box, they are extremely vulnerable to the inevitable damage caused by sheet rock routers, sheet rock saws and knives, and nonconductive coatings; such as drywall mud, paint, lacquer and enamel.
It may be assumed that an inspection will detect damaged wires and the electrician will be required to rerun the wires. That is not always true. An inspector may not always see a damaged wire hidden in the wall or spliced. The plug in tester used during the inspection will confirm that the outlet or receptacle is working even though the amperage rating of the conductor is compromised or lessened due to damage.
It may also be assumed that electricians will re-run a damaged wire that violates code 300.14 "Length of Free Conductors at Outlets, Junctions, and Switch Panels". However, from my experience and from conversations I've had with many electricians, that is not what is occurring.
Please see supporting material results of Survey of Electricians conducted from 2004 through 2006.

It is a simple case of economics, the electrician has contracted the job for a certain fee that doesn't allow for re-doing any part of the job. Nor does the electrician's scheduling for completion of that job or to begin future jobs permit the added delays. Nor will the electrician be a favorite with the General Contractor if he demands the drywall be removed so new wires can be run. As a result, electricians have found a work-around to re-running the wires.

As members of the NFPA, I feel that we have a responsibility to ensure that the wires are explicitly protected by a specific code at every point of vulnerability during construction from the distribution panel to inside the electrical box.

This is especially true of the conductors once they are inside the electrical box as they are extremely vulnerable to the inevitable damage from sheet rock routers, sheet rock saws and knives, and nonconductive coatings; such as drywall mud, paint, lacquer and enamel.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle

Revise recommended text to read:

(G) Conductors Inside Electrical Boxes. Conductors, inside electrical boxes, subject to physical damage from router bits, sheet rock saws, and knives, and nonconductive coatings, such as drywall mud, paint, lacquer and enamel, ~~must~~ shall be protected during the construction process by means of a rigid cover, plate, or insert of a thickness and strength as to prohibit penetration by the above mentioned items.

Panel Statement: The panel has revised the recommended text for compliance with the NEC Style Manual regarding expression of mandatory text.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 9 Negative: 4

Explanation of Negative:

AYER, L.: The responsibility of protecting electrical conductors within a box during construction is covered in 110.7, Insulation Integrity. While it is possible that conductors may be nicked or cut within a box, there are numerous ways that electricians can prevent this from happening. Asking for carpenters to use shorter router

blades, pushing the wires back deep into the box, or installing deeper device boxes are ways to solve this problem. To require a protector plate for each device box in every application would be considered excessive. Wires within surface mount boxes or masonry walls are not subject to the same damage from routers or knives as boxes installed in other areas. Enforcement of this issue would be difficult and would require additional inspection costs to verify that protector plates were installed.

MAASSEN, R.: After reviewing the negative votes, I concur with Mr. Ayer that the responsibility of protecting the electrical conductors within a box is covered in 110.7, Insulation Integrity. There are many ways to protect the conductors from damage like stuffing the conductors to the rear of the box, using shorter router blades and using deeper device boxes are ways to solve this problem. Also, not all walls are dry walled. To require the protective plate for each device box in every application would not be needed to protect the conductors. Enforcement of this issue would be difficult and would require additional inspection costs to verify that protector plates were installed prior to dry walling.

OWEN, S.: Protection for conductors is a good idea, and an important issue with respect to methods of installing sheetrock, when outlet openings are being cut with a router. The proposal and the comment have been submitted to the wrong article and section of the NEC. Section 300.4 requires conductor protection from physical damage in cable- and raceway-type wiring methods, not in enclosures and boxes as would be covered in Articles 312 and 314. Panel 9 has jurisdiction over Article 312 for cabinets, cutout boxes, and meter socket enclosures, Article 314 for outlet, device, pull and junction boxes, as well as conduit bodies, fittings, and handhole enclosures, and Article 408 which covers switchboards and panelboards. Protection for conductors is more appropriately covered in all three of the articles covered by Panel 9, and is already covered in 110.12(C) for corrosion and other protection.

SLEIGHTS, J.: I continue to reject the addition of requirements related to this proposal/comment. There was no new relevant material submitted during the comment stage to cause the committee to reverse the original vote on the proposal. Submitters provided various information in comments but it is of a generic nature and not directly related to the "problem" as stated. To this point, I have seen only anecdotal information on the extent and severity of the specific "problem" in the field.

When damage to conductors does occur, for whatever reason, to say that the electrician will not fix the damage correctly is an issue separate to mandating another requirement. Clearly they are violating other code rules in not fixing any damage correctly. If the "problem" is widespread, and the costs to repair damage sufficient, then the use of a product or technique to prevent such damage would make financial sense in and of itself. There is NO code rule prohibiting the use of specialty products or other techniques at present.

Finally, the matter of damage to conductors and equipment during installation is a wider concern than just conductors in boxes behind drywall. It extends to ALL equipment installed prior to the actions of other trades. This is clearly addressed in section 110.12(C). Any upgrade in requirements, if properly documented and proposed, belongs with the code section already devoted to the subject.

Comment on Affirmative:

CASPARRO, P.: This is a positive move and in the right direction to protect the integrity of conductors in outlet boxes during construction.

EASTER, L.: NEMA understands that the protection requirements resulting from acceptance of this comment applies to outlet boxes and similar boxes.

3-9 Log #1061 NEC-P03 **Final Action: Reject**
(300.4(A)(1) Exception No. 3)

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education

Comment on Proposal No: 3-20

Recommendation: Add new text as follows:

Exception No. 3: Where a wood member is in contact with masonry, holes shall be permitted to be bored without protection from penetration originating from the direction of the masonry.

Substantiation: If I understood the CMP's statement correctly, they were concerned that the original proposal could be taken as authorizing unprotected holes anywhere in wood members, so long as the members were in contact with masonry at some point. The revised wording of the proposed exception eliminates this possibility.

I admit to being confused by the CMP's argument against counting multiple layers or elements of wood as the sum of their thicknesses in a particular direction so I am unable to dispute it.

Panel Meeting Action: Reject

Panel Statement: The proposed exception is not necessary since there is not a penetration issue from the masonry side of the wood member. The text in 300.4(A)(1) is only dealing with protection issues where there is a possibility of damage to conductors installed in either cables or raceways. The only penetration issue would be from opposite side of the wood member with the edge of the bored hole required to be a distance of not less than 1 ¼ inch from the nearest edge.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-10 Log #2040 NEC-P03 **Final Action: Accept in Principle**
(300.4(E))

Submitter: William Benard, State of New Hampshire, Bureau of Electrical Safety and Licensing

Comment on Proposal No: 3-31

Recommendation: Revise as follows:

(E) Cables and Raceways installed under roof decking. Exposed and concealed locations, where a cable- or raceway-type wiring method is installed under roof decking, such as metal corrugated sheeting, or other material that supports a roof insulating and waterproofing membrane and will be penetrated by screws or other mechanical devices designed to provide "hold down" strength of the waterproofing membrane, the cable or raceway shall be installed and supported so that the nearest outside surface of the cable or raceway is not less than 38.1 mm (1 1/2 in.) from the nearest surface of the roof decking where screws are likely to penetrate when roofing maintenance repairs or replacement occurs before or after the initial raceway installation.

(~~E~~) (F) Cables and Raceways Installed in Shallow Grooves

(Remaining text unchanged)

(~~F~~)(G) Insulated Fittings

(Remaining text unchanged)

Substantiation: This proposal needs to be accepted as amended. The panel members may not have completely understood the problem addressed in the original proposal. The intention of the proposal is to prevent accidental penetration of electrical cables and raceways under common flat roof decks. The submitter did not intend to describe a scenario where the roof deck was being replaced. Sufficient substantiation was provided to establish that this problem does, indeed, exist.

Typically, the decking would remain unchanged and in its original condition. The waterproofing and insulating material above conventional metal corrugated sheeting is the element of repair or replacement. Roofing material manufacturer's installation standards mandate a self tapping deck screw to penetrate the underside of the corrugated steel decking by at least 1 inch and up to 1 1/4 inches. Minimum penetration provides "hold down" strength for the insulating material above but becomes a hazard to anything within the lower penetration proximity. Therefore, raceways located in close proximity to the underside of the decking would be exposed to severe physical damage. This is happening every single day during re-roofing projects that are only repairing or replacing the waterproofing material on the surface of the roof of an occupied building. It is not the first installation that is a concern because typically the exterior insulation and waterproofing material of the flat roof is already in place before the electrician begins to install the new wiring methods.

The selection of a minimum "38.1 mm (1 1/2 in.) from the nearest surface of the roof decking where screws are likely to penetrate" was chosen after measuring a multitude of installations where 38.1 mm (1 1/2 in.) was discovered to be a minimum safe distance in a majority of installations from the protruding screw at the lowest point of the underside of the roof deck.

The original panel statement alludes to a responsibility of the "individual building trades" and an ability to stay away from electrical raceways that might be located in harms way when making repairs to a damaged building. This reroofing should not be considered as a repair but as routine maintenance. All roofing material has a life that necessitates maintenance, repair, or replacement. Is it the Panel's intention to indicate that whenever a roofing material is replaced the electrical wiring for the building has to be replaced as well? It would be impracticable to provide a replacement of material above a finished metal roof deck and be able to know where a roof could or could not penetrate the decking with any one of a thousand deck screws. If any electrical wiring methods are installed within a 1 1/2 inch proximity of the underside of the metal decking, it is a sure bet that at least one electrical raceway or cable will be damaged causing a failure to the electrical system. At the very least, an overcurrent device will be called upon to hopefully prevent fire, personal injury or possible electrocution. Considering the various voltages and inrush fault currents available an imminent hazard will be present if an unqualified person attempts to reset the device without clearing the fault at its origin. Refer to the evidence submitted describing actual incidents. These incidents happen all too often when the faults are created over retail outlets without the retail personnel even being aware of work going on above them. There is no need to elaborate the possible hazardous scenarios that could evolve from this potential.

I submit that this problem is at least as serious as the threat recognized and addressed in the current section 300.4(D). If we are concerned about a sheetrock screw penetrating a cable adjacent to a wall stud, then we should recognize the similar hazard of a deck screw penetrating a metal raceway. The proof is in the pudding see the photos I have provided.

The cut away roofing detail exemplifies the purpose for the screw installation for roofing surface material installation, maintenance or replacement before and after electrical wiring installations. Notice the screw penetration below the underside of the metal decking. Photos exemplifying screw penetration are also provided.

Retail store maintenance representatives and service electricians confirm that re-roofing projects (replacing insulating and/or waterproofing material) causes thousands of dollars of expenditure for repairs to electrical systems damaged during membrane maintenance or repair. Copies of testimony with invoicing for repair of damage caused by screws penetrating electrical conduit is provided as evidence.

Photos (1, 2, and 3) accompaning with this proposal provide evidence of damage to wiring methods in the identified area. The incident cascaded to personal injury when unqualified individuals in the retail store repeatedly attempted to reset an overcurrent device supplying a 277 volt lighting circuit without consideration to the increased hazards from the repeated short circuit.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle

Revise recommended text to read:

"(E) Cables and Raceways Installed Under Roof Decking. A cable- or raceway-type wiring method, installed in exposed or concealed locations under metal-corrugated sheet roof decking, shall be installed and supported so the nearest outside surface of the cable or raceway is not less than 38 mm (1 1/2 in.) from the nearest surface of the roof decking.

FPN: Roof decking material is often repaired or replaced after the initial raceway or cabling and roofing installation and may be penetrated by the screws or other mechanical devices designed to provide "hold down" strength of the water-proof membrane or roof insulating material.

Exception: Rigid metal conduit and intermediate metal conduit shall not be required to comply with 300.4(E)."

Reidentify existing 2005 NEC subdivisions (E) and (F) as (F) and (G)

Panel Statement: The proposed text was revised for clarity and ease of use. Some of the wording within the proposal was informative text that fit better as a fine print note and the exception was added to cover rigid and IMC that would not suffer damage from these hold-down devices or screws. The metric measurement was changed to a hard conversion, as it is the panel's opinion that the 0.1 mm provided in the soft conversion was not critical.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

CASPARRO, P.: Allowing additional room between the underside of roof decking and where a cable or raceway type wiring methods is allowed to be installed should alleviate damage to these cables and raceways.

SLEIGHTS, J.: I support the panel action on this proposal in recognition of the problem with the following comment.

There was no substantiation for the addition of the exception for RMC and IMC and it should not have been included.

3-11 Log #1627 NEC-P03 **Final Action: Accept in Principle (300.4(F))**

Submitter: Paul J. Casparro, Scranton Electricians JATC / Rep. International Brotherhood of Electrical Workers

Comment on Proposal No: 3-32

Recommendation: The Proposal should be Accepted.

Substantiation: See comment on Proposal 3-35.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 3-8.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 3

Explanation of Negative:

AYER, L.: See my Explanation of Negative Vote on Comment 3-8.

OWEN, S.: See my explanation of negative vote on Comment 3-8.

SLEIGHTS, J.: See my explanation of negative vote on Comment 3-8.

Comment on Affirmative:

CASPARRO, P.: See my explanation of vote on Comment 3-8.

3-12 Log #2255 NEC-P03 **Final Action: Accept in Principle (300.4(F))**

Submitter: Donald A. Ganiere, Ottawa, IL

Comment on Proposal No: 3-34

Recommendation: The proposal should be accepted.

Substantiation: The panel rejected this proposal with a statement that said: "It covers all raceways where 4 AWG and larger conductors enter a cabinet, box, enclosure, or raceway." If the code rule actually said that there would have been no reason for this proposal, however the code rule doesn't say where "conductors enter the enclosure", it says where "raceways containing conductors enter enclosures". The current wording only requires protection for ungrounded conductors #4 and larger where the raceway itself enters the enclosure. The only two raceways that actually enter the enclosure are the threaded raceways, RMC and IMC. The other raceways terminate at a connector and the connector, not the raceway enters the enclosure. The other point that this proposal attempts to address is protection for the ungrounded conductors of cables. The code doesn't now require the use of an insulated fitting to protect the ungrounded conductors of cables where they enter enclosures. If the cable jacket does not extend into the enclosure beyond the metallic cable connector, there is the same potential for problems as there is where raceways are used without an insulated bushing.

Panel Meeting Action: Accept in Principle

Revise the 2005 NEC text in 300.4(F) to read:

"Where raceways contain~~ing ungrounded conductors~~ 4 AWG or larger ungrounded conductors and these conductors enter a cabinet, box enclosure, or raceway, the conductors shall be protected by a substantial fitting providing a smoothly rounded insulating surface, unless the conductors are separated from the fitting or raceway by substantial insulating material that is securely fastened in place."

Existing exception and second paragraph remain unchanged.

Panel Statement: The text was clarified to indicate that the key issue is not the raceway entering the cabinet, box, or raceway but rather the 4 AWG and larger conductors entering these enclosures being properly protected with a substantial fitting with a smoothly insulated surface.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-13 Log #767 NEC-P03 **Final Action: Accept in Principle (300.4(G) (New))**

Submitter: Carlo Compagnone, Compa Covers, Inc.

Comment on Proposal No: 3-35

Recommendation: This proposal should be accepted.

Substantiation: As a Master electrician for many years, and one who is justifiably concerned with workplace and home-safety issues, I would like to take this opportunity to elaborate on why I respectfully disagree with the Panel's decision to reject Proposal 3-35.

Specifically, the safety issues that are addressed within said Proposal 3-35 have been ongoing concerns that have yet to be fully resolved. The mere fact that Section 110.12(C) was written into the NEC serves as evidence of the very real potential for damage and contamination to the internal parts of electrical equipment and to electrical wiring and electrical outlet boxes during construction. The greatest attribute of Section 110.12(C) is that it makes clear the fact that damaged or contaminated electrical equipment and wiring is likely to "adversely affect safe operation or (the) mechanical strength of the equipment...".

Section 110-12(C) specifically addresses the need for protecting the "internal parts of electrical equipment", and it is thus debatable whether it is applicable to or speaks to the concerns covered within Proposal 3-35. Specifically, it appears unclear as to whether Section 110.12(C) is intended to address the protection of wiring within electrical outlet boxes from damage and contamination during the construction phase. In the event that Section 110.12(C) is not to be construed so broadly as to cover or address the problem of damage and contamination to electrical wiring situated within open electrical outlet boxes during the rough-in and construction phases, then it is readily apparent that the National Electrical Code is in need of and would benefit from the acceptance of Proposal 3-35. That proposal addresses specifically the very real need for protecting electrical outlet boxes from contamination and damage to wiring during the rough-in and construction phases.

At least some of the members of the applicable NEC Panel appear to have interpreted the word "equipment" within that section sufficiently broadly so as to cover damage and contamination to wiring within electrical outlet boxes. Assuming arguendo that Section 110.12(C) is intended to address damage and contamination to wiring within electrical outlet boxes, it nevertheless lacks direction as to the means for implementing its mandates. Specifically, although Section 110.12(C) provides a mandate that prohibits, inter alia, the damaging of internal parts of electrical equipment, it provides no real guidance as to the measures to be taken in preventing the damage. It leaves open the possibility that electricians will use many different and varied ways of attempting to prevent contamination and damage to wiring within electrical outlet boxes in an effort to comply with Section 110.12(C). It is foreseeable that such a lack of uniformity will result in failed attempts to comply with that section, despite good faith attempts to do so. These failed attempts may in turn result in excessive costs and rework for electricians, fire damage to the premises at issue, electrical shock and even death. An electrician may leave him or herself open to liability in the event that the method chosen by that electrician for attempting to comply with Section 110.12(C) was deemed insufficient in retrospect.

The fact that damage to and contamination of wiring and electrical components within electrical outlet boxes continues to be widespread and commonplace during the construction phase, speaks directly to the fact that Section 110.12(C) does not go far enough. It is devoid of a uniform procedure for implementing its mandates, and a uniform procedure is needed to alleviate the problem.

Proposal 3-35 provides for that uniform procedure relative to potential damage and contamination to wiring within electrical outlet boxes, and its acceptance would eliminate the guess work as to how to implement the mandates of Section 110.12(C). Proposal 3-35 complements Section 110.12(C) and provides it with the means for implementing its mandates as it applies to wiring within electrical outlet boxes. The proposal includes a requirement that a nonmetallic, temporary cover be placed on the open front of electrical outlet boxes during the construction phase. This requirement is an easy-to-implement solution to the aforementioned problem. It would shield against the plaster, spray from insulation, power routers, and paint contamination that is addressed within the language of Section 110.12(C), and that is so often present as a result of the carelessness of nonelectrical tradespersons who are eager to finish their work in a timely manner. It would provide protection so that wiring and other electrical components within electrical outlet boxes are not damaged, broken, bent or cut by others during the rough-in or construction phases.

The concept of providing specific solutions for the protection of wiring is not foreign to the National Electrical Code. For example, Article 300 provides for very specific methods of safeguarding cables which are subject to damage during the construction phase. 300.4 requires the installation of a nail plate where cable wiring is subject to nail or screw penetration. 300.4(B)(1) requires installation of bushings or grommets on all metal edges of punched out or factory-installed holes. Article 300 also requires a minimum burial depth for underground cable installation, and additional protection when depth is reduced by the use of concrete. Proposal 3-35 supplies the National Electrical Code with the specific solution to the ongoing problem of construction-phase damage and contamination to the internal electrical wiring and components contained within electrical outlet boxes.

Proposal 3-35 would result in cost-savings to electricians who so often, at present, are required to rewire or repair electrical outlet boxes that have been damaged by others during a construction phase, due to internal wiring and components having been left exposed. Proposal 3-35 would result in a satisfactory solution to the safety concerns that are continuously arising as a result of damaged or contaminated internal electrical wiring.

One primary purpose of the National Electrical Code is the safeguarding of persons and property, which in turn is a primary reason why the National Fire Protection Association sponsors the code-making process and publishes the National Electrical Code. Acceptance of Proposal 3-35 would be, at the very least, a definitive step in the direction of saving electricians and homeowners time and money. More importantly, it would provide a uniform and specific mandate to electricians that, when implemented, would serve as a safeguard against the loss of property due to fire damage, physical harm, and even death.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 3-8.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 3

Explanation of Negative:

AYER, L.: See my Explanation of Negative Vote on Comment 3-8.

OWEN, S.: See my explanation of negative vote on Comment 3-8.

SLEIGHTS, J.: See my explanation of negative vote on Comment 3-8.

Comment on Affirmative:

CASPARRO, P.: See my explanation of vote on Comment 3-8.

3-14 Log #1256 NEC-P03 **Final Action: Accept in Principle**

(300.4(G) (New))

Submitter: Sanford Egesdal, Egesdal Associates PLC

Comment on Proposal No: 3-32

Recommendation: Accept or Accept in Principle Proposals 3-32 and 3-35.

Substantiation: It makes sense to protect electrical conductors from construction debris, until final electrical installation. The fire alarm industry manufacturers ship smoke detectors with a protective covering, which is removed after there is no longer potential damage from the various construction trades. Some fire alarm control panels are shipped with a protective device (often a piece of cardboard) to place over the fire alarm system wiring and terminals in a rough-in-box for protection from paint, plaster, and general construction site grime. A steel plate may not be necessary for protection. Also, I recently renovated my condo. I was disappointed with the sheetrock mud, paint, and other construction debris that had to be scraped and chipped out of the electrical boxes and off the electrical conductors.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 3-8.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 3

Explanation of Negative:

AYER, L.: See my Explanation of Negative Vote on Comment 3-8.

OWEN, S.: See my explanation of negative vote on Comment 3-8.

SLEIGHTS, J.: See my explanation of negative vote on Comment 3-8.

Comment on Affirmative:

CASPARRO, P.: See my explanation of vote on Comment 3-8.

3-15 Log #1403 NEC-P03 **Final Action: Accept in Principle**

(300.4(G) (New))

Submitter: Jody Cook, Plugs & Switches, Inc.

Comment on Proposal No: 3-36

Recommendation: Revise text to read as follows:

(C) Integrity of Electrical Equipment and Connections. Internal parts of electrical equipment, including busbars, wiring terminals, insulators, junction boxes, and other surfaces...

(D) Method of Protecting Conductors. Either the method of installing sheet rock is to be non-evasive to protect against damage to conductors and the introduction of foreign substances or the electrician has to use a cover or both.

Substantiation: I read through the explanation of denial of 300.4(G). I respectfully request that you reconvene on this proposal. I realize that this proposal is difficult to approve without endorsing a specific product or creating a conflict of interest. However, without protection of conductors in junction boxes, you are asking the electrical contractors and inspectors to compromise on their guarantee of circuit integrity.

We all agree that there is a problem with 110.12(C) not thoroughly covering this topic, as the NEC is written as a minimum safety standard. Why would we pass codes about unused openings in junction boxes, but not codes addressing circuit integrity? It is not uncommon for an electrician to find that the copper wires have turned green due to an oxidation chemical reaction, and electricians often remove foreign materials and debris from junction boxes at their own time and expense.

Typically, the inspector and electrical contractor are not on site during, or able to monitor, the sheet rock installation. Therefore, there is no care, nor custody, of electrical systems and terminations. The goal of protecting conductors and junction boxes is not being met today. It is not practical to hold the sheet rock installer liable; the practical solution is to have the electrician protect his work.

In conclusion, the electrical conductors need to be protected. My suggestion would be to add text to 110.12(C) "junction boxes", and the addition of the subsection 110.12(D) "Method of Protecting Conductors: To protect against damage to conductors and the introduction of foreign substances, either the method of installation of the sheet rock is to be non-evasive; the electrician has to use a cover; or both."

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 3-8.

Number Eligible to Vote: 13
Ballot Results: Affirmative: 10 Negative: 3
Explanation of Negative:
AYER, L.: The submitter is requesting to add text to Article 110 which is outside the jurisdiction of Code Panel 3 and should have been submitted to Code Panel 1. See my Explanation of Negative Vote on Comment 3-8, which addresses the submitter's concerns.
OWEN, S.: See my explanation of negative vote on Comment 3-8.
SLEIGHTS, J.: See my explanation of negative vote on Comment 3-8.
Comment on Affirmative:
CASPARRO, P.: See my explanation of vote on Comment 3-8.

3-16 Log #1628 NEC-P03 **Final Action: Accept in Principle**
(300.4(G) (New))

Submitter: Paul J. Casparro, Scranton Electricians JATC / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 3-35
Recommendation: The Proposal should be Accepted. Add the following wording to 300.4(G):
Protection of Outlet Boxes During Construction. The open front of both metal and nonmetallic electrical outlet boxes shall be temporarily covered to protect insulated electrical conductors from physical damage or deterioration due to power routers, plaster spray, spray foam insulation, and other potential damage during construction. The covers shall be constructed of a nonmetallic material and shall be clearly marked "Not for Permanent Installation".
Substantiation: Conductors inside electrical boxes during construction are physically damaged by sheet rock routers, sheet rock screws, knives, etc. When the conductors are damaged, the ampere rating of the conductor is compromised or lessened. This can cause overheating which often leads to fires.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 3-8.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 10 Negative: 3
Explanation of Negative:
AYER, L.: See my Explanation of Negative Vote on Comment 3-8.
OWEN, S.: See my explanation of negative vote on Comment 3-8.
SLEIGHTS, J.: See my explanation of negative vote on Comment 3-8.
Comment on Affirmative:
CASPARRO, P.: See my explanation of vote on Comment 3-8.

3-17 Log #1629 NEC-P03 **Final Action: Accept in Principle**
(300.4(G))

Submitter: Paul J. Casparro, Scranton Electricians JATC / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 3-36
Recommendation: The Proposal should be Accepted.
Substantiation: See comment on Proposal 3-35.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 3-8.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 10 Negative: 3
Explanation of Negative:
AYER, L.: See my Explanation of Negative Vote on both Comments 3-8 and 3-15.
OWEN, S.: See my explanation of negative vote on Comment 3-8.
SLEIGHTS, J.: See my explanation of negative vote on Comment 3-8.
Comment on Affirmative:
CASPARRO, P.: See my explanation of vote on Comment 3-8.

3-18 Log #1447 NEC-P03 **Final Action: Reject**
(300.5)

Submitter: Larry Cross, IBEW Local 98
Comment on Proposal No: 3-38
Recommendation: I agree with P. Casparro that a warning ribbon placed 12 in. above the underground would alleviate this problem, thus saving unnecessary damage and possible bodily harm.
Substantiation: None.
Panel Meeting Action: Reject
Panel Statement: The basic section deals with direct burial conductors and cables with a warning ribbon to be installed 12 inches above the cables that are directly buried at 18 inches or deeper. If a metal raceway is installed for the underground installation, as requested in the proposal, there is no reason for direct-burial style conductors to be used and thus no reason to have the warning ribbon installed. Regular wet location type conductors, such as THWN which are not approved as direct buried conductors or cables, could and probably would be installed. Schedule 80 PVC could certainly be used as a protection method for underground service conductors or cables. Restricting the protection to metal conduit would not recognize this alternative protection method. A backhoe operator could damage cables or conductors in any wiring method installed, but a raceway can and does provide some level of protection for these service conductors. Direct burial cables are not protected, so a warning ribbon is a method to help identify the location for these conductors and provide some warning that service cables are located below.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-19 Log #1470 NEC-P03 **Final Action: Reject**
(300.5)

Submitter: James O'Driscoll, IBEW Local #98
Comment on Proposal No: 3-38
Recommendation: I agree with the explanation of negative on this proposal.
Substantiation: As a journeyman wireman in the field, I see many times excavation work being performed on a building premises which would be on the load side of the service point. The call before you dig would not necessarily find these underground installations. I think all underground installations should have a ribbon. This would include any power or communication cables and raceways of all energy levels.
Panel Meeting Action: Reject
Panel Statement: The basic section deals with direct burial conductors and cables with a warning ribbon to be installed 12 inches above the cables that are directly buried at 18 inches or deeper. If a metal raceway is installed for the underground installation, as requested in the proposal, there is no reason for direct-burial style conductors to be used and thus no reason to have the warning ribbon installed. Regular wet- location type conductors, such as THWN which are not approved as direct buried conductors or cables, could and probably would be installed.
Schedule 80 PVC or RTRC could certainly be used as a protection method for underground service conductors or cables. Restricting the protection to metal conduit would not recognize this alternative protection method. A backhoe operator could damage cables or conductors in any wiring method installed, but a raceway can and does provide some level of protection for these service conductors. Direct burial cables are not protected, so a warning ribbon is a method to help identify the location for these conductors and provide some warning that service cables are located below. The utility company cable locator service will locate any underground service lateral conductors up to the service disconnecting means. Even underground feeder and branch circuit conductors can be located by cable locators purchased and operated by other than the utility company personnel.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-20 Log #1630 NEC-P03 **Final Action: Reject**
(300.5)

Submitter: Paul J. Casparro, Scranton Electricians JATC / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 3-38
Recommendation: This Proposal should be Accepted to read:
(G) Service Conductors. Underground service conductors that are not encased in concrete or in metal conduit and that are buried 450 mm (18 in.) or more below grade shall have their location identified by a warning ribbon that is placed in the trench at least 300 mm (12 in.) above the underground installation.
Substantiation: Underground service conductors and conduit systems are damaged on a regular basis. To protect against this occurrence warning ribbon should be placed 12 in. above the installation. Backhoe operators and electricians can be protected from bodily harm by this inexpensive and simple procedure.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-18.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-20a Log #CC300 NEC-P03 **Final Action: Accept**
(300.5(B))

Submitter: Code-Making Panel 3,
Comment on Proposal No: 3-42
Recommendation: Revise 300.5(B) as follows:
(B) Wet Locations. The interior of enclosures or raceways installed underground shall be considered to be a wet location. Insulated conductors and cables installed in these enclosures or raceways in underground installations shall be listed for use in wet locations and shall comply with 310.8(C). Any connections or splices in an underground installation shall be approved for wet locations.
Substantiation: There seems to be a misunderstanding in the industry about the types of conductors and splices that can be installed in enclosures or raceways in an underground installation. The requirement for using wet location listed conductors must also comply with 310.8(C) since there are three

different methods to comply with insulated conductors and cables used in wet locations. They must be:
(1) Moisture-impervious metal-sheathed;
(2) Types MTW, RHW, RHW-2, TW, THW, THW-2, THHW, THHW-2, THWN, THWN-2, XHHW, XHHW-2, ZW; or
(3) Of a type listed for use in wet locations.
Panel Meeting Action: Accept
Panel Statement: The text in this comment provides a clarification of the underground installation that the interior of these raceways or enclosures is considered to be a wet location. This concept was introduced in both Comments 3-21 and 3-52, but the panel decided to modify the text in 300.5(B) for underground installations since all other underground installation requirements were already located in 300.5.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13
Comment on Affirmative:
CASPARRO, P.: The text in this comment provides a clarification of the code for underground installations and states that the interior of these raceways or enclosures is considered to be a wet location.

3-21 Log #274 NEC-P03 **Final Action: Accept in Principle (300.5(B))**

Submitter: Dennis Downer, Morrisville, VT
Comment on Proposal No: 3-42
Recommendation: Revise text to read as follows:
300.5 Underground Installation.
(B) Listing Cables. ~~and~~ insulated conductors and any splices or terminations installed in enclosures or raceways in underground installations shall be listed for use in wet locations.
Substantiation: 300.5(B) should include the wording splices or terminations to be consistent with 314.30(C). In any underground installation, all splices and terminations shall be listed as suitable for wet locations, not just in handhole enclosures without bottoms. There are numerous other application such as PVC boxes installed underground where flooding of the box could happen.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on panel Comment 3-20a (Log #CC300).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13
Comment on Affirmative:
CASPARRO, P.: See my explanation of vote on Comment 3-20a.

3-22 Log #409 NEC-P03 **Final Action: Accept in Principle in Part (300.5(C))**

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-45
Recommendation: Accept proposal revised:
UNDERGROUND CABLES UNDER BUILDINGS OR STRUCTURES.
Underground cable installed under a building, or a structure with a floor shall be in a raceway that extends beyond the ~~outside walls~~ perimeter of the building or structure, or to the points of emergence within the perimeter of the building or structure.
Exception; A raceway shall not be required for Type MI cable.
Substantiation: Structures that are not deemed buildings but have a floor (earth or other material) should be included. Such structure may not have walls, per se but will have a perimeter. Some underground cables may not extend beyond outside walls but be terminated entirely within the perimeters of the building or structure. A raceway does not seem necessary for Type MI cable.
Panel Meeting Action: Accept in Principle in Part
Revise the 2005 NEC 300.5(C) text to read:
UNDERGROUND CABLES UNDER BUILDINGS. Underground cable installed under a building shall be in a raceway. ~~that is extended beyond the outside walls of the building.~~
Panel Statement: The addition of structures was not accepted since the main reason for this subsection is to enable direct buried cables installed under a concrete slab under a building, not a structure. The addition of an exception was not accepted as it presents new material not addressed in the original proposal. The concept of "emergence within the perimeter" was accepted in principle. The deletion of the last part of the sentence provides clarity that the cable installed under a building must be installed in a raceway.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-23 Log #694 NEC-P03 **Final Action: Reject (300.5(D))**

Submitter: Jamie McNamara, Hastings, MN
Comment on Proposal No: 3-38
Recommendation: The panel should reconsider this proposal and except it. It would add a degree of safety to people excavating around underground installations.
Substantiation: In the panel statement, it indicated that "In addition, the result of this proposal would be to delete the present 300.5(D)(2) because it has not been shown as retained, and the reason for doing so has not been provided." It was my intent to retain all text that did not have a strike through. I used strike through to show deleted text and underline to show added text, everything else is to remain the same.
Original proposal:
300.5 Underground Installations...
(D) Protection form Damage. Direct-buried conductors and cables shall be protected from damage in accordance with 300.5(D)(1) through (D)(3)~~(4)~~.
(1)...
~~(3) Service Conductors. Underground service conductors that are not encased in concrete and that are buried 450 mm (18 in.) or more below grade shall have their location identified by a warning ribbon that is placed in the trench at least 300 mm (12 in.) above the underground installation.~~
(3)~~(4)~~ Enclosure or Raceway Damage..... (E)...
(G) Service Conductors. Underground service conductors that are not encased in concrete or in metal conduit and that are buried 450 mm (18 in.) or more below grade shall have their location identified by a warning ribbon that is placed in the trench at least 300 mm (12 in.) above the underground installation.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-18.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-24 Log #1306 NEC-P03 **Final Action: Reject (300.5(D)(3))**

Submitter: David Williams, Delta Township
Comment on Proposal No: 3-47
Recommendation: Revise text to read as follows:
300.5(D)(3) Service Conductors. Underground direct buried service conductors that are not encased in concrete or installed in a raceway and that are buried 450 mm (18 in.) or more below grade shall have their location identified by a warning ribbon that is placed in the trench at least 300 mm (12 in.) above the underground installation.
Substantiation: This section is often misinterpreted to require the warning ribbons for service raceway installations as well. I personally think it is a good idea for the warning ribbon on raceway installations since those still have the potential of a serious accident if dug into with a backhoe.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-18.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-25 Log #1445 NEC-P03 **Final Action: Reject (300.5(D)(3))**

Submitter: Larry Cross, IBEW Local 98
Comment on Proposal No: 3-50
Recommendation: I agree with P. Casparro that a warning ribbon placed above the underground would alleviate this problem, thus saving unnecessary damage and possible bodily harm.
Substantiation: Can we really ever be too safe?
Panel Meeting Action: Reject
Panel Statement: Installing a warning ribbon above underground feeder and branch circuits is permitted but not required. Anyone digging in a location where directly buried service conductors have a ribbon installed 12 inches above the cable should be warned that there is a cable below that location. Expanding this warning ribbon requirement to all service, feeder, and branch-circuit underground direct burial applications would tend to desensitize the effect of the warning ribbon.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-26 Log #1446 NEC-P03 **Final Action: Reject (300.5(D)(3))**

Submitter: Larry Cross, IBEW Local 98
Comment on Proposal No: 3-48
Recommendation: I agree with P. Casparro that a warning ribbon placed 12 in. above the underground would alleviate this problem, thus saving unnecessary damage and possible bodily harm.
Substantiation: None.
Panel Meeting Action: Reject
Panel Statement: The panel intends that this requirement apply only to direct buried service cables and conductors. The proposal and comment have not substantiated the need to add raceways to the types of installations covered by 300.5(D)(3).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-27 Log #1471 NEC-P03 **Final Action: Reject**
(300.5(D)(3))

Submitter: James O'Driscoll, IBEW Local #98
Comment on Proposal No: 3-48
Recommendation: I agree with the explanation of negative on this proposal.
Substantiation: As a journeyman wireman in the field, I see many times excavation work being performed on a building premises which would be on the load side of the service point. The call before you dig would not necessarily find these underground installations. I think all underground installations should have a ribbon. This would include any power or communication cables and raceways of all energy levels.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 3-26.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-28 Log #1623 NEC-P03 **Final Action: Reject**
(300.5(D)(3))

Submitter: Wally Harris, Atlantic Inland Inspections
Comment on Proposal No: 3-50
Recommendation: Revise the text of this Proposal to read as follows:
(3) Service, Branch Circuit and Feeder Conductors. Underground branch circuit, feeder and service conductors that are not encased in concrete and that are buried 450 mm (18 in.) or more below grade shall have their location identified by a warning ribbon that is placed in the trench at least 300 mm (12 in.) above the underground installation.
Substantiation: The original proposal in the ROP should be reconsidered, and accepted.

In the Rejection statement the Panel stated in Part; "Service conductors are not protected by overcurrent protection devices and constitute a much greater hazard where these conductors are damaged during excavation."

By including the wording "...constitute a much greater hazard" in their statement, the Panel surely recognizes that there is some degree of hazard present in Branch Circuit and Feeder conductors as well as Service conductors. The degree of hazard is not the question. The question is whether or not the "practical safeguarding of persons and property" as stated in 90.1(A) is in fact being considered by the Panel in the initial rejection of the original Proposal. Panel member Mr. Casparro asked the ultimate question in his comment in the "Explanation of Negative" in the ROP - "Can we really ever be TOO safe?"

I must respectfully disagree with the Panel in their statement that the presence of a warning ribbon would tend to "desensitize the effect of the warning ribbon." The Panel also stated that "Human nature tends to disregard safety items where that person is constantly exposed too often to that safety item."

Desensitization of human beings, and human nature are best left to members of the Medical and Psychological professions. The "...practical safeguarding of persons and property from hazards arising from the use of electricity" as stated in 90.1(A) is best left in the competent hands of the Code Panels and the industry professionals that enhance the NEC and continue to make it the benchmark for electrical work world wide.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 3-25.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-29 Log #1631 NEC-P03 **Final Action: Reject**
(300.5(D)(3))

Submitter: Paul J. Casparro, Scranton Electricians JATC / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 3-50
Recommendation: This Proposal should have been Accepted.
Substantiation: The panel is correct in saying that service conductors are not protected overcurrent protection and therefore constitute a much greater hazard when these conductors are damaged during excavation. I disagree with the panel statement that says "Expanding this warning ribbon requirement to all service, feeder, and branch circuit underground direct burial applications would tend to desensitize the effect of the warning ribbon." Any type of warning device that eliminates a hazard, extra work, and the expense of a repair would be valid in its use.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 3-25.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-30 Log #2256 NEC-P03 **Final Action: Reject**
(300.5(D)(3))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 3-49
Recommendation: The panel should accept this proposal.
Substantiation: The panel statement says that if a safety rule is difficult or expensive to comply with then we don't need it in the code. The "warning ribbon" rule is intended to provide some protection in the form of a warning ribbon to someone who is digging in the area of the underground service cable. The method of original installation does not change the level of hazard to the future digger. They are just as hurt or killed if they dig into an energized service cable that was installed using directional boring equipment as one that was installed using conventional trenching. If this is really a hazard to future workers, then they deserve the protection of a warning ribbon no matter what cable installation method was used. If it is not really a hazard, then the rule should be deleted from the code, but you can't have it both ways. The panel statement says one is safe to the future digger and the other is a hazard, when in reality there is no difference in the level of hazard involved.
Panel Meeting Action: Reject
Panel Statement: The only way to install a warning ribbon 12 inches above a bored hole containing service conductors would be to drill an additional hole with the ribbon inserted in the hole and pulled through from one location to another or to dig a trench to a depth 12 inches above the cable. In addition, since the ribbon would be installed in a drilled hole, the inspector would not be able to verify the depth of the ribbon as being 12 inches above the service conductors. Unenforceable requirements must not be inserted into the NEC.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-31 Log #25 NEC-P03 **Final Action: Accept**
(300.5(D)(4))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 3-52
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action taken on Proposal 8-53. This action will be considered by the Panel as a Public Comment.

See the Technical Correlating Committee action on Proposal 8-53.

It was also the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 8 for comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See the panel action and statement on Comment 3-33.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-32 Log #351 NEC-P03 **Final Action: Accept in Principle**
(300.5(D)(4))

Submitter: Code-Making Panel 8,
Comment on Proposal No: 3-52
Recommendation: CMP-3 should Accept Proposal 3-52.
Substantiation: CMP-3 should accept Proposal 3-52 to correlate with the action taken by CMP-8 on Proposal 8-53.

This comment has been balloted through CMP-8 with the following ballot results:

12 Eligible to Vote
11 Affirmative
1 Negative

Mr. R. Loyd voted negatively stating: "Proposal 3-52 was to reject. No comment necessary, CMP-8 has no substantiation or recommendation that CMP-3 reverse their action."
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 3-33.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-33 Log #391 NEC-P03 **Final Action: Accept**
(300.5(D)(4))

Submitter: David H. Kendall, Carlon
Comment on Proposal No: 3-52
Recommendation: This proposal should be Accept in Principle and revised to read as follows:
300.5(D)(4) Enclosure or Raceway Damage. Where the enclosure or raceway is subjected to physical damage, the conductors shall be installed in rigid metal conduit, intermediate metal conduit, Schedule 80 ~~rigid nonmetallic~~ PVC conduit, or equivalent.
Substantiation: Panel 8 did Accept in Principle Proposal 8-53. To be consistent with the revised Article 352 "Schedule 80 PVC conduit" should be used instead of "Schedule 80 rigid PVC conduit" as proposed.
Panel Meeting Action: Accept
Panel Statement: The panel notes that there is an inconsistency in how PVC is designated in the action taken on Proposal 8-53.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-34 Log #1063 NEC-P03 **Final Action: Reject**
(300.5(D)(4))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 3-52
Recommendation: Revise text to read as follows:
"...~~physical~~ damage of the sort that tends to be readily visible...".
Substantiation: NEC users rely on standard dictionary definitions, augmented by the NEC's explicit definitions. The NEC Style Manual saying in "3.2.5.5 Provisions on Protection Against Physical Damage. If protection against physical damage is to be one of the requirements, this can be standardized by the use of this terminology" this does not benefit the ordinary user. The Style Manual is offering an option, not a requirement. I assumed the term was being used loosely to mean damage from blows, abrasion, pressure, or tension, but assumptions should not be necessary. An ideal I believe we share is to enforce the Code as written, not "You know what we mean." This CMP's statement indicates that they intended the long-term physical effects of chemicals and radiation, such as embrittlement, to be among types of damage excluded. Other CMPs use the term with somewhat different intentions, if one reads the Panel Statements in this ROP. Webster's definition does not clue us to this, nor does Article 100, nor does the beginning of this chapter. I would hope 110.3(A)(2)'s requirement of suitable "mechanical strength and durability" sufficed. If this additional statement is needed because that is too broad, let's say exactly what the CMP statement indicates is meant.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any additional technical substantiation to delete the word "physical" from the text in 300.5(D)(4). The panel reaffirms its panel statement from the proposal as follows: "Physical" is used throughout the NEC as a descriptive adjective to the noun "damage." While the submitter feels the phrase "physical damage" is superfluous, the word "physical" seems to provide a certain emphasis and a further description where combined into the phrase "physical damage." This phrase tends to draw more attention than just "damage." In addition, physical damage provides a description of thermal and mechanical damage where the damage can be readily identified, such as a raceway that has been physically damaged versus damage from ultraviolet light where the raceway may be more brittle and thus can be easily damaged physically by impact to the raceway. Chemicals or heat can cause unseen damage to electrical components that can eventually lead to physical damage at a later time. This phrase is used in the NEC Style Manual in 3.2.5.5 as an acceptable method to describe physical damage.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-35 Log #1371 NEC-P03 **Final Action: Accept in Principle**
(300.5(D)(4))

Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 3-52
Recommendation: This Proposal should be Accepted as originally proposed.
Revise 300.5(D)(4) as follows:
300.5(D)(4) Enclosure or Raceway Damage. Where the enclosure or raceway is subject to physical damage, the conductors shall be installed in rigid metal conduit, intermediate metal conduit, Schedule 80 rigid ~~nonmetallic~~ PVC conduit, or equivalent.
Substantiation: In accordance with CMP-8's action on Proposal 8-53, Article 352 will now apply only to "Rigid Polyvinyl Chloride Conduit: Type PVC" rather than "Rigid Nonmetallic Conduit: Type RNC." Therefore, it is necessary to revise the terminology used throughout the remainder of the NEC. As the only type of rigid nonmetallic conduit that is currently listed in Schedule 80 dimensions is rigid PVC conduit, the reference in 300.5(D)(4) should be revised as noted above.
This will correlate with the TCC Action on Proposal 3-52.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel action on Comment 3-33 addresses the submitter's concern.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-36 Log #2503 NEC-P03 **Final Action: Reject**
(300.5(D)(4))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 3-52
Recommendation: Accept the proposal revised as follows.
300.5(D)(4) Enclosure or Raceway Damage. Where the enclosure or raceway is subject to physical damage, the conductors shall be installed in rigid metal conduit, intermediate metal conduit, RTRC, Schedule 80 rigid nonmetallic PVC conduit, or equivalent.
Substantiation: RTRC should be included in this list. If RTRC is not included then this proposal should be rejected. Not including RTRC in the list is not appropriate. There is no information that shows RTRC cannot also provide this function.
Panel Meeting Action: Reject
Panel Statement: Reinforced thermosetting resin conduit (RTRC) cannot be added to this section because the RTRC designation does not necessarily indicate that the conduit provides the extra physical protection as does Schedule 80 PVC.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
PACE, D.: In past RTRC has been acceptable for this appliation. No technical substantiation has been submitted to exclude RTRC from this application. This comment should be rejected.

3-37 Log #1064 NEC-P03 **Final Action: Reject**
(300.5(F))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 3-53
Recommendation: Revise text to read as follows:
"...~~physical~~ damage of the sort that tends to be readily visible...".
Substantiation: NEC users rely on standard dictionary definitions, augmented by the NEC's explicit definitions. The NEC Style Manual saying in "3.2.5.5 Provisions on Protection Against Physical Damage. If protection against physical damage is to be one of the requirements, this can be standardized by the use of this terminology" this does not benefit the ordinary user. The Style Manual is offering an option, not a requirement. I assumed the term was being used loosely to mean damage from blows, abrasion, pressure, or tension, but assumptions should not be necessary. An ideal I believe we share is to enforce the Code as written, not "You know what we mean." This CMP's statement indicates that they intended the long-term physical effects of chemicals and radiation, such as embrittlement, to be among types of damage excluded. Other CMPs use the term with somewhat different intentions, if one reads the Panel Statements in this ROP. Webster's definition does not clue us to this, nor does Article 100, nor does the beginning of this chapter. I would hope 110.3(A)(2)'s requirement of suitable "mechanical strength and durability" sufficed. If this additional statement is needed because that is too broad, let's say exactly what the CMP statement indicates is meant.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-34.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-38 Log #418 NEC-P03 **Final Action: Reject**
(300.5(I) Exception No. 2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-57
Recommendation: Accept proposal.
Substantiation: Since isolated conductors are permitted in cables with a nonmagnetic sheath, what reason is there not to permit them in nonmagnetic raceways?
Panel Meeting Action: Reject
Panel Statement: The submitter has not addressed the situation that is at issue in this exception since this exception is dealing with conductors that are installed in parallel as permitted in 310.4 and has provided no technical substantiation for the suggested change. The use of a nonferrous raceway does not eliminate circulating currents. See the fine print note to 300.20(B).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-39 Log #457 NEC-P03 **Final Action: Reject**
(300.5(I) Exception No. 2)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-57
Recommendation: Accept proposal.
Substantiation: Isolated conductors are permitted for cables with a nonmagnetic sheath such as Type MI but not in metallic raceways which are nonmagnetic such as aluminum, brass, some stainless steels, and not in nonmagnetic metal covered cables where the covering is not a "sheath".
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-38.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-40 Log #1263 NEC-P03 **Final Action: Reject**
(300.6(A) (New))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: Sanford Egesdal, Egesdal Associates PLC
Comment on Proposal No: 3-58
Recommendation: Accept Proposal 3-58.
Substantiation: Considering that electrically conductive corrosion resistant compound applied in the field will be expected to function for decades, it is reasonable to require a listed product. Independent evaluation and listing will provide long-term confidence in the product and integrity of the conduit system.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 7 Negative: 6
Explanation of Negative:
AYER, L.: At the present time, there is only one company which provides a listed compound that can be used for corrosion protection. It would not be a fair practice to allow this monopoly. Other approved products have been used for over 30 years without incident or hazard. The submitter has not provided any additional substantiation why the present methods used to protect against corrosion are not sufficient.
EASTER, L.: The panel should have rejected the comment to require a listed coat
ing. The existing text makes it clear that an electrically conductive coating must be used where corrosion protection of field threads is necessary. The word "approved" is used in lieu of "listed" because there are many products, such as zinc rich spray paint, that will provide the intended field thread protection. There has never been any substantiation submitted to show there is a problem with the use of these types of products that have been approved for use for years but are not "listed" products. If there is a listed product available on the market, this does not preclude its use.
MAASSEN, R.: The panel should not have accepted requiring a "listed" compound for application to all field threads. The existing text makes it clear that an electrically conductive coating must be used where corrosion protection of field threads is necessary. To use a product from only one manufacturer that is presently listed is inappropriate. Also, this product remains tacky and can cause additional contamination of the surface, causing it to loose conductivity.
OWEN, S.: The existing text makes it clear that an electrically conductive coating must be used where corrosion protection of field threads is necessary. The word "approved" is used in lieu of "listed" because there are many products, such as zinc-rich spray paint, that will provide the intended field thread protection. There has never been any substantiation submitted to show that there is a problem with the use of these types of products that have been approved for use for years, but are not "listed" products. If there is a listed product available on the market, this does not preclude its use.
PACE, D.: The panel should not have accepted requiring a "listed" compound for application to all field threads. No substantiation was provided to show that "non-listed" compounds are a problem. Just because a product listing category exists does not mean that it is necessary to require a listing of the products used. "Listed" products may be approved for use, but there is no justification to require "listed" products only. Changes in the NEC should be well documented with appropriate substantiation to support the change. This comment should be rejected.
SANDERS, M.: The panel should have rejected the comment to require a listed coating.
The term "approved" should continue to be used in lieu of "listed" because there are products, such as zinc rich pastes, that have an historical track record of providing the intended corrosion protection and intended conductivity of field cut threads.
A review of the history of this sentence (initially an exception) adoption into the Code shows 1987 acceptance of a Proposal (NEC TCR) statement that zinc chromate paste does not reduce the current carrying capacity of the conduit in (during) a fault condition and also did not challenge the use of red lead paint. During the 1999 NEC cycle, the term "identified" was accepted as being too restrictive and it was changed to "approved." Subsequent to this, UL Product Category FOIZ was developed, a product listing was established, and in the ROP for the 2005 Code cycle the term "approved" was initially changed to "listed", and specifically rejected adding "zinc rich compound." During the comment period, it was pointed out the historical record of using this compound as both a corrosion inhibitor and electrically conductive agent, and that only anecdotal comments were submitted with no technical substantiation offered to reject this long standing practice. This was accepted by CMP-03, and the term "approved" was retained for the 2005 NEC. No technical substantiation has been provided in the 2008 NEC Proposal or Comment period that would prohibit the use of this long standing practice of using a zinc rich paste compound.
However, many are incorrectly assuming that any substance used on field cut threads, such as zinc rich spray paint, Teflon taping, red lead paint, and pipe dope are also acceptable. The quantity of zinc in zinc rich spray paint is unknown. Teflon tape contains no metallic particles, it is not a compound as the text of 300.6(A) specifically requires, and should never be used on electrical metallic raceway. Red lead paint was developed to resist wood decay in barns (hence the red color of barns), the quantity of metallic particles in the paint is unknown, and the lead has not been used in any galvanizing procedure subject to any listing process. Pipe dope does not contain any metallic particles and should never be used on electrical metallic raceway. Zinc rich paste has an acceptable historical track record in the type metal that does go through a listing procedure following the galvanizing process.
Comment on Affirmative:
CASPARRO, P.: This is a step in the right direction because listed corrosion resistant compounds have been tested for both their corrosion resistively and electrical conductivity. This will also take the guess work out for the inspectors.

3-41 Log #1337 NEC-P03 **Final Action: Reject**
(300.6(A))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" to correlate with the Technical Correlating Committee action on Comment 3-40.
Submitter: Kevin McCall, Local Union #98 IBEW
Comment on Proposal No: 3-58
Recommendation: Revise text as follows:
Add the word "listed" along with the word "approved" to describe electrically conductive corrosion resistant compound. Where the corrosion protection is necessary and the conduit is threaded in the field, the threads shall be coated with a listed and approved electrically conductive corrosion resistant compound.
Substantiation: Installer, AHJ all involved in the installation process will have any doubts about the proper installation process. The language "approved" acceptable to the AHJ and "listed" equipment, materials, or services included in a list published by an organization that is acceptable to the AHJ and concerned with evaluation of products or services that maintain provides inspection. As defined in Article 100 of NEC "listed" and "approved" would supplied adequate language for all to know that equipment, materials, and services are more guarantied and (text illegible).
Panel Meeting Action: Accept in Part
Accept adding the word "listed" but delete the word "approved" in the last sentence of 300.6(A).
Panel Statement: Section 110.2 already requires this corrosion-resistant installation to be approved, but there is listed material that is tested as an acceptable ground return path through the coated threads. Listed corrosion-resistant compounds have been tested for both their corrosion resistivity and electrical conductivity. Electrical inspectors should not be required to determine in the field whether a material installed on the threads of a raceway is electrically conductive when there is a listed material that is available that will ensure conductivity of the conduit path.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 11 Negative: 2
Explanation of Negative:
AYER, L.: See my Explanation of Negative Vote on Comment 3-40
EASTER, L.: See negative NEMA vote on Comment 3-40.
Comment on Affirmative:
CASPARRO, P.: See my explanation of vote on Comment 3-40.

3-42 Log #1440 NEC-P03 **Final Action: Reject**
(300.6(A))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" to correlate with the Technical Correlating Committee action on Comment 3-40.
Submitter: James O'Driscoll, IBEW Local #98
Comment on Proposal No: 3-58
Recommendation: I agree with the submitter.
Substantiation: A listed compound would eliminate any guesswork in the field both from an installation and an inspection point of view. Also, installations are much safer in the fact that the effective grounding path would not be compromised by corrosion.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 11 Negative: 2
Explanation of Negative:
AYER, L.: See my Explanation of Negative Vote on Comment 3-40
EASTER, L.: See NEMA recommendation and my explanation of negative vote on Comment 3-40.
Comment on Affirmative:
CASPARRO, P.: See my explanation of vote on Comment 3-40.

3-43 Log #1443 NEC-P03 **Final Action: Reject**
(300.6(A))

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" to correlate with the Technical Correlating Committee action on Comment 3-40.
Submitter: Larry Cross, IBEW Local 98
Comment on Proposal No: 3-58
Recommendation: I agree with the submitter "listed" and delete the word approved to describe electrically conductive corrosion resistant compound.
Substantiation: None.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 11 Negative: 2
Explanation of Negative:
AYER, L.: See my Explanation of Negative Vote on Comment 3-40
EASTER, L.: See NEMA recommendation and my explanation of negative vote on Comment 3-40.
Comment on Affirmative:
CASPARRO, P.: See my explanation of vote on Comment 3-40.

3-44 Log #1469 NEC-P03 **Final Action: Reject**
(300.6(A))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" to correlate with the Technical Correlating Committee action on Comment 3-40.
Submitter: James O'Driscoll, IBEW Local #98
Comment on Proposal No: 3-58
Recommendation: I agree with the explanation of negative on this proposal.
Substantiation: As a journeyman wireman in the field, I see many times excavation work being performed on a building premises which would be on the load side of the service point. The call before you dig would not necessarily find these underground installations. I think all underground installations should have a ribbon. This would include any power or communication cables and raceways of all energy levels.
Panel Meeting Action: Accept
Panel Statement: The panel notes that the recommendation supports the text proposed in Proposal 3-58. The panel also notes that the substantiation for this comment does not apply to Proposal 3-58 having to do with listed corrosion-resistant thread compound. It appears to apply to the installation of a warning ribbon above underground service conductors.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
AYER, L.: See my Explanation of Negative Vote on Comment 3-40

3-45 Log #1632 NEC-P03 **Final Action: Reject**
(300.6(A))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" to correlate with the Technical Correlating Committee action on Comment 3-40.
Submitter: Paul J. Casparro, Scranton Electricians JATC / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 3-58
Recommendation: This Proposal should have been Accepted.
Substantiation: Listed corrosion resistant compounds have been tested for both their corrosion resistivity and electrical conductivity, as pointed out by Mr. Guida. Listing would remove the guess work for the authority having jurisdiction when trying to determine if a compound is adequate for the task. The metal raceway must remain a low impedance path back to the source in a fault condition to facilitate the operation of the overcurrent device.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 11 Negative: 2
Explanation of Negative:
AYER, L.: See my Explanation of Negative Vote on Comment 3-40
EASTER, L.: See NEMA recommendation and my explanation of negative vote on Comment 3-40.
Comment on Affirmative:
CASPARRO, P.: See my explanation of vote on Comment 3-40.

3-46 Log #26 NEC-P03 **Final Action: Accept**
(300.7(B), FPN)

TCC Action: The Technical Correlating Committee understands that the correlation is accomplished in Comment 3-47.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 3-62
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 8-53. See Technical Correlating Committee action on Proposal 8-53. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-47 Log #352 NEC-P03 **Final Action: Accept**
(300.7(B), FPN)

Submitter: Code-Making Panel 8,
Comment on Proposal No: 3-62
Recommendation: CMP-3 should Accept Proposal 3-62.
Substantiation: CMP-3 should accept Proposal 3-62 to correlate with the action taken by CMP-8 on Proposal 8-53.
This comment has been balloted through CMP-8 with the following ballot results:
12 Eligible to Vote
11 Affirmative
1 Negative
Mr. R. Loyd voted negatively stating: "Proposal 3-62 was to Reject. No comment necessary, CMP-8 has no substantiation for recommending that CMP-3 reverse their action. "HDPE" is not recognized as "nonmetallic conduit".
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-48 Log #1372 NEC-P03 **Final Action: Accept**
(300.7(B), FPN)

Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 3-62
Recommendation: This Proposal should be Accepted as originally proposed.
FPN: Table 352.44~~(A)~~ provides the expansion information for polyvinyl chloride (PVC).
Substantiation: In accordance with CMP-8's action on Proposal 8-53, Article 352 will now apply only to "Rigid Polyvinyl Chloride Conduit: Type PVC" and Table 352.44(A) will be renumbered as Table 352.44. Therefore, it is necessary to revise the reference in the FPN to 300.7(B) as noted above.
This will correlate with the TCC Action on Proposal 3-62.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-49 Log #1690 NEC-P03 **Final Action: Reject**
(300.7(B), FPN)

Submitter: Ricky Troxel, Bear Electric
Comment on Proposal No: 3-61
Recommendation: Add the following to 300.7(B) after the last sentence:
(Table 352.44(A) provides expansion information for polyvinyl chloride (PVC), electrical metallic tubing (EMT), intermediate metal conduit (In rigid metal conduit (RMC), and aluminum conduit.) The FPN should be deleted from this section and placed with Table 352.44(A).
Substantiation: Deleting the FPN from this section would eliminate confusion. It would be better suited with Table 352.44(A) where it will be usable.
Panel Meeting Action: Reject
Panel Statement: Table 352.44 does not provide expansion information for EMT, IMC, rigid metal conduit, and aluminum conduit, but this table can be used with a multiplier of 0.20. This fine print note must be retained within 300.7(B) for expansion fittings since it provides necessary background information on expansion characteristics.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-50 Log #1911 NEC-P03 **Final Action: Accept in Principle**
(300.7(B), FPN)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 3-61
Recommendation: Revise the first paragraph as follows:
"Tables 352.44 and 355.44 provide the expansion information for Polyvinyl Chloride (PVC) and for Reinforced Thermosetting Resin Conduit (RTRC) respectively. A nominal number for steel conduit can be determined by multiplying the expansion length in ~~this~~ Table 352.44 by 20. The coefficient of expansion for steel..."
Substantiation: The new article on RTRC should be referenced in this context. It has a coefficient of thermal expansion less than half that of PVC.
Panel Meeting Action: Accept in Principle
The panel accepts the recommended text with the correction of the multiplier to 0.20.
Panel Statement: The panel action corrects a typographical or transcription error.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-51 Log #2272 NEC-P03 **Final Action: Reject**
(300.7(B), FPN)

Submitter: Richard Troxel, Bear Electric
Comment on Proposal No: 3-61
Recommendation: Add the following to 300.7(B) after the last sentence:
(Table 352.44(A) provides expansion information for polyvinyl chloride (PVC), electrical metallic tubing (EMT), intermediate metal conduit (IMC), ridgid metal conduit (RMC), and aluminum conduit.) The FPN should be deleted from this section and placed with Table 352.44(A).
Substantiation: Deleting the FPN from this section would eliminate confusion. It would be better suited with Table 352.44(A) where it will be useable.
Panel Meeting Action: Reject
Panel Statement: Table 352.44 does not provide expansion information for EMT, IMC, rigid metal conduit, and aluminum conduit, but this table can be used with a multiplier of 0.20. This fine print note must be retained within 300.7(B) for expansion fittings, since it provides necessary background information on expansion characteristics.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-52 Log #2257 NEC-P03 **Final Action: Accept in Principle**
(300.9 (New))

Submitter: Donald A. Ganiere, Ottawa, IL
Comment on Proposal No: 3-63
Recommendation: This proposal should be accepted.
Substantiation: I understand that panel's point that conductors must be selected so that they are suitable for the locations where they are being installed. The point of this proposal is to make it clear that the interior of any raceway installed in a wet location is a wet location. That is not a completely accepted idea in the field. A section was added, 300.5(B) in a previous code to make it clear that the interior of all underground raceways is a wet location. This is the same issue with raceways that are installed in wet locations. The interior of the raceway will be a wet location and conductors or cables installed in these raceways must be listed as suitable for use in wet locations. If the interior of raceways in outside or wet locations is not also a wet location, why do sections 225.22 and 230.53 require that "raceways on exteriors of buildings or other structures shall be arranged to drain"? Note: This proposal covers underground raceways and raceways in wet locations and if accepted, you should also accept Proposal 3-43.
Panel Meeting Action: Accept in Principle
Revise recommended text for 300.9 to read:
300.9 Raceways in Wet Locations Above Grade. Where raceways are installed in wet locations above grade, the interior of these raceways shall be considered to be a wet location. Insulated conductors and cables installed in raceways in wet locations above grade shall comply with 310.8(C).
Panel Statement: The panel accepts the recommendation to create a new 300.9 for aboveground wet locations and has chosen to place the underground installation requirements in 300.5(B). The text was not deleted in 300.5(B) since this entire Section 300.5 applies to underground installations. Providing additional underground requirements in a new 300.9 could be missed by the user of the Code. The requirement for using wet location listed conductors in the proposal was changed to "complying with 310.8(C)" because there are three different methods to comply with insulated conductors and cables used in wet locations. They must be:
(1) Moisture-impervious metal-sheathed;
(2) Types MTW, RHW, RHW-2, TW, THW, THW-2, THHW, THHW-2, THWN, THWN-2, XHHW, XHHW-2, ZW; or
(3) Of a type listed for use in wet locations.
See the panel action and statement on Comment 3-20a (Log #CC300).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13
Comment on Affirmative:
CASPARRO, P.: See my explanation of vote on Comment 3-20a.

3-53 Log #1841 NEC-P03 **Final Action: Accept in Principle**
(300.10 Exception No. 2 (New))

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 3-65
Recommendation: This Proposal should have been Accepted in Principle, and located in 300.12 as opposed to 300.10. Leave 300.10 as currently written, and add a new Exception No. 2 (and number the existing Exception as No. 1 as follows:
Exception No. 2: Conduit installed into the bottom of open bottom equipment, such as switchboards, motor control centers, and transformers, shall not be required to be mechanically secured to the equipment.
Substantiation: This relaxation of the requirement of mechanical continuity (especially as modified by the panel) belongs in 300.12 for mechanical continuity, as opposed to 300.10 for electrical continuity.
Panel Meeting Action: Accept in Principle
Accept the recommendation to relocate the new exception to 300.12 and revise the exception to read:
"Exception No. 2: Raceways and cables installed into the bottom of open bottom equipment, such as switchboards, motor control centers, and floor or pad-mounted transformers, shall not be required to be mechanically secured to the equipment."
Identify the current exception to 300.12 as Exception No.1.
Panel Statement: The submitter is correct that a better place for this text is in 300.12 for mechanical continuity. "Floor and pad-mounted" was added to differentiate between a wall mount transformer and a floor or pad-mounted transformer, and the existing exception was relabeled as Exception No. 1. The term "raceway" has been used to include all of the raceways covered in Chapter 3, and the panel has also included cables in the exception for consistency.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

9-3 Log #27 NEC-P09 **Final Action: Accept**
(300.11(A))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 3-67
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 9 for action in Article 314. This action will be considered by Code-Making Panel 9 as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: Panel 9 understands this comment to be a direction to consider action in Article 314. After reconsideration, Panel 9 respectfully declines to take this action. See panel action and statement on Comment 9-4.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-4 Log #56 NEC-P09 **Final Action: Accept**
(300.11(A))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 9-7d
Recommendation: The Technical Correlating Committee directs that the panel reconsider this Proposal since boxes for power-limited fire alarms are not excluded from Article 314 by any rules from Article 760. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: After reconsideration, CMP 9 respectfully declines to incorporate the subject of Proposal 9-7d within Article 314. The submitters request is already permitted under 314.23(D)(1). CMP 9 understands that the rules in 314.23 apply without modification to boxes used in fire alarm wiring within the scope of Article 760 because no modifications have been made in that article to Chapter 3 provisions in this regard. To the extent the proposal could address Article 760 systems, it is requesting that such modifications be made. CMP 9 lacks the background to evaluate whether the particular characteristics of this equipment warrant a modification of the general NEC rules with respect to enclosure support. If CMP 9 were to act on the merits of the proposal, the result would be an exception in 314.23 for certain equipment within the scope of Article 760. This sort of an exception is exactly what the Style Manual is attempting to avoid, as it recognizes the role of 90.3. This was the reason for the last sentence of the panel statement on Proposal 9-7d.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

3-54 Log #336 NEC-P03 **Final Action: Reject**
(300.11(A)(2) Exception)

Submitter: John Stacey, City of St. Louis
Comment on Proposal No: 3-69
Recommendation: Revise text to read as follows:
The ceiling support system shall be permitted to support flexible ceiling branch circuit wiring and associated ceiling equipment. ~~where installed with the manufacturer's instructions.~~
Substantiation: Drop ceilings must be junk and need to be listed for the load of the associated equipment - the luminaries, etc. and the wiring associated - both have no instructions from manufacturer's. Additional support wires will have the same shortening effect when loaded with conduits. Allow flexible wiring - 2 or 3 caddy clips is not a life safety or fire safety hazard per 90.1(A). This appears to be a manufacturer's whim. No documented testing in the original substantiation.

I am 30+ years in the industry and I have never seen or heard of ceiling installers removing clips. There needs to be some relief for electricians - not just ceiling manufacturers. Good Luck!
Panel Meeting Action: Reject
Panel Statement: Manufacturers of ceiling systems have designed most dropped ceilings for the installation of 2 ft X 2 ft or 2 ft X 4 ft drop-in fluorescent luminaires or recessed incandescent luminaires but not the additional weight of raceways or cables. Where additional support wires are connected to the building structure for support of raceways or cables, the installer should either use the new type of support devices that will not cause the wire to be shortened or install the raceways or cables on the additional support wire before the support wire is tied to the ceiling grid assembly. Where ceiling support wires are shortened by installing raceway or cable support clips or devices to the wire, removing the raceway or cable support clip and not providing any additional support could cause damage to the raceway or cable and the internal conductors, which very easily could be a life safety or fire issue.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-55 Log #2036 NEC-P03 **Final Action: Reject**
(300.11(B))

Submitter: Donald Cook, Shelby County Building Inspections
Comment on Proposal No: 3-70
Recommendation: Accept proposal as submitted.
Substantiation: The panel statement first indicates that raceways are not tested nor listed for external mechanical load carrying conditions. If that is the case, it is difficult to understand why the text in the section allows these raceways to support other raceways, cables or nonelectric equipment under the conditions in (2) and (3). I assume that item (1) is included so a raceway manufacturer has the ability to submit their product to a certification body and have it evaluated for that purpose. As indicated in the original proposal and Mr Ayer's negative ballot, the items included in (3); boxes, conduit bodies, and luminaries are not raceways, cables or nonelectric equipment. Please provide clarification of the panel intent.
Panel Meeting Action: Reject
Panel Statement: To clarify the text of this particular subsection, it is necessary to go back to the original text as accepted for the 1987 NEC. The original text was as follows:
"300-11(b) Raceways Used as Means of Support. Raceways shall not be used as a means of support for other raceways, cables or non-electric equipment.
Exception No. 1: Where the raceway or means of support are identified for the purpose.
(FPN): See Article 318 for cable trays.
Exception No. 2: Raceways containing power supply conductors for electrically controlled equipment shall be permitted to support Class 2 circuit conductors or cables that are solely for the purpose of connection to the equipment control circuits.
Exception No. 3: As permitted in 370-23 for boxes or conduit bodies or 410-16(f) for fixtures."
The main text did not permit a raceway to support other raceways, cables, or non-electric equipment; however, the first exception permits a raceway or means of support where identified for the purpose. The non-electric equipment referred to the main text and subsequently in the first exception was a reference to a cable tray system defined as "a unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways. The cable tray is non-electric equipment that is for supporting cables and raceways but is identified for that purpose. The text was changed from a section with exceptions to positive text without any exceptions but with the same general purpose to permit cable trays as a means of support for cables and raceways. The present text appeared as follows:
"300.11(B) Raceways Used as Means of Support. Raceways shall be used only as a means of support for other raceways, cables, or non-electric equipment under any of the following conditions:
(1) Where the raceway or means of support is identified for the purpose.
(2) Where the raceway contains power supply conductors for electrically controlled equipment and is used to support Class 2 circuit conductors or cables that are solely for the purpose of connection to the equipment control circuits.
(3) Where the raceway is used to support boxes or conduit bodies in accordance with 314.23 or to support luminaires (fixtures) in accordance with 410.16(F)."
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-56 Log #421 NEC-P03 **Final Action: Reject**
(300.11(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-12
Recommendation: Accept proposal revised:
Cable wiring methods shall not be used as a means of support for other cables, raceways, or ~~nonelectrical~~ equipment unless identified for the purpose.
Substantiation: This section should also apply to equipment that is electrical.
Panel Meeting Action: Reject
Panel Statement: The proposal number should be 3-72, not 3-12. See the panel action and statement on Comment 3-55.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-57 Log #1065 NEC-P03 **Final Action: Reject**
(300.12 Exception No. 1)

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 3-75
Recommendation: Revise text to read as follows:
"...~~physical~~ damage of the sort that tends to be readily visible...".
Substantiation: NEC users rely on standard dictionary definitions, augmented by the NEC's explicit definitions. The NEC Style Manual saying in "3.2.5.5 Provisions on Protection Against Physical Damage. If protection against physical damage is to be one of the requirements, this can be standardized by the use of this terminology" this does not benefit the ordinary user. The Style Manual is offering an option, not a requirement. I assumed the term was being used loosely to mean damage from blows, abrasion, pressure, or tension, but assumptions should not be necessary. An ideal I believe we share is to enforce the Code as written, not "You know what we mean." This CMP's statement indicates that they intended the long-term physical effects of chemicals and radiation, such as embrittlement, to be among types of damage excluded. Other CMPs use the term with somewhat different intentions, if one reads the Panel Statements in this ROP. Webster's definition does not clue us to this, nor does Article 100, nor does the beginning of this chapter. I would hope 110.3(A)(2)'s requirement of suitable "mechanical strength and durability" sufficed. If this additional statement is needed because that is too broad, let's say exactly what the CMP statement indicates is meant.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 3-34.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-58 Log #1066 NEC-P03 **Final Action: Reject**
(300.15(C))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 3-77
Recommendation: Revise text to read as follows:
"...~~physical~~ damage of the sort that tends to be readily visible...".
Substantiation: NEC users rely on standard dictionary definitions, augmented by the NEC's explicit definitions. The NEC Style Manual saying in "3.2.5.5 Provisions on Protection Against Physical Damage. If protection against physical damage is to be one of the requirements, this can be standardized by the use of this terminology" this does not benefit the ordinary user. The Style Manual is offering an option, not a requirement. I assumed the term was being used loosely to mean damage from blows, abrasion, pressure, or tension, but assumptions should not be necessary. An ideal I believe we share is to enforce the Code as written, not "You know what we mean." This CMP's statement indicates that they intended the long-term physical effects of chemicals and radiation, such as embrittlement, to be among types of damage excluded. Other CMPs use the term with somewhat different intentions, if one reads the Panel Statements in this ROP. Webster's definition does not clue us to this, nor does Article 100, nor does the beginning of this chapter. I would hope 110.3(A)(2)'s requirement of suitable "mechanical strength and durability" sufficed. If this additional statement is needed because that is too broad, let's say exactly what the CMP statement indicates is meant.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 3-34.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-59 Log #1912 NEC-P03 **Final Action: Accept**
(300.15(L))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 3-79
Recommendation: Accept the proposal.
Substantiation: The panel statement is at odds with customary trade practice. Relatively few handholes contain boxes to enclose splices. Instead, the handholes rely on the fact that the typical cover requires tools to open, either because of bolts made-up wrench tight, or (unusual for a handhole) a cover over 100 lbs. This is also a requirement in 314.30(D). Nevertheless, most handholes are accessible to the public. In fact, handhole strength ratings are based on whether they will be driven over or just walked over. By accessible, I mean that members of the public can walk/dance on top of the cover, not that the public can get into the interior of the enclosure. A requirement to supplement the handhole enclosure with some kind of wet-location inner box for any handhole enclosure in public spaces simply because someone may have the requisite tools is excessive. Remember, whoever gets into the handhole enclosure will also have the tools to open the enclosed box, even more easily.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
PACE, D.: Accepting this comment thus, accepting the original proposal, would allow conductors to be run in manhole or hand hole enclosures that are accessible to un-qualified persons without being required to be run in a box or conduit body. This reduces the level of safety for this type installation and potentially places un-qualified persons at risk for injury when they have no way of knowing or understanding the hazards. This comment should be rejected.

3-60 Log #437 NEC-P03 **Final Action: Accept in Principle**
(300.16(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 3-80
Recommendation: Accept addition of "conduit body" after "box" and revise last sentence: A fitting other than a conduit body used for this purpose shall contain no splices or taps...(remainder unchanged).
Substantiation: Conduit bodies with three or more hubs are suitable. 590.4(G) recognizes a conduit body as suitable. The definition of fitting in Article 100 includes conduit bodies. 314.16(2) permits splices in conduit bodies without special permission.
Panel Meeting Action: Accept in Principle
Revise the existing text in 300.16(A) as follows:
300.16 Raceway or Cable to Open or Concealed Wiring
(A) Box, Conduit Body, or Fitting. A box, conduit body, or terminal fitting having a separately bushed hole for each conductor shall be used wherever a change is made from conduit, electrical metallic tubing, electrical nonmetallic tubing, nonmetallic-sheathed cable, Type AC cable, Type MC cable, or mineral-insulated, metal-sheathed cable and surface raceway wiring to open wiring or to concealed knob-and-tube wiring. A fitting used for this purpose shall contain no taps or splices and shall not be used at luminaire (fixture) outlets. A conduit body used for this purpose shall contain no taps or splices, unless it complies with 314.16(C)(2).
Panel Statement: Conduit body has been added to both the title and the first sentence in 300.16(A) since 314.17(B) permits this application for open wiring on insulators and for concealed knob-and-tube wiring. The last sentence was added to ensure that any conduit body where a splice to the wiring system is necessary also complies with 314.16(C)(2).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-61 Log #1913 NEC-P03 **Final Action: Reject**
(300.17)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 3-81
Recommendation: Accept the proposal.
Substantiation: The panel statement is incorrect. The proposal clearly conditions the rule on the absence of a pull point at the transition. Strut-type channel raceway has pull points along its entire length, as long as the cover is removed. Surface raceways in the medium and larger sizes have removable covers as well, and only the smaller ones would be (and should be) subject to this rule. The important concept here is simply this: without this proposal a raceway method transition without a pull point can effectively nullify any XXX.26 bend limitation.
Panel Meeting Action: Reject
Panel Statement: Section 300.17 is dealing with the number and size of conductors, not the number of bends in a run. Section 300.17 has a fine print note referencing various sections for the number and size of conductors within a wiring method, so adding a second paragraph dealing with the number and degree of bends would be inappropriate.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-62 Log #28 NEC-P03 **Final Action: Accept**
(300.17, FPN)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 3-83
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposals 8-53 and 8-78. This action will be considered by the Panel as a Public Comment.
See Technical Correlating Committee action on Proposals 8-53 and 8-78
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
CMP-3 has accepted the recommendation of CMP-8 in Comment 3-63.
Panel Statement: CMP-8 has the responsibility for raceway designations.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-63 Log #353 NEC-P03 **Final Action: Accept**
(300.17, FPN)

TCC Action: The Technical Correlating Committee directs that the term "rigid PVC" be changed to "PVC" to correlate with the panel action on Comments 3-33 and 3-78.
Submitter: Code-Making Panel 8,
Comment on Proposal No: 3-83
Recommendation: CMP-3 should Accept Proposal 3-83 as originally proposed.
Substantiation: CMP-3 should Accept Proposal 3-83 as originally proposed to correlate with the action taken by CMP-8 on Proposals 8-53 and 8-78.
This comment has been balloted through CMP-8 with the following ballot results:
12 Eligible to Vote
11 Affirmative
1 Negative
Mr. R. Loyd voted negatively stating: "Proposal 3-83 was to Accept in Part. No comment necessary, CMP-8 has no substantiation for recommending that CMP-3 change their action. There are no correlation issues with CMP-3's action."
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-64 Log #392 NEC-P03 **Final Action: Accept in Principle**
(300.17, FPN)

TCC Action: The Technical Correlating Committee directs that the term "rigid PVC" be changed to "PVC" to correlate with the panel action on Comments 3-33 and 3-78.
Submitter: David H. Kendall, Carlon
Comment on Proposal No: 3-83
Recommendation: This proposal should be Accept in Principle and revised to read as follows:
FPN: See the following sections of this code; intermediate metal conduit, 342.22; rigid metal conduit, 344.22; flexible metal conduit 348.22; liquidtight flexible metal conduit, 350.22; ~~rigid nonmetallic~~ PVC conduit, 352.22; HDPE conduit, 353.22; RTRC, 355.22; liquidtight nonmetallic flexible conduit, 356.22; electrical metallic tubing, 358.22; flexible metallic tubing, 360.22; electrical nonmetallic tubing, 362.22; cellular concrete floor raceways, 372.11; cellular metal floor raceways, 374.5; metal wireways, 376.22; nonmetallic wireways, 378.22; surface metal raceways, 386.22; surface nonmetallic raceways, 388.22; underfloor raceways, 390.5; fixture wire, 402.7; theaters, 520.6; signs, 600.31(C); elevators, 620.33; audio signal processing, amplification and reproduction equipment, 640.23(A) and 640.24; Class I, Class 2, and Class 3 circuits, Article 725; fire alarm circuits, Article 760; and optical fiber cables and raceways, Article 770.
Substantiation: Panel 8 did Accept in Principle Proposals 8-53 and 8-78. To be consistent with the revised Article 352 "PVC conduit" should be used instead of "rigid PVC conduit" as proposed.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 3-63.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-65 Log #1373 NEC-P03 **Final Action: Accept in Principle**
(300.17, FPN)

TCC Action: The Technical Correlating Committee directs that the term "rigid PVC" be changed to "PVC" to correlate with the panel action on Comments 3-33 and 3-78.
Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 3-83
Recommendation: This Proposal should be Accepted as originally proposed.
FPN: See the following sections of this Code: Intermediate Metal Conduit, 342.22; Rigid Metal Conduit, 344.22; Flexible Metal Conduit, 348.22; Liquidtight Flexible Metal Conduit, 350.22; Rigid ~~Nonmetallic~~ PVC Conduit, 352.22; HDPE Conduit, 353.22; RTRC, 355.22; Liquidtight Nonmetallic Flexible Conduit, 356.33; Electrical Metallic Tubing, 358.22; Flexible Metallic Tubing, 360.22; Electrical Nonmetallic Tubing, 362.22; Cellular Concrete Floor Raceways, 372.11; Cellular Metal Floor Raceways, 374.5; Metal Wireways, 376.22; Nonmetallic Wireways, 378.22; Surface Metal Raceways, 386.22; Surface Nonmetallic Raceways, 388.22; Underfloor Raceways, 390.5; Fixture Wire, 402.7; Theaters, 520.6; Signs, 600.31(C); Elevators, 620.33; Audio Signal Processing, Amplification, and Reproduction Equipment, 640.23(A) and 640.24; Class 1, Class 2, and Class 3 Circuits, Article 725; Fire Alarm Circuits, Article 760; and Optical Fiber Cables and Raceways, Article 770.
Substantiation: In accordance with CMP-8's actions on Proposals 8-53 and 8-78, Article 352 will now apply to "Rigid Polyvinyl Chloride Conduit: Type PVC" and Article 355 will apply to "Reinforced Thermosetting Resin Conduit: Type RTRC." As noted in CMP-3's statement on the original proposal, Article 353 already applies to HDPE conduit. Therefore, it is necessary to revise the references in the FPN to 300.17 as shown above.
This will correlate with the TCC Action on Proposal 3-83.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 3-63.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-66 Log #2090 NEC-P03 **Final Action: Reject**
(300.18(C) (New))

Submitter: Leonard F. Devine, Jr., Palm Beach County Plan Review
Comment on Proposal No: 3-84
Recommendation: Add new text to read as follows:
300.18(C) Raceway Diameter. Raceways shall be of the same trade size from end to end of a run unless the trade size of the raceway is changed at an exposed junction/pull box, or the size of the raceway is changed in the run where visible.
Substantiation: This will help negate changes being made in a run where not visible and not being discovered during a remodel when one has assumed that the raceway is of the same trade size form one end to the other. Wiring sometimes is damaged when a contractor pulls wire into a smaller raceway.
Panel Meeting Action: Reject
Panel Statement: Section 300.18 applies generally to all wiring methods in Chapter 3. To make the proposed change apply generally would involve some wiring methods that are totally covered by concrete, such as under-floor raceways in Article 390, cellular metal floor raceways in Article 374, cellular concrete floor raceways in Article 372, or other possible raceways, where the raceways and the junction boxes are under the concrete and technically would be in violation of the proposed text. In addition, the connecting raceways between the under-floor junction boxes are not a trade size. Trade sizes can be changed at conduit bodies, seal-off devices, and other applications also not covered by the proposed text.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-67 Log #1939 NEC-P03 **Final Action: Accept in Principle**
(300.19)

Submitter: Barry F. O'Connell, Tyco Thermal Controls
Comment on Proposal No: 3-85
Recommendation: Although covered in a general way in Section 110.3(B), I believe this proposal should be accepted because it clarifies specific requirements that apply only to Electrical Circuit Protective Systems that can fail from self-weight in a fire unless properly supported.
Substantiation: None given.
Panel Meeting Action: Accept in Principle
Add a new 300.19(B) to read:
(B) Fire Rated Cables and Conductors. Support methods and spacing intervals for fire rated cables and conductors shall comply with any restrictions provided in the listing of the electrical circuit protective system used and in no case shall exceed the values in Table 300.19(A).
Reidentify existing subdivision (B) as (C).
Panel Statement: New text is provided to specify the correct installation methods for the survivability of critical circuits.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-68 Log #1374 NEC-P03 **Final Action: Reject**
(300.22)

Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 3-92
Recommendation: This Proposal should be revised and Accepted as follows:
300.22 Wiring in Ducts, Plenums, and Other Air-Handling Spaces. The provisions of this section apply to the installation and uses of electric wiring and equipment in ducts, plenums, and other air-handling spaces.
FPN: See Article 424, Part VI, for duct heaters.
(A) Ducts for Dust, Loose Stock, or Vapor Removal. No wiring systems of any type shall be installed in ducts used to transport dust, loose stock, or flammable vapors. No wiring system of any type shall be installed in any duct, or shaft containing only such ducts, used for vapor removal or for ventilation of commercial-type cooking equipment.
(B) Ducts or Plenums Used for Environmental Air. Only wiring methods consisting of Type MI cable, Type MC cable employing a smooth or corrugated impervious metal sheath without an overall nonmetallic covering, electrical metallic tubing, flexible metallic tubing, intermediate metal conduit, ~~or~~ rigid metal conduit without an overall nonmetallic covering, or phenolic Type RTRC rigid nonmetallic conduit listed as having adequate fire-resistant and low smoke-producing characteristics, shall be installed in ducts or plenums specifically fabricated to transport environmental air. Flexible metal conduit shall be permitted, in lengths not to exceed 1.2 m (4 ft), to connect physically adjustable equipment and devices permitted to be in these ducts and plenum chambers. The connectors used with flexible metal conduit shall effectively close any openings in the connection. Equipment and devices shall be permitted within such ducts or plenum chambers only if necessary for their direct action upon, or sensing of, the contained air. Where equipment or devices are installed and illumination is necessary to facilitate maintenance and repair, enclosed gasketed-type luminaires (fixtures) shall be permitted.
(C) Other Space Used for Environmental Air. This section applies to space used for environmental air-handline purposes other than ducts and plenums as specified in 300.22(A) and (B). It does not include habitable rooms or areas of buildings, the prime purpose of which is not air handling.
FPN: The space over a hung ceiling used for environmental air-handling purposes is an example of the type of other space to which this section applies.
Exception: This section shall not apply to the joist or stud spaces of dwelling units where the wiring passes through such spaces perpendicular to the long dimension of such spaces.
(1) Wiring Methods. The wiring methods for such other space shall be limited to totally enclosed, nonventilated, insulated busway having no provisions for plug-in connections, Type MI cable, Type MC cable without an overall nonmetallic covering, Type AC cable, or other factory-assembled multiconductor control or power cables that is specifically listed for the use, or listed prefabricated cable assemblies of metallic manufactured wiring systems without nonmetallic sheath. Other types of cables and conductors shall be installed in electrical metallic tubing, flexible metallic tubing, intermediate metal conduit, rigid metal conduit without an overall nonmetallic covering, phenolic Type RTRC rigid nonmetallic conduit listed as having adequate fire-resistant and low smoke-producing characteristics, flexible metal conduit, or, where accessible, surface metal raceway or metal wireway with metal covers or solid bottom metal cable tray with solid metal covers.
(2) Equipment. Electrical equipment with a metal enclosure, or with a nonmetallic enclosure listed for the use and having adequate fire-resistant and low-smoke-producing characteristics, and associated wiring material suitable for the ambient temperature shall be permitted to be installed in such other space unless prohibited elsewhere in this Code.
Exception: Integral fan systems shall be permitted where specifically identified for such use.
(D) Information Technology Equipment. Electric wiring in air-handling areas beneath raised floors for information technology equipment shall be permitted in accordance with Article 645.
Substantiation: This proposal was Rejected by CMP-3 based upon the NFPA Standards Council's Decision 05-24 that the NEC Project is "to maintain status quo in the NEC until the Technical Committee on Air Conditioning has, through processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A." This was done to "give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues pertaining to plenum cables." However, since that time, I have been made aware of the Standards Council's clarification that states that if a proposal has technical merit, and is not related to NFPA 90A flammability of plenum wire and cables issues, then the NEC CMP needs to act on them. This is the case for my proposal to revise 300.22 of the NEC to permit the use of a limited range of RTRC products as a general purpose wiring method in Ducts of Plenums Used for Environmental Air. Therefore, I request that CMP-3 reconsider it, in conjunction with the additional technical substantiation presented below.
Clearly, the determination of what raceway products are suitable for use in these applications is under the jurisdiction of NEC CMP-3. This proposal relates neither to the use of plenum wire or cable, nor to any product that is intended for use related to air conditioning applications. To unnecessarily restrict the range of products that can demonstrate their ability to provide safe and dependable performance, not based upon any technical merits, would result in an unfair advantage for products which have been grandfathered into these applications.

Accordingly, I have developed the necessary technical substantiation to conclusively demonstrate to CMP-3 the ability of these products to be safely used in these applications. Based on this substantiation, phenolic RTRC products warrant inclusion in 300.22.

The position of Underwriters Laboratories in relation to flame spread and smoke developed values for materials used in plenums was put forth in UL's Mr. Randy Laymon's letter dated December 15, 2004.

As a result of my initial proposal, and this UL position paper, FRE Composites (2005) Inc. undertook testing with Underwriters Laboratories of phenolic RTRC products to both UL 2024 plenum and riser tests, and the ASTM E84 flame spread and smoke developed tests. As can be seen from the UL test data and reports, phenolic RTRC products, in a variety of trade sizes, were able to complete each of these testing programs with flame and smoke ratings significantly below the criteria established for products to be used in both plenum and riser applications.

The performance of these products, as demonstrated, is summarized as follows:

Test	Maximum Permitted Value	Maximum Test Value
Plenum (UL 2024) Flame	5.0 ft	2.0 ft
Plenum (UL 2024) Smoke Peak	0.50	0.10
Plenum (UL 2024) Smoke Avg.	0.15	0.02
Riser (UL 2024) Flame	12.0 ft	4.0 ft
Riser (UL 2024) Temperature	850.0˚F	371˚F
ASTM E84 Flame Spread Index (FSI)	25	5
ASTM E84 Smoke Developed Index (SDI)	50	0

Therefore, in consideration of the data generated by an independent, NRTL accredited test laboratory, and in conjunction with UL's stated position on this issue, these conduit products have conclusively demonstrated their ability to perform acceptably in both plenum and riser applications and I recommend their inclusion in 300.22 in accordance with revised Proposal 3-92. It should be noted that this proposal has been slightly modified from its original version in order to delete the FPN indicating suggested acceptance criteria for these products. The development of appropriate flame and smoke criteria, along with the product's listing requirements is best left to the determination of the listing organization.

Additionally, a reference to "phenolic" RTRC conduit has been added in order to limit this proposal to only that conduit type which was evaluated as part of the technical substantiation provided with this comment.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: This continues to be a proposal to be rejected based on Standards Council Decision 05-24 (SC #05-7-4). This decision relates to combustibles in plenums and would include cables in conduit as well as "plenum cables."

"1. Jurisdiction over combustibles in plenums. As the Council has indicated earlier in this decision, the Technical Committee on Air Conditioning, rather than the NEC Project, has, for many years, and should continue to have, primary jurisdiction for air distribution systems including the subject of combustibles, such as cables, in ducts, plenums and other air handling spaces (plenum spaces)."

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-69 Log #2155 NEC-P03 **Final Action: Accept**

(300.22)

Submitter: David H. Kendall, Carlon

Comment on Proposal No: 3-95

Recommendation: Proposal 3-95 should be "Accept" by Panel 3.

Substantiation: Panel 3 misused the Standards Council Decision 05-24 (SC#05-7-4) when rejecting Proposal 3-95. The Standards Council decision is a directive to Plenum-Cables and NFPA 90A. Proposal 3-95 addresses wiring methods that are installed inside metal raceways which are located within the plenum. Products that are installed inside a metal raceway are outside of the airflow of the plenum. NFPA 90A does not address wiring methods inside a metal raceway, this is the privy of Panel 3 and needs to be addressed by Panel 3.

Proposal 3-95 only indicates that it is acceptable to install other raceways inside metal conduits. Proposal 3-95 should be accepted by the Panel.

Panel Meeting Action: Accept

Panel Statement: This comment and proposal to add raceways installed inside metal raceways within other spaces used for environmental air is not encompassed by the Standards Council decision based on NFPA 90A.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-70 Log #828 NEC-P03 **Final Action: Reject**

(300.22(C) Exception)

Submitter: Neal Dorenkott, City of Eastlake / Rep. BOCONEO

Comment on Proposal No: 7-54

Recommendation: Delete the following text:

~~Exception: This section shall not apply to the joist or stud spaces of dwelling units where the wiring passes through such spaces perpendicular to the long dimension of such spaces.~~

Substantiation: Referring to Proposal 7-54 Log #553, the Panel Statement states: "Section 300.22 addresses wiring in ducts, plenums, and other air-handling spaces and, therefore, applies to all wiring methods. The reference in 334 is not needed." If the panel states it is unnecessary to repeat the requirement in 334.10, then they are agreeing with the issue that NM, NMC and NMS should not be allowed in air returns. Therefore the exception of 300.22(C) is not justified. The panel is allowing contradiction by allowing this exception. I encourage the panel to reconsider my proposal and/or delete the exception of 300.22(C), as it is allowing confusion in the interpretation of the code.

Panel Meeting Action: Reject

Panel Statement: The exception in 300.22(C) has been in the NEC for many years and applies where a joist or stud space is used in a dwelling unit as other spaces for environmental air. This exception permits wiring to pass through this space perpendicular to the long dimension of the space. Panel 7 simply stated that it was not necessary to repeat the requirement in 334.10.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-71 Log #829 NEC-P03 **Final Action: Reject**

(300.22(C) Exception)

Submitter: Neal Dorenkott, City of Eastlake / Rep. BOCONEO

Comment on Proposal No: 7-47

Recommendation: Delete the following text:

~~Exception: This section shall not apply to the joist or stud spaces of dwelling units where the wiring passes through such spaces perpendicular to the long dimension of such spaces.~~

Substantiation: Referring to Proposal 7-47 Log #552, the Panel Statement states: "The exception to 300.22(C) applies in general and it is unnecessary to repeat the requirement in 334.10." If the panel states it is unnecessary to repeat the requirement in 334.10, then they are agreeing with the issue that NM, NMC and NMS should not be allowed in air returns. Therefore the exception of 300.22(C) is not justified. The panel is allowing contradiction by allowing this exception. I encourage the panel to reconsider my proposal and/or delete the exception of 300.22(C), as it is allowing confusion in the interpretation of the code.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 3-70.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-72 Log #1439 NEC-P03 **Final Action: Reject**

(300.24)

Submitter: James O'Driscoll, IBEW Local #98

Comment on Proposal No: 3-100

Recommendation: I agree with P. Casparro's Explanation of Negative.

Substantiation: Cables of all energy levels should be kept off ceiling tiles. These cables laying on the ceiling grid and tiles inhibit the servicing and maintenance of all building systems.

Panel Meeting Action: Reject

Panel Statement: There has been no additional technical substantiation added by this comment to counter the panel statement in the proposal. The panel reaffirms its position as stated in its statement on Proposal 3-100. Additionally, Section 300.23 already covers panels designed to allow access.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-73 Log #1444 NEC-P03 **Final Action: Reject**
(300.24)

Submitter: Larry Cross, IBEW Local 98
Comment on Proposal No: 3-100
Recommendation: I agree with P. Casparro.
Substantiation: We continue to support keeping wires and cable of any energy level off of ceiling tiles.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 3-72.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-74 Log #1067 NEC-P03 **Final Action: Reject**
(300.31)

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 3-101
Recommendation: Revise text to read as follows:
"...~~physical~~ damage of the sort that tends to be readily visible...".
Substantiation: NEC users rely on standard dictionary definitions, augmented by the NEC's explicit definitions. The NEC Style Manual saying in "3.2.5.5 Provisions on Protection Against Physical Damage. If protection against physical damage is to be one of the requirements, this can be standardized by the use of this terminology" this does not benefit the ordinary user. The Style Manual is offering an option, not a requirement. I assumed the term was being used loosely to mean damage from blows, abrasion, pressure, or tension, but assumptions should not be necessary. An ideal I believe we share is to enforce the Code as written, not "You know what we mean." This CMP's statement indicates that they intended the long-term physical effects of chemicals and radiation, such as embrittlement, to be among types of damage excluded. Other CMPs use the term with somewhat different intentions, if one reads the Panel Statements in this ROP. Webster's definition does not clue us to this, nor does Article 100, nor does the beginning of this chapter. I would hope 110.3(A)(2)'s requirement of suitable "mechanical strength and durability" sufficed. If this additional statement is needed because that is too broad, let's say exactly what the CMP statement indicates is meant.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 3-34.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-75 Log #1200 NEC-P03 **Final Action: Accept**
(300.40)

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 3-5
Recommendation: The NEC TCC Grounding and Bonding Task Group recommends that CMP-3 consider the following alternative revised wording for Section 300.40:
300.40 Insulation Shielding. Metallic and semiconducting insulation shielding components of shielded cables shall be removed for a distance dependent on the circuit voltage and insulation. Stress reduction means shall be provided at all terminations of factory-applied shielding. Metallic shielding components such as tapes, wires, or braids, or combinations thereof~~, and their associated conducting or semiconducting components~~ shall be connected to a grounding conductor, grounding bus bar, or a grounding electrode ~~grounded~~ .
Substantiation: The NEC TCC Grounding and Bonding Task Group agrees with CMP-3 that for 300.40 the original proposed wording was not entirely correct in this case. However, the Task Group remains concerned that "connected to ground" does not adequately prescribe where this connection is to be made. Therefore, the Task Group has proposed new wording that more clearly identifies where the connection of the shielding can be made.
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
The following is the minority affirmative comment by one Task Group member during the Task
Group's results balloting:
"The term "grounding conductor" should be "grounding electrode conductor". The present definition for "grounding conductor" is vague and very similar to the definition of "grounding electrode conductor"."
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-76 Log #1068 NEC-P03 **Final Action: Reject**
(300.42)

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 3-103
Recommendation: Revise text to read as follows:
"...~~physical~~ damage of the sort that tends to be readily visible...".
Substantiation: NEC users rely on standard dictionary definitions, augmented by the NEC's explicit definitions. The NEC Style Manual saying in "3.2.5.5 Provisions on Protection Against Physical Damage. If protection against physical damage is to be one of the requirements, this can be standardized by the use of this terminology" this does not benefit the ordinary user. The Style Manual is offering an option, not a requirement. I assumed the term was being used loosely to mean damage from blows, abrasion, pressure, or tension, but assumptions should not be necessary. An ideal I believe we share is to enforce the Code as written, not "You know what we mean." This CMP's statement indicates that they intended the long-term physical effects of chemicals and radiation, such as embrittlement, to be among types of damage excluded. Other CMPs use the term with somewhat different intentions, if one reads the Panel Statements in this ROP. Webster's definition does not clue us to this, nor does Article 100, nor does the beginning of this chapter. I would hope 110.3(A)(2)'s requirement of suitable "mechanical strength and durability" sufficed. If this additional statement is needed because that is too broad, let's say exactly what the CMP statement indicates is meant.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 3-34.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-77 Log #1914 NEC-P03 **Final Action: Reject**
(Table 300.50)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 3-105
Recommendation: In the panel text, insert the words "or institutional" after "industrial".
Substantiation: The panel is on the right track, but this allowance has been in routine use at major institutional settings as well, and should continue. We just approved the use of this cover reduction at the Flaghship State University (under state rules that restored this provision). This campus has a staff of approximately 60 FTE licensed electricians and they are responsible for the campus 13.8 kV distribution as well as utilization voltages. The level of sophistication at that campus equals or exceeds that often seen at industrial facilities. The inspection community should not be routinely forced into providing special permission pursuant to 90.4 in facilities that are not "industrial" but have an equivalent level of control.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any technical substantiation to support expansion of this note to institutional establishments.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-78 Log #1375 NEC-P03 **Final Action: Accept in Principle**
(300.50(B))

Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 3-106
Recommendation: This Proposal should be Accepted as originally proposed.
300.50(B) Protection from Damage. Raceways installed on poles shall be of rigid metal conduit, intermediate metal conduit, ~~PVC~~ Schedule 80 rigid PVC conduit, or equivalent, extending from the minimum cover depth specified in Table 300.50 to a point 2.5 m (8 ft) above finished grade.
Substantiation: In accordance with CMP-8's actions on Proposals 8-53, Article 352 will now apply to "Rigid Polyvinyl Chloride Conduit: Type PVC". Therefore, it is necessary to revise the terminology used throughout the remainder of the NEC for consistency. As the only type of rigid nonmetallic conduit that is currently listed in Schedule 80 dimensions is rigid PVC conduit, the reference in 300.50(B) should be revised as noted above.
Panel Meeting Action: Accept in Principle
Revise 300.50(B) to read:
(B) Protection from Damage. Raceways installed on poles shall be of rigid metal conduit, intermediate metal conduit, Schedule 80 PVC conduit, or equivalent, extending from the minimum cover depth specified in Table 300.50 to a point 2.5 m (8 ft) above finished grade.
Panel Statement: Based on the action of Panel 8 on Proposal 8-53, it appears that revised Article 352 uses the acronym PVC, not rigid PVC, so the text was revised using PVC.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-79 Log #1069 NEC-P03 **Final Action: Reject**
(300.50(D))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 3-107
Recommendation: Revise text to read as follows:
"...~~physical~~ damage of the sort that tends to be readily visible...".
Substantiation: NEC users rely on standard dictionary definitions, augmented by the NEC's explicit definitions. The NEC Style Manual saying in "3.2.5.5 Provisions on Protection Against Physical Damage. If protection against physical damage is to be one of the requirements, this can be standardized by the use of this terminology" this does not benefit the ordinary user. The Style Manual is offering an option, not a requirement. I assumed the term was being used loosely to mean damage from blows, abrasion, pressure, or tension, but assumptions should not be necessary. An ideal I believe we share is to enforce the Code as written, not "You know what we mean." This CMP's statement indicates that they intended the long-term physical effects of chemicals and radiation, such as embrittlement, to be among types of damage excluded. Other CMPs use the term with somewhat different intentions, if one reads the Panel Statements in this ROP. Webster's definition does not clue us to this, nor does Article 100, nor does the beginning of this chapter. I would hope 110.3(A)(2)'s requirement of suitable "mechanical strength and durability" sufficed. If this additional statement is needed because that is too broad, let's say exactly what the CMP statement indicates is meant.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 3-34.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 310 — CONDUCTORS FOR GENERAL WIRING

6-1 Log #672 NEC-P06 **Final Action: Accept**
(310.4)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 6-7
Recommendation: I agree with the Panel Action to add a new paragraph to 310.13 except the word "multi-conductor" should be changed to "multiconductor".
Substantiation: This is an editorial correction for consistency. Multiconductor is not hyphenated. In the 2005 NEC, the word "multi-conductor" is only used in Articles 690 and 810 and Annex D. The word "multiconductor" is used in 31 Articles, Chapter 9, and Annex B. In the 2008 preprint, "multi-conductor" only appears 7 times whereas "multiconductor" appears 142 times.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-2 Log #673 NEC-P06 **Final Action: Accept in Principle in Part**
(310.4)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 6-7a
Recommendation: The Proposal should be Accepted in Principle.
Revise the second sentence in the first paragraph to read:
"Where parallel equipment grounding conductors are used with conductors in parallel, they shall be sized in accordance with 250.122."
Combine Exceptions No. 1 and No. 2 by moving the phrase "for frequencies of 360 Hz and higher" from Exception No. 2 into Exception No. 1 so Exception No. 1 will read as shown below (underlining added for Comment review only and is not to be included in the final text):
Exception No. 1: Conductors, other than equipment grounding conductors, in sizes smaller than 1/0 AWG shall be permitted to be run in parallel to supply control power to indicating instruments, contactors, relays, solenoids, and similar control devices, or for frequencies of 360 Hz and higher, provided all of the following apply:
(a) They are contained within the same raceway or cable.
(b) The ampacity of each individual conductor is sufficient to carry the entire load current shared by the parallel conductors.
(c) The overcurrent protection is such that the ampacity of each individual conductor will not be exceeded if one or more of the parallel conductors become inadvertently disconnected.
Delete Exception No. 2.
Renumber Exception No. 3 as Exception No. 2 and in the FPN, change Exception No. 3 to Exception No. 2.
Delete Exception No. 4.
In the FPN, at the end of the section, change "multi-conductor" to "multiconductor", delete the word "listed", and reword to read:
"See 310.13 for sectioned equipment grounding conductors in multiconductor cables."
Substantiation: The deletion of the words "with conductors in parallel" from the existing 2005 NEC changes the requirements without substantiation and would permit the use of parallel equipment grounding conductors when the phase, neutral, or grounded circuit conductors are not paralleled.
Since Exceptions No. 1 and No. 2 have identical requirements, the two Exceptions can be combined into Exception No. 1, Exception No. 2 can be deleted, and Exception No. 3 renumbered as Exception No. 2.
Exception No. 4 is not required since 90.3 states "Chapters 1, 2, 3, and 4 apply generally; Chapters 5, 6, and 7 apply to special occupancies, special equipment, or other special conditions. These latter chapters supplement or modify the general rules. Chapters 1 through 4 apply except as amended by Chapters 5, 6, and 7 for the particular conditions." 620.12(A)(1) modifies the general rule in 310.4 for traveling cables.
The substantiations for the modifications to the FPN at the end of the section are as follows:
(1) The change to "multiconductor" is an editorial correction for consistency. Multiconductor is not hyphenated. In the 2005 NEC, the word "multi-conductor" is only used in Articles 690 and 810 and Annex D. The word "multiconductor" is used in 31 Articles, Chapter 9, and Annex B. In the 2008 preprint, "multi-conductor" only appears 7 times whereas "multiconductor" appears 142 times.
(2) Deletion of the word "listed" is necessary since "listing" is not a requirement in most of the multiconductor cable Articles.
(3) FPN reworded in accordance with 4.1.2 of the NEC Style Manual.
Panel Meeting Action: Accept in Principle in Part
The comment is accepted in principle in part by the panel by modifying the panel action on Comment 6-3 as follows:
Revise Exception No. 1 to read "Exception No. 1: Conductors in sizes smaller than 1/0 AWG shall be permitted to be run in parallel to supply control power to indicating instruments, contactors, relays, solenoids, and similar control devices, or for frequencies of 360 Hz and higher, provided all of the following apply:"
Delete Exception No. 2.
Renumber "Exception No. 3" as "Exception No. 2" and change the reference in the FPN to "Exception No. 2"
In 310.4(E) FPN, delete the word "listed".
The panel does not accept the remainder of the Comment.
Panel Statement: The inclusion of these revisions in the panel action on Comment 6-3 further enhances the reorganization and clarity of the section.
The word "listed" was deleted from 310.4(E) FPN since not all multiconductor cables in Chapter 3 are required to be listed but, when paralleled, they still must comply with 250.122.
The text as contained in Comment 6-03 for 310.4(E) addresses the requirements.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-3 Log #1088 NEC-P06 **Final Action: Accept in Principle in Part**
(310.4)

TCC Action: The Technical Correlating Committee understands that the FPN immediately following 310.4(E) of the text recommended in Comment 6-3 is deleted and incorporated as a new second sentence in 310.4(E).
The Technical Correlating Committee further understands that the word "listed" is deleted from this new second sentence by the panel action on Comment 6-2.
Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 6-7a
Recommendation: Revise 310.4 of the ROP text to read as follows:
310.4 Conductors in Parallel.
(A) General. Aluminum, copper-clad aluminum, or copper conductors of size 1/0 AWG and larger, comprising each phase, polarity, neutral~~,~~ or grounded circuit conductor~~, or equipment grounding conductor~~ shall be permitted to be connected in parallel (electrically joined at both ends). ~~Where parallel equipment grounding conductors are used they shall be sized in accordance with 250.122.~~
Exception No. 1: Conductors~~, other than equipment grounding conductors~~, in sizes smaller than 1/0 AWG shall be permitted to be run in parallel to supply control power to indicating instruments, contactors, relays, solenoids, and similar control devices, provided all of the following apply:
(a) They are contained within the same raceway or cable.
(b) The ampacity of each individual conductor is sufficient to carry the entire load current shared by the parallel conductors.
(c) The overcurrent protection is such that the ampacity of each individual conductor will not be exceeded if one or more of the parallel conductors become inadvertently disconnected.
Exception No. 2: Conductors~~, other than equipment grounding conductors,~~ in sizes smaller than 1/0 AWG shall be permitted to be run in parallel for frequencies of 360 Hz and higher where conditions (a), (b), and (c) of Exception No. 1 are met.
Exception No. 3: Under engineering supervision, grounded neutral conductors in sizes 2 AWG and larger shall be permitted to be run in parallel for existing installations.
FPN: ~~Section~~ 310.4 Exception No. 3 can be used to alleviate overheating of neutral conductors in existing installations due to high content of triplen harmonic currents.
(B) Conductor Characteristics. The paralleled conductors in each phase, polarity, neutral, grounded circuit conductor, or equipment grounding conductor shall comply with all of the following:

(1) Be the same length
(2) Have the same conductor material
(3) Be the same size in circular mil area
(4) Have the same insulation type
(5) Be terminated in the same manner

(C) Separate Cables or Raceways. Where run in separate cables or raceways, the cables or raceways with conductors shall have the same number of conductors, and shall have the same electrical characteristics. Conductors of one phase, polarity, neutral, grounded circuit conductor, or equipment grounding conductor shall not be required to have the same physical characteristics as those of another phase, polarity, neutral, grounded circuit conductor, or equipment grounding conductor to achieve balance.

(D) Ampacity Adjustment. Conductors installed in parallel shall comply with the provisions of 310.15(B)(2)(a).

(E) Equipment Grounding Conductors. Where parallel equipment grounding conductors are used they shall be sized in accordance with 250.122. FPN: For sectioned equipment grounding conductors in listed multiconductor cables, see 310.13

~~Exception No. 1: Conductors, other than equipment grounding conductors, in sizes smaller than 1/0 AWG shall be permitted to be run in parallel to supply control power to indicating instruments, contactors, relays, solenoids, and similar control devices, provided all of the following apply:~~
~~(a) They are contained within the same raceway or cable.~~
~~(b) The ampacity of each individual conductor is sufficient to carry the entire load current shared by the parallel conductors.~~
~~(c) The overcurrent protection is such that the ampacity of each individual conductor will not be exceeded if one or more of the parallel conductors become inadvertently disconnected.~~
~~Exception No. 2: Conductors, other than equipment grounding conductors, in sizes smaller than 1/0 AWG shall be permitted to be run in parallel for frequencies of 360 Hz and higher where conditions (a), (b), and (c) of Exception No. 1 are met.~~
~~Exception No. 3: Under engineering supervision, grounded neutral conductors in sizes 2 AWG and larger shall be permitted to be run in parallel for existing installations.~~
~~FPN: Section 310.4 Exception No. 3 can be used to alleviate overheating of neutral conductors in existing installations due to high content of triplen harmonic currents.~~
~~Exception No. 4: As permitted in 620.12(A)(1).~~
~~The paralleled conductors in each phase, polarity, neutral, grounded circuit conductor, or equipment grounding conductor shall comply with all of the following:~~
~~(1) Be the same length~~
~~(2) Have the same conductor material~~
~~(3) Be the same size in circular mil area~~
~~(4) Have the same insulation type~~
~~(5) Be terminated in the same manner~~
~~Where run in separate cables or raceways, the cables or raceways with conductors shall have the same number of conductors, and shall have the same electrical characteristics. Conductors of one phase, polarity, neutral, grounded circuit conductor, or equipment grounding conductor shall not be required to have the same physical characteristics as those of another phase, polarity, neutral, grounded circuit conductor, or equipment grounding conductor to achieve balance.~~
~~Conductors installed in parallel shall comply with the provisions of 310.15(B)(2)(a).~~
~~FPN: For sectioned equipment grounding conductors in listed multiconductor cables, see 310.13~~

Substantiation: The panel was correct to begin a reorganization of 310.4 in Proposal 6-7a. This comment is to further enhance that rewrite by reorganizing the material into subsections with headings. This arrangement will also allow the exceptions to follow the appropriate part of the text they are taking exception to. The following is the specific substantiation for the revisions and arrangement:

1) The first paragraph is titled "general" since it contains the basic permission to allow parallel connections.

2) The words "equipment grounding conductor" have been deleted from this main paragraph. When the panel added equipment grounding conductors to the list of involved conductors, it created a direct conflict with the last sentence relative to the permitted sizing. Equipment grounding conductors have not been subjected to the 1/0 and larger provisions, but the revision in the ROP implies that they are subject to that limitation. The sentence dealing with equipment grounding conductor sizing has been given its own subsection and heading.

3) Exceptions 1, 2 and 3 have been relocated to follow this "general" paragraph. All three exceptions are taking exception to the 1/0 sizing provisions in some manner or another. This arrangement makes the exceptions more logical in their approach.

4) In exceptions 1 and 2, the words "other than equipment grounding conductors" have been deleted from the first sentence. These words are no longer needed since equipment grounding conductors are dealt with separately in paragraph (E). The main paragraph specifies the involved conductors and the exceptions would be limited to those conductors (unless further limited by the exception itself).

5) The existing text about the conductor characteristics is still in tact, but is now placed under its own subsection as item (B).

6) The existing paragraph about separate raceways or cables is still intact, but broken out into its own subsection (C).

7) The existing sentence about applying the ampacity adjustment factors is still in tact but given its own subsection (D).

8) The equipment grounding conductor sizing provisions has been moved to its own subsection (E). This also allows for placement of the FPN on sectioned conductors to be located directly below this paragraph.

9) The existing Exception #4 is deleted. Since the rule in 620 takes specific exception to the text in 310, and exception is not needed. In fact, the inclusion of the exception adds confusion because it implies that any item modified by Chapters 5, 6, or 7 needs an exception in the general chapters. The deletion of the exception is consistent with the TCC direction to avoid redundancy with the provisions of 90.3.

The requirements for 310.4 are not changed by this comment, but the material is provided in a much more user friendly manner and will make the rules easier to find and cite when needed.

Panel Meeting Action: Accept in Principle in Part

Delete the FPN immediately following (E) and add a second sentence to (E) to read: "Sectioned equipment grounding conductors smaller than 1/0 AWG shall be permitted in multiconductor cables in accordance with 310.13, provided the combined circular mil area in each cable complies with 250.122."

The panel accepts the remainder of the Comment.

Panel Statement: This action also addresses Comment 6-41 and locates the information in the FPN as positive text as recommended in the NEC Style Manual.

The panel action on Comment 6-02 modifies the action on this comment.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-4 Log #1885 NEC-P06 **Final Action: Accept in Principle (310.4)**

Submitter: Mike Holt, Mike Holt Enterprises, Inc.

Comment on Proposal No: 6-7a

Recommendation: Accept the proposal with the following changes:

310.4 Conductors in Parallel. Aluminum, cooper-clad aluminum, or copper conductors shall be permitted to be connected in parallel (electrically joined at both ends) in accordance with (A) through (E):

(A) Ungrounded and Grounded Conductors. Ungrounded and Grounded conductors shall comply with the following: Conductors shall

(1) be not smaller than 1/0 AWG

Exception No. 1 to (1): Conductors in sizes smaller than 1/0 AWG shall be permitted to be run in parallel to supply control power to indicating instruments), contactors, relays, solenoids, and similar control devices, provided all of the following apply:

(a) They are contained within the same raceway or cable.

(b) The ampacity of each individual conductor is sufficient to carry the entire load current shared by the parallel conductors.

(c) The overcurrent protection is such that the ampacity of each individual conductor will not be exceeded if one or more of the parallel conductors become inadvertently disconnected.

Exception No. 2 to (1): Conductors in sizes smaller than 1/0 AWG shall be permitted to be run in parallel for frequencies of 360 Hz and higher where conditions (a), (b), and (c) of Exception No. 1 are met:

Exception No. 3 to (1): Under engineering supervision, grounded conductors in sizes 2 AWG and larger shall be permitted to be run in parallel for existing installations.

FPN: Section 310.4 Exception No. 3 can be used to alleviate overheating of neutral conductors in existing installations due to high content of triplen harmonic currents.

Exception No. 4 to (1): As permitted in 620.12(A)(1).

(2) be the same length
(3) have the same conductor material
(4) be the same size in circular mil area
(5) have the same insulation type
(6) be terminated in the same manner

(B) Equipment Grounding Conductors. Equipment grounding conductors shall comply with 310.4(A)(2) through (A)(6) and shall be sized in accordance with 250.122(F).

(C) Raceways and Cables. Cables or raceways with conductors shall have the same number of conductors, and shall have the same electrical characteristics.

(D) Conductor sets. Conductors of one phase, polarity, neutral, or grounded circuit conductor, shall not be required to have the same physical characteristics as those of another phase, polarity, neutral, or grounded circuit conductor, to achieve balances.

(E) Ampacity adjustment. Conductors installed in parallel shall comply with the provisions of 310.15(B)(2)(a).

FPN: For sectioned equipment grounding conductors in listed multiconductor cables, see 310.13.

Substantiation: The existing text of the accepted proposal does not allow for equipment grounding conductors smaller than 1/0 AWG. In addition to this, a list format and subsections makes for a more user-friendly document.

Panel Meeting Action: Accept in Principle

See the panel action on Comments 6-2 and 6-3.

Panel Statement: See the panel actions and statement on Comments 6-2 and 6-3.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-5 Log #2258 NEC-P06 **Final Action: Reject**
(310.4)

Submitter: Donald A. Ganiere, Ottawa, IL

Comment on Proposal No: 6-8

Recommendation: This proposal should be accepted.

Substantiation: The panel rejected this proposal with the comment that the current wording complies with section 3.1.3 of the NEC Style Manual. Based on the online version of this document, I think the panel meant to say section 3.1.2. This section says that the use of the words “shall be permitted” are to be used to “indicate allowed optional or alternate methods.”

That would indicate that there must be some rule that says that conductors cannot be installed in parallel. I am not aware of any such rule. Using the current wording of “shall be permitted” in no way limits the use of smaller conductors installed in parallel. The rule should be changed to the wording in the proposal to provide a valid restriction on the use of conductors smaller than 1/0 in parallel.

Panel Meeting Action: Reject

Panel Statement: The submitter is correct that the NEC Style Manual reference in the panel statement on Proposal 6-8 should have been 3.1.2, Permissive Rules. The parenthetical sentence immediately following the referenced text states, “(Note that these are still mandatory language and constitute rules.)” Also, Item 4 under 3.3.1, Writing Style General Guidelines, in the NEC Style Manual states, “Use positive language, rather than negative, wherever possible.” Section 250.118 defines the types of equipment grounding conductors and uses the singular of “conductor” except in 250.118(10). Section 310.4 deals with conductors that are run in parallel. The language specifically allows conductors 1/0 or larger to be run in parallel, which means conductors smaller than 1/0 in general are not permitted to be run in parallel.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-6 Log #365 NEC-P06 **Final Action: Reject**
(310.6)

Submitter: James (Jim) Erwin, Celanese Ltd

Comment on Proposal No: 6-13

Recommendation: Accept Proposal 6-13.

Substantiation: Insufficient evidence exists to stop the use of UL listed and manufacturer approved non-shielded cable that is properly installed and properly terminated for 5 kV applications. The introduction of shielded cables with stress cone termination in confined spaces may introduce new safety concerns

Panel Meeting Action: Reject

Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

HUDDLESTON, JR., R.: The panel again chose to ignore the many years of solid evidence supporting the fact that with proper installation, non shielded cable may be used safely for 4160 volt applications. The Panel Statement sums it up: “The potential hazard that arises by using non shielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.” By making this statement, the Panel has effectively said that it does not matter whether the cable is installed in conduit or is metal-clad and installed by qualified persons - they believe it is unsafe regardless. What a statement! Where in the world is the technical substantiation for making such a statement? Where is the evidence that a conduit or MC cable installation is unsafe? There was none (other than anecdotal) during the 2005 Code cycle, and there was none presented during the 2008 Code cycle. I also find it curious that the Panel chose to allow the use of 5 kV non shielded cable for airfield lighting series circuits. The statement made by the panel : “hazard...exists in all locations in all conditions whether maintained by qualified or unqualified personnel” would lead one to believe they believe that this too would be an unsafe installation, yet the Panel agreed to allow this practice to continue. If the Panel truly believed their statement : ”hazard...exists in all locations in all conditions”, then surely they would not have granted this exception. Furthermore, this code requirement requires costly change-out of existing equipment or extensive field modification of listed equipment to allow shielded cable to be used in existing installations. Such replacement is neither warranted nor justified, yet the panel continues to ignore the comments of the user community and the safe installations that have been in place for many years.

MCCLUNG, L.: The Panel Statement in Comments: 6-10, 6-11, 6-12, 6-13, 6-14, 6-15, 6-16, 6-17, 6-18, 6-19, 6-20, 6-21, 6-22, 6-23, 6-24, 6-25, and 6-26; “The potential hazard that arises by using non-shielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit and metal-clad cable installations”; is erroneous, misleading and a distortion of the facts. In no way does it justify deletion of the usage of non-shielded 5 kV from the Code. 5 kV non-shielded cable used above 2.4 kV (i.e. 3.3 kV, 4.16 kV, etc.), properly specified with the correct insulation wall thicknesses and a non tracking type jacket with or without an overall metallic sheath or armor, properly installed and terminated by a qualified individual is equally as safe as medium voltage shielded cable.

As one of the “user” representatives IEEE needs to identify the necessity for major industrial/commercial entities to continue to have available the 5 kV non-shielded cables for wiring medium voltage motors and other medium voltage equipment where equipment manufacturer’s (NEMA members) traditionally have not included adequate space for shielded cable terminations. (NOTE: This usage applies to both installed and new equipment).

Rather than penalizing the user of this type cable, the Panel should work with the users to establish the necessary rules to assure proper application similar to that which the Technical Correlating Committee recommended for the 5000 volt non-shielded cable for airfield series lighting when installed in accordance with the FAA Advisory Circulars (ACs).

WALL, C.: See my statement on Comment 6-12.

Comment on Affirmative:

CLINE, S.: As hard and fairly as we tried, we were unable to close the distance between the two widely separated camps. It seems we still have overall people-resistant safety on one side, and the hope of practical risk-management on the other.

It seems possible to me that use within an overall metallic sheath, conduit or armor MAY be acceptable if evidentiary-level substantiation of the equivalent safety performance, when compared to shielded construction, is presented.

Very surprisingly to me, there was no suggestion to accept like-kind cable replacement for existing installations of high-level installations.

ZIMNOCH, J.: The original purpose for applying shields to medium voltage cables, discovered in the late 1800’s, was to “connect the sufficient number of points on the insulation surface for the purpose of equalizing the potential differences.” Thus, the shield provides a zero-potential on the external surface of the insulation.

In the case of a non-shielded cable operating at voltages above 2.4 kV, the greater the air gap from the insulation surface to ground, the greater the potential on the surface of the cable which creates a substantial safety and reliability concern.

ICEA had always recommended the use of a shield for voltages rated above 2kV for the reasons above. It was the introduction of the “Exception” in the 1975 code that permitted use of non-shielded cable to voltages as high as 8 kV. In 1975 the scientific laws had not changed, only the rules guiding its use had.

To date, regardless of the type of insulation or thickness used, both the cable and terminations will retain a standing voltage and discharge when operated above 2.4 kV. The use of metallic conduit, sheaths or track resistant tubing’s over the ends will not stop this.

I have spoken to many trained medium voltage splicers/electricians that agreed that limiting the use of non-shielded cable to 2.4 kV operation was a step in the right direction for theirs and others safety.

6-7 Log #572 NEC-P06 **Final Action: Reject**
(310.6)

Submitter: William M. Lewis, Martinsville, IN

Comment on Proposal No: 6-13

Recommendation: The proposal should have been Accepted and expanded to include the installation of non-shielded 4160 volt cable in metallic conduit.

Substantiation: All of the negative comments are correct.

Also, the proposal addresses the perceived safety issues in the positive comments. Regarding Mr. Laider’s comment: Shielded cable is not shielded at the termination. My experience is that shielded cable experiences higher failure rates at the terminations than nonshielded at 4160 volts.

Regarding Mr. Zimnoch’s comments: The proposed metallic overall enclosure, while not addressing the technical issue of insulation degradation, would have the same result as individual shielding as regards to safety.

Two points regarding the panel statement:

1. the panel made the change in the 2005 code without technical substantiation.

2. the extensive testing and listing by UL provides adequate technical substantiation.

I am submitting a comment only on this one proposal to reduce the panel's workload, even though all the proposals from 6-14 through 6-25 need reconsideration:

Panel Meeting Action: Reject

Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations. The panel disagrees with the statement that technical substantiation was lacking in the previous code cycle.

See panel action and statement on Proposal 6-13.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.

MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.

WALL, C.: See my statement on Comment 6-12.

Comment on Affirmative:

CLINE, S.: See my affirmative comment on Comment 6-6.

ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-8 Log #674 NEC-P06 **Final Action: Accept**
(310.6)

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 6-16

Recommendation: I support the Panel Action to Reject the Proposal.

Substantiation: UL is developing UL Standard 2460 that will address the submitter's request for use of nonshielded conductors up to 5000 volts when part of an assembly. The Scope of the proposed standard is shown below for information.

1 Scope.

1.1 These requirements cover single-conductor, nonshielded cables rated 5000 volts, 90°C dry only.

1.2 The cables covered by these requirements are intended solely for use as factory-installed wiring in equipment (internal wiring).

1.3 These requirements do not cover cables that are intended for direct installation in buildings or structures in accordance with the National Electrical Code (NEC), NFPA 70.

1.4 The final acceptance of these cables is dependent upon their use in complete equipment that conforms with the standards applicable to such equipment.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.

MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.

WALL, C.: See my statement on Comment 6-12.

Comment on Affirmative:

CLINE, S.: See my affirmative comment on Comment 6-6.

6-9 Log #1235 NEC-P06 **Final Action: Accept in Principle**
(310.6)

TCC Action: The Technical Correlating Committee directs that the panel action on this comment be reported as "Accept in Principle" according to the panel action on Comment 5-6 on Proposal 5-18 and the term "grounding conductor" is changed to "grounding electrode conductor".

Submitter: Neil F. LaBrake, Jr., Syracuse, NY

Comment on Proposal No: 6-4

Recommendation: Revise 310.6 as follows:

Solid dielectric insulated conductors operated above 2000 volts in permanent installations shall have ozone-resistant insulation and shall be shielded. All metallic insulation shields shall be connected to a grounding conductor, grounding busbar, or a grounding electrode ~~be grounded through an effective grounding path meeting the requirements of 250.4(A)(5) or 250.4(B)(4)~~. Shielding shall be for the purpose of confining the voltage stresses to the insulation.

Substantiation: The revised wording proposed in this comment attempts to address the concerns expressed by the Panel in their rejection of this part. The existing language is vague and does not describe how the grounding of the cable shield is to be done. The Bonding and Grounding Task Group concluded that it is necessary to replace vague references to "shall be grounded" with more prescriptive requirements. If the proposed wording does not meet the intent of this section, the Task Group encourages the Panel to develop alternative wording that provides a prescriptive requirement.

Note: the term "grounding conductor" will have to be replaced with "grounding electrode conductor" if Proposal 5-18 continues to be accepted.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr. The following is the minority affirmative comment by one Task Group member during the Task Group's results balloting:

"The term "grounding conductor" should be "grounding electrode conductor". The present definition for "grounding conductor" is vague and very similar to the definition of "grounding electrode conductor"."

Panel Meeting Action: Accept

Panel Statement: If Proposal 5-18 continues to be accepted, this comment is accepted in principle and "grounding conductor" is changed to "grounding electrode conductor."

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-10 Log #1891 NEC-P06 **Final Action: Reject**
(310.6)

Submitter: Paul S. Hamer, Chevron Energy Technology Company

Comment on Proposal No: 6-13

Recommendation: Proposal 6-13, as modified in Mr. McClung's Explanation of Negative, should be accepted.

Substantiation: When conductors are enclosed in an overall metallic sheath or armor that is grounded, there is no shock hazard since the conductor's electric field is confined to within the metallic sheath or armor. In fact, the same is true for unshielded cables installed in metallic conduit. The Panel Statement for rejection of this Proposal is incorrect.

Panel Meeting Action: Reject

Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.

MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.

WALL, C.: See my statement on Comment 6-12.

Comment on Affirmative:

CLINE, S.: See my affirmative comment on Comment 6-6.

ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-11 Log #1892 NEC-P06 **Final Action: Reject**
(310.6)

Submitter: Paul S. Hamer, Chevron Energy Technology Company

Comment on Proposal No: 6-17

Recommendation: Proposal 6-17 should be accepted.

Substantiation: When conductors are enclosed in an overall metallic sheath, armor, or conduit, there is no shock hazard since the conductor's electric field is confined to within the metallic sheath, armor, or conduit. Also, see the Explanation of Negative comments for this Proposal. The Panel Statement for rejection of this Proposal (by referring back to the 2005 Code cycle) does not respect the NFPA Regulations Governing Committee Projects 4-3.5.1, which states "...Such statement shall be sufficiently detailed so as to convey the TC's rationale for its action so that rebuttal may, if desired, be submitted during the Comment period...". The Panel must provide reasonable rationale if the Panel Action on the original Proposal is other than "accept." It has not fulfilled this obligation in the ROP.

Panel Meeting Action: Reject

Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.

MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.

WALL, C.: See my statement on Comment 6-12.

Comment on Affirmative:

CLINE, S.: See my affirmative comment on Comment 6-6.

ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-12 Log #1155 NEC-P06 **Final Action: Reject**
(310.6 Exception)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group

Comment on Proposal No: 6-14

Recommendation: Proposal 6-14 should be accepted-in-principle.

Substantiation: See companion EEI submitted comments on Proposals 6-15 and 6-19.
Panel Meeting Action: Reject
Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: Listed products installed per their listing are safe; however, the panel statement clearly shows that the majority of the panel does not believe this. The panel has implicated the entire system of ensuring that hazards do not exist. They have clearly stated that nonshielded cables give rise to a hazard that proper installation using listed products cannot eliminate. The hazard that they allude to is only a hazard to an electrician that removes a cover from a termination enclosure while the cables are energized. Improperly trained electricians incorrectly believe they should be able to touch the outer surface of energized nonshielded cables operating above 2.4 kV and not receive a shock. If an electrician touches the outer surface of an energized nonshielded or shielded conductor in a medium voltage termination chamber he has violated several safe work practice rules. Statements made by panel members during the meeting indicated that they believe they can protect workers from unsafe work practices by requiring shielded cables. They are incorrect on this. Contact with a terminator installed on a shielded cable can cause a shock just as contacting a nonshielded cable since charges exist on the outer surface of a terminator installed on shielded cables just as charges exist on the outer surface of nonshielded cables.
A panel member stated that today's maintenance personnel and electricians are not as well trained as in past times. He is incorrect. With today's emphasis on safe work practices, today's electrical workers are safer than they have ever been. I have confidence in the ability of IBEW and contractors to properly train their personnel. When electricians observe NFPA 70E and OSHA work rules, then the hazards alluded to by panel members will be eliminated.
Additionally, the panel ignored the concern expressed by at least two panel members over how to replace nonshielded cables with shielded cables in existing installations without violating the listing of the motors and controllers. Motors operating at voltages above 2.4 kV are expensive. The termination enclosures of many existing motors and controllers do not have adequate space for terminating shielded cables. Modifying the enclosure is not an option. Replacing a motor with one that has a larger enclosure is the only other option, but is unnecessarily expensive; however, when this was brought out during panel discussions it was quickly dismissed. A number of panel members opposing the use of shielded cables (above 2.4 kV) were willing to compromise so that nonshielded cables would only be used on existing installations; however, most on the panel were opposed to a compromise position. It was obvious that some of the panel had their minds made up and were not going to consider the facts.
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-13 Log #1156 NEC-P06 **Final Action: Reject**
(310.6 Exception)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 6-15
Recommendation: Accept-in-principle Proposal 6-15 with the following revised text.
310.6 Exception No. 2 (New): Where the conditions of maintenance and supervision ensure that only qualified persons service the installation, nonshielded insulated conductors shall be permitted for use up to 5000 volts.
Substantiation: In addition to the lack of consideration that Code-Making Panel 6 gave to the fact that nonshielded cables have been used safely for decades, they did not consider that many existing installations include motors with terminal housings that do not have adequate space for terminating shielded cables, either for the added length of the terminator, the increased minimum bending radius of shielded cable, nor the termination and connection of the metallic shield or neutral. It is a fact that the termination boxes on large motors would have to be modified to accept shielded cable under the 2005 NEC present 310.6, which is both time consuming and impractical.
The Edison Electric Institute supports efforts to bring this change about. We prefer to have the exception worded to not limit the use of nonshielded cable to industrial customers, nor to limit the installation to metallic conduits. It may be more acceptable to CMP-6 to allow use up to 5,000 volts rather than 8,000 volts as 4.16kV and 4.8kV applications are more prevalent.
Refer to EEI's companion comment on Proposal 6-19.
Panel Meeting Action: Reject
Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-12.
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-14 Log #1161 NEC-P06 **Final Action: Reject**
(310.6 Exception)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 6-16
Recommendation: Proposal 6-16 should be accepted-in-principle.
Substantiation: See companion EEI submitted comments on Proposals 6-15 and 6-19.
Panel Meeting Action: Reject
Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-12.
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-15 Log #1162 NEC-P06 **Final Action: Reject**
(310.6 Exception)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 6-17
Recommendation: Proposal 6-17 should be accepted-in-principle.
Substantiation: See companion EEI submitted comments on Proposals 6-15 and 6-19.
Panel Meeting Action: Reject
Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-12.
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-16 Log #1814 NEC-P06 **Final Action: Reject**
(310.6 Exception)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 6-13
Recommendation: Proposal 6-13 should have been accepted as submitted.
Renumber present Exception as Exception No. 1: and add Exception No. 2: "Nonshielded multiconductor cables rated 2001 - 5000 volts listed by a qualified testing laboratory shall be permitted for use up to 5000 volts if the cable has an overall metallic shield or armor. The metallic sheath or armor shall be grounded through an effective grounding path meeting the requirements of 250.4(A)(5) or 250.4(B)(4).
FPN: see 300.3(C)(2) for installation requirements for conductors rated over 600 volts."

Substantiation: Insufficient evidence was presented to the panel to ban the use of nonshielded cable for 4160 volt applications during the 2005 cycle, especially when installed as armored cable as this proposal specified. Code Panel members should seriously consider the effects on those in industry who are faced with situations where they have existing medium voltage installations where terminations are not stress-coned and non-shielded cable has been used successfully. If changes or modifications to these installations must be made, older existing equipment will not generally allow enough space to terminate shielded cable.
Panel Meeting Action: Reject
Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-12.
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-17 Log #1815 NEC-P06 **Final Action: Reject**
(310.6 Exception)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 6-14
Recommendation: Proposal 6-14 should have been accepted as submitted.
Change Exception 1 to read " Nonshielded insulated conductors listed by a qualified testing laboratory shall b permitted for use up to 5000 volts under the following conditions…".
Substantiation: Insufficient evidence was presented to the panel to ban the use of nonshielded cable for 4160 volt applications. There are literally hundreds of documented examples of safe nonshielded cable installations that have been in place for many years, with no problems whatsoever. The panel, in rejecting this proposal, refused to acknowledge the hardships that banning nonshielded cable for 4160 volt applications imposes on users of existing equipment, such as retrofitting larger junction boxes on motors and switchgear in order to allow adequate room to install stress cones (and voiding UL listing by modifying the equipment).
Panel Meeting Action: Reject
Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-12.
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-18 Log #1816 NEC-P06 **Final Action: Reject**
(310.6 Exception)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 6-15
Recommendation: Proposal 6-15 should have been accepted as submitted.
Change 2400 volts to 5000 volts in Exception: "Nonshielded insulated conductors listed by a qualified testing laboratory shall be permitted for use up to 5000 volts under the following conditions…".
Substantiation: Insufficient evidence was presented to the panel to ban the use of nonshielded cable for 4160 volt applications. There are literally hundreds of documented examples of safe nonshielded cable installations that have been in place for many years, with no problems whatsoever. The panel, in rejecting this proposal, refused to acknowledge the hardships that banning nonshielded cable for 4160 volt applications imposes on existing users of equipment, such as retrofitting larger junction boxes on motors and switchgear in order to allow adequate room to install stress cones (and voiding UL listing by modifying the equipment).
Panel Meeting Action: Reject
Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-12.
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-19 Log #1817 NEC-P06 **Final Action: Reject**
(310.6 Exception)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 6-17
Recommendation: Proposal 6-17 should have been accepted as submitted.
Change 2400 volts to 5000 volts in Exception: "Nonshielded insulated conductors listed by a qualified testing laboratory shall be permitted for use up to 5000 volts under the following conditions…".
Substantiation: Insufficient evidence was presented to the panel to ban the use of nonshielded cable for 4160 volt applications. There are literally hundreds of documented examples of safe nonshielded cable installations that have been in place for many years, with no problems whatsoever. The panel, in rejecting this proposal, refused to acknowledge the hardships that banning nonshielded cable for 4160 volt applications imposes on users of existing equipment, such as retrofitting larger junction boxes on motors and switchgear in order to allow adequate room to install stress cones (and voiding UL listing by modifying the equipment).
Panel Meeting Action: Reject
Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-12.
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-20 Log #1153 NEC-P06 **Final Action: Reject**
(310.6 Exception No. 2 (New))

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 6-13
Recommendation: Proposal 6-13 should be accepted-in-principle.
Substantiation: See companion EEI submitted comments on Proposals 6-15 and 6-19.
Panel Meeting Action: Reject
Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-12.
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-21 Log #1163 NEC-P06 **Final Action: Reject**
(310.6 Exception No. 2 (New))

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 6-18
Recommendation: Proposal 6-18 should be accepted-in-principle.
Substantiation: See companion EEI submitted comments on Proposals 6-15 and 6-19.

Panel Meeting Action: Reject
Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-12.
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-22 Log #1164 NEC-P06 **Final Action: Reject**
(310.6 Exception No. 2 (New))

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 6-19
Recommendation: Accept-in-principle Proposal 6-19 with the following revised text.
310.6 Exception No. 2 (New): Where the conditions of maintenance and supervision ensure that only qualified persons service the installation, nonshielded insulated conductors shall be permitted for use up to 5000 volts.
Substantiation: In addition to the lack of consideration that Code-Making Panel 6 gave to the fact that nonshielded cables have been used safely for decades, they did not consider that many existing installations include motors with terminal housings that do not have adequate space for terminating shielded cables, either for the added length of the terminator, the increased minimum bending radius of shielded cable, nor the termination and connection of the metallic shield or neutral. It is a fact that the termination boxes on large motors would have to be modified to accept shielded cable under the 2005 NEC present 310.6, which is both time consuming and impractical.
The Edison Electric Institute supports efforts to bring this change about. We prefer to have the exception worded to not limit the use of nonshielded cable to industrial customers, nor to limit the installation to metallic conduits. It may be more acceptable to CMP-6 to allow use up to 5,000 volts rather than 8,000 volts as 4.16kV and 4.8kV applications are more prevalent.
Refer to EEI's companion comment on Proposal 6-15.
Panel Meeting Action: Reject
Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-12.
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-23 Log #1165 NEC-P06 **Final Action: Reject**
(310.6 Exception No. 2 (New))

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 6-20
Recommendation: Proposal 6-20 should be accepted-in-principle.
Substantiation: See companion EEI submitted comments on Proposals 6-15 and 6-19.
Panel Meeting Action: Reject
Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-12.
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-24 Log #1818 NEC-P06 **Final Action: Reject**
(310.6 Exception No. 2 (New))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 6-18
Recommendation: Proposal 6-18 should have been accepted as described below (FPN altered from original proposal).
Renumber present Exception as Exception No. 1: and add Exception No. 2: "Nonshielded multiconductor cables rated 2001 - 5000 volts listed by a qualified testing laboratory shall be permitted for use up to 5000 volts if the cable has an overall metallic shield or armor. The metallic sheath or armor shall be grounded through an effective grounding path meeting the requirements of 250.4(A)(5) or 250.4(B)(4).
FPN: see 300.3(C)(2) for installation requirements for conductors rated over 600 volts."
Substantiation: Insufficient evidence was presented to the panel to ban the use of nonshielded cable for 4160 volt applications, especially when installed as armored cable as this proposal specified.
Panel Meeting Action: Reject
Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.

Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-12.
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-25 Log #1819 NEC-P06 **Final Action: Reject**
(310.6 Exception No. 2 (New))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 6-19
Recommendation: Proposal 6-19 should have been accepted in principle as amended during panel discussions - replacing 8000 volts (8 kV) by 5000 volts (5 kV) in the proposal text.
"Exception No. 2: In industrial establishments where the conditions or maintenance and supervision ensure that only qualified persons service the installation, nonshielded insulated conductors shall be permitted for use up to 5000 volts when installed in a metal raceway such as rigid metal conduit."
Substantiation: Insufficient evidence was presented to the panel to ban the use of nonshielded cable for 4160 volt applications. Rejecting the proposal on a safety basis ignores the fact that conduit installations are undoubtedly a safe way to install nonshielded cable. Panel members who supported rejecting this proposal are apparently unaware that grounded /bonded conduit systems provide a safe, secure means of protecting the cable from any corona damage, and as long as proper installation techniques are used when terminating the cable, a safe, proper installation will result. Of course, if improper techniques are used to install and terminate shielded cable, an unsafe installation results - the same as with a nonshielded cable installation.
Panel Meeting Action: Reject
Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-12.
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-26 Log #1893 NEC-P06 **Final Action: Reject**
(310.6 Exception No. 2 (New))

Submitter: Paul S. Hamer, Chevron Energy Technology Company
Comment on Proposal No: 6-19
Recommendation: Proposal 6-19 should have been "accepted in principle," reducing "8000 volts" to "5000 volts."

Substantiation: When conductors are enclosed in an overall metallic sheath, armor, or conduit, there is no shock hazard since the conductor's electric field is confined to within the metallic sheath, armor, or conduit. Also, see the Explanation of Negative comments for this Proposal. The Panel Statement for rejection of this Proposal (by referring back to the 2005 Code cycle) does not respect the NFPA Regulations Governing Committee Projects 4-3.5.1, which states "...Such statement shall be sufficiently detailed so as to convey the TC's rationale for its action so that rebuttal may, if desired, be submitted during the Comment period...". The Panel must provide reasonable rationale if the Panel Action on the original Proposal is other than "accept." It has not fulfilled this obligation in the ROP.

Panel Meeting Action: Reject

Panel Statement: The potential hazard that arises by using nonshielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit installations and metal-clad cable installations.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.

MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.

WALL, C.: See my statement on Comment 6-12.

Comment on Affirmative:

CLINE, S.: See my affirmative comment on Comment 6-6.

LAIDLER, W.: See my comment on affirmative vote on Comment 6-36.

ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-27 Log #35 NEC-P06 **Final Action: Accept**
(310.6 Exception No. 3 (New))

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 6-21

Recommendation: The Technical Correlating Committee directs that the panel reconsider the proposal and act on its merits since the application discussed is not exempt under 90.2(B). This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Add a new Exception No. 2 as follows:

Exception No. 2: Where permitted in 310.7 Exception No. 2.

Panel Statement: See panel the action and statement on Comment 6-36.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

WALL, C.: Acceptance of this comment allows nonshielded cables up to 5000 volts in conduit installations. By accepting this comment the panel is admitting that nonshielded cables can be operated and worked safely up to 5000 volts. This is contrary to their panel statement for comment 6-12 where they stated that there were hazards that arose for such cables in all locations and under all conditions.

6-28 Log #675 NEC-P06 **Final Action: Accept**
(310.7)

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 6-23

Recommendation: The Proposal should have been Accepted and the original Panel Action to Accept was correct and should be reinstated.

Substantiation: I agree with the Affirmative Comments to Accept the Proposal; they are all correct and factual.

During the discussion and Panel Action on Proposal 6-49 for the 2005 NEC, there was never any discussion by the panel regarding the 310.7 Exception. There was no discussion regarding leaving it in the Code nor revising or removing it; it was totally overlooked.

The Panel should Accept Proposal 6-23 and revise the Exception from 5000 volts to 2400 volts.

Failure to correct the Exception will continue to perpetuate a conflict within the Code between 310.6, 328.10, Table 310.63 and the 310.7 Exception.

Even if the nonshielded conductors are installed in a raceway, or a metallic sheathed or armored cable, the conductors must still be separated out individually for terminations and the workers will still be exposed to the safety issues at the terminations, particularly when working on adjacent circuits while the nonshielded conductors are energized.

Table 310.63 was revised in the 2005 NEC to limit nonshielded insulated conductors to 2400 V. UL Standard 1072 was subsequently revised to require shielding in cables rated higher than 2400 volts so a cable manufacturer can no longer obtain a UL Listing for nonshielded conductors or cables rated above 2400 V. Listed nonshielded conductors rated above 2400 V are no longer available for use in metallic sheathed or armored cables nor for use in raceways.

UL Standard 2460 is being developed to provide for the use of nonshielded single conductors rated up to 5000 volts for use as factory installed wiring in equipment (internal wiring). This standard will not "cover cables that are intended for direct installation in buildings or structures in accordance with the National Electrical Code (NEC), NFPA 70."

Panel Meeting Action: Accept

Panel Statement: The panel does not agree with all the substantiation of the comment and acknowledges that workers should be working under the provision of NFPA 70E.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.

MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.

WALL, C.: The panel is disregarding the fact that the cables allowed by the exception are listed for the application and do not create an unsafe installation. The hazard that the panel wants to eliminate is the danger associated with working on live terminations. This hazard is addressed by the work procedures dictated by NFPA 70E and OSHA, not the NEC. Requiring shielded cables does not make the installation safer. Also see my statement on Comment 6-12.

Comment on Affirmative:

CLINE, S.: See my affirmative comment on Comment 6-6.

6-29 Log #1167 NEC-P06 **Final Action: Reject**
(310.7)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group

Comment on Proposal No: 6-22

Recommendation: Accept-in-principle Proposal 6-22 by changing the proposed text "rated 2001-5000 volts listed by a qualified testing laboratory" to "rated and listed for 2001-5000 volts" and moving FPN No. 1 as shown in the following revised text of 310.7.

310.7 Direct Burial Conductors. Conductors used for direct burial applications shall be of a type identified for such use.

FPN No. 1: See 300.5 for installation requirements for conductors rated 600 volts or less.

Cables rated above 2000 volts shall be shielded.

Exception: Nonshielded multiconductor cables rated and listed for 2001-5000 volts shall be permitted for use up to 5000 volts if the cable has an overall metallic sheath or armor.

The metallic shield, sheath, or armor shall be grounded through an effective grounding path meeting the requirements of 250.4(A)(5) or (B)(4).

~~FPN No. 1: See 300.5 for installation requirements for conductors rated 600 volts or less.~~

FPN No. 2: See 300.50 for installation requirements for conductors rated over 600 volts.

Substantiation: The Edison Electric Institute supports the Proposal Submitter's substantiation and the negative ballot comment by Mr. McClung. In addition, nonshielded cables have been used safely for decades especially where 4.16kV and 4.8kV applications are more prevalent.

The suggested revised text in this comment addresses Code-Making Panel No. 6's concern for meeting the NEC Style Manual regarding the use of the word "listed" and FPN No. 1 is technically associated with the first paragraph of 310.7.

Panel Meeting Action: Reject

Panel Statement: Limiting the voltage to 2.4 kV in the exception to 310.7 for nonshielded multiconductor cable was inadvertently overlooked during the 2005 Code cycle. The safety concerns of using nonshielded cable are the same for underground installations as for those aboveground.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.

MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.

WALL, C.: See my statement on Comment 6-28

Comment on Affirmative:

CLINE, S.: See my affirmative comment on Comment 6-6.

ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-30 Log #1169 NEC-P06 **Final Action: Reject**
(310.7)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group

Comment on Proposal No: 6-24

Recommendation: Reject this Proposal.

Substantiation: See companion EEI submitted comments on Proposals 6-15, 6-19, and 6-22.

Panel Meeting Action: Reject
Panel Statement: Limiting the voltage to 2.4 kv in the exception to 310.7 for nonshielded multiconductor cable was inadvertently overlooked during the 2005 Code cycle. The safety concerns of using nonshielded cable are the same for underground installations as those above ground.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-28
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-31 Log #36 NEC-P06 **Final Action: Accept**
(310.7 Exception)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 6-23
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative. It was the additional action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting concerning a conflict within Chapter 3. This action will be considered by the Panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The proposal should have been accepted, and the original panel action to accept was correct and should be reinstated.
In 310.7 Exception, change 5000 to 2400.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-28
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.

6-32 Log #37 NEC-P06 **Final Action: Accept**
(310.7 Exception)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 6-24
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative. It was the additional action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting concerning a conflict within Chapter 3. This action will be considered by the Panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The proposal should have been accepted and the original panel action to accept was correct and should be reinstated.
In 310.7 Exception, change 5000 to 2400.
Panel Statement: See the panel action and statement on Comment 6-31.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-28
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.

6-33 Log #1168 NEC-P06 **Final Action: Reject**
(310.7 Exception)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 6-23
Recommendation: Continue to reject this proposal.
Substantiation: See companion EEI submitted comments on Proposals 6-15, 6-19, and 6-22.
Panel Meeting Action: Reject
Panel Statement: Limiting the voltage to 2.4 kV in the exception to 310.7 for nonshielded multiconductor cable was inadvertently overlooked during the 2005 Code cycle. The safety concerns of using nonshielded cable are the same for underground installations as for those aboveground.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-28
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-34 Log #1236 NEC-P06 **Final Action: Accept in Principle**
(310.7 Exception)

TCC Action: The Technical Correlating Committee directs that the panel action on this comment be reported as "Accept in Principle" according to the panel action on Comment 5-6 on Proposal 5-18 and the term "grounding conductor" is changed to "grounding electrode conductor." The Technical Correlating Committee understands that the revision indicated in Comment 6-34 is to the second paragraph of 310.7, not to the Exception.
Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 6-4
Recommendation: Revise 310.7 Exception as follows:
The metallic shield, sheath, or armor shall be connected to a grounding conductor, grounding busbar, or a grounding electrode ~~grounded through an effective grounding path meeting the requirements of 250.4(A)(5) or (B)(4).~~
Substantiation: The revised wording proposed in this comment attempts to address the concerns expressed by the Panel in their rejection of this part. The existing language is vague and does not describe how the grounding of the cable shield is to be done. The Bonding and Grounding Task Group concluded that it is necessary to replace vague references to "shall be grounded" with more prescriptive requirements. If the proposed wording does not meet the intent of this section, the Task Group encourages the Panel to develop alternative wording that provides a prescriptive requirement.
Note: the term "grounding conductor" will have to be replaced with "grounding electrode conductor" if Proposal 5-18 continues to be accepted.
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr. The following is the minority affirmative comment by one Task Group member during the Task Group's results balloting:
"The term "grounding conductor" should be "grounding electrode conductor". The present definition for "grounding conductor" is vague and very similar to the definition of "grounding electrode conductor"."
Panel Meeting Action: Accept
Panel Statement: If proposal 5-18 continues to be accepted, then this comment is accepted in principle and "grounding conductor" is changed to "grounding electrode conductor."
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-35 Log #1820 NEC-P06 **Final Action: Reject**
(310.7 Exception)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 6-24
Recommendation: Proposal 6-24 should have been rejected.
Substantiation: Insufficient evidence was presented to the panel to ban the use of nonshielded cable for 4160 volt applications.
Panel Meeting Action: Reject
Panel Statement: Limiting the voltage to 2.4 kV in the exception to 310.7 for nonshielded multiconductor cable was inadvertently overlooked during the 2005 Code cycle. The safety concerns of using nonshielded cable are the same for underground installations as for those aboveground.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-6.
WALL, C.: See my statement on Comment 6-28
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-36 Log #38 NEC-P06 **Final Action: Accept**
(310.7 Exception No. 2 (New))

TCC Action: The Technical Correlating Committee directs that the text in the comment be rewritten to comply with 4.2 in the NEC Style Manual to read as follows:
"Exception No 2: Airfield lighting cable used in series circuits that are rated up to 5000 volts and are powered by regulators shall be permitted to be nonshielded.
FPN: Federal Aviation Administration (FAA) Advisory Circulars (ACs) provide additional practices and methods for airport lighting."
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 6-25
Recommendation: The Technical Correlating Committee directs that the panel reconsider the proposal and act on its merits since the application discussed is not exempt under 90.2(B). This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise text in Proposal 6-25 to read:
Exception No 2: Airfield lighting cable used in series circuits that are rated up to 5000 volts and are powered by regulators shall be permitted to be nonshielded, provided the practices and methods used in airfield lighting are based on Federal Aviation Administration (FAA) Advisory Circulars (ACs).
Panel Statement: The panel concluded that the safety concerns for airfield lighting circuits justify the use of nonshielded cable as proposed.
See the panel action on Comment 6-27.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
LAIDLER, W.: I am voting to accept this comment. However, it is my opinion that for safety reasons shielded cable should be used on voltages that exceed 2.4kv in all locations and under all conditions. This being said, because of safety concerns brought up during the panel's discussion, relative to the uniqueness of airfield lighting installations, this exception is warranted.
WALL, C.: By accepting this comment the panel is admitting that nonshielded cables can be operated and worked safely up to 5000 volts. This is contrary to their panel statement for comment 6-12 where they stated that there were hazards that arose for such cables in all locations and under all conditions.

6-37 Log #1821 NEC-P06 **Final Action: Accept in Principle**
(310.8(D))

TCC Action: The Technical Correlating Committee has revised the text of the comment to comply with 3.3 of the NEC Style Manual to read as follows:
"(D) Locations Exposed to Direct Sunlight. Insulated conductors or cables used where exposed to the direct rays of the sun shall comply with (D)(1) or (D)(2).
(1) Cables shall be listed, or listed and marked, as being sunlight resistant.
(2) Cables shall be covered with insulating material, such as tape or sleeving that is listed, or listed and marked, as being sunlight resistant."
Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 6-27
Recommendation: Proposal 6-27 should have been accepted as submitted.
(D) Locations Exposed to Direct Sunlight. Insulated conductors or cables used where exposed to direct rays of the sun shall comply with one of the following:
(1) Cables listed as being sunlight resistant.
(2) Conductors listed as being sunlight resistant.
(3) Covered with insulating material, such as tape or sleeving, that is listed as being sunlight resistant.
Substantiation: The panel seemed to misunderstand this proposal. All that is being proposed is to get rid of words that do not add anything to the meaning or intent of the Code. What is the possible benefit of wording such as "listed, or listed and marked"? Listed and marked can not exist unless the cable or conductors are listed, and there is not a requirement that the cable be marked - only listed. The National Electrical Code is confusing enough to read and understand without superfluous words.
Panel Meeting Action: Accept in Principle
Combine (1) and (2), and reword 310.8(D) to read:
"(D) Locations Exposed to Direct Sunlight. Insulated conductors or cables used where exposed to direct rays of the sun shall ~~comply with one of the following~~:
(1) ~~Cables~~ be listed, or listed and marked, as being sunlight resistant, or ~~(2) Conductors listed, or listed and marked, as being sunlight resistant~~
(2) ~~(3) Covered~~ Be covered with insulating material, such as tape or sleeving, that is listed, or listed and marked, as being sunlight resistant."
Panel Statement: This editorial consolidation of text does not change any of the existing requirements.
The terminology "listed, or listed and marked," is desired by the panel. Either of the two conditions can exist depending on the applicable product standard and, without the second condition being included, an inspector has no readily available way of knowing which condition applies. The panel statement on Proposal 6-27 correctly stated that: "Some standards require products to be marked "sunlight resistant" while others do not." For instance, an SE cable is required to be sunlight resistant without a marking, whereas a jacketed metal clad cable is not sunlight resistant unless so marked.
The panel action agrees with the negative vote on Proposal 6-27 to delete words that do not change the meaning.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-38 Log #1823 NEC-P06 **Final Action: Reject**
(310.10, FPN)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 6-29
Recommendation: Proposal 6-29 should have been rejected.
Substantiation: A fine print note (FPN) referencing that there is a possibility that rooftop conduits may cause conductors to become warmer than ambient temperatures is appropriate in the NEC.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Proposal 6-51. FPN No. 2 is no longer needed because the concept has been incorporated in the 310.15(B)(2)(c) text.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: The Panel obviously bought into the study performed which showed that the air space inside of conduits run in close proximity to rooftops heats up in the sunshine. However, the de-rating factors in the original proposal which were accepted by the Panel fail to acknowledge that existing de-rating for ambient temperatures already takes into consideration heating of air space inside of conduits. This is amply evidenced by the fact that no data was presented to the Panel showing that failures were occurring in the field in rooftop conduits. The Panel discussed some anecdotal examples where they thought maybe they remembered a failure of a wiring system and now, in hindsight, it may have been caused by the air space inside of the conduit heating up in the sunshine - maybe. Is this the way major changes to the National Electrical Code are supposed to be made? It is this Panel member's opinion that changes must be made with deliberation and that legitimate technical substantiation of a real problem exists with the current NEC. The de-rating factors accepted by the Panel are way out of line with reality, and it is disappointing to see how the Panel made this decision.
The study this Proposal was based on was conducted using a limited range of conduit sizes and only included conductors inside the conduit. The study did not compare the effect of heating from various roof pitches or even different roof types or colors, and thus was woefully inadequate. Despite the limitations of the study, the rule was written to apply to all conduit sizes for both single conductors and multi-conductor cables. There was no testing to determine whether there was any evidence of deterioration of insulation or if an unsafe or detrimental condition existed. To be so broadly applied, this study should have been much more thorough, included evidence of insulation deterioration, and the results should be independently verified rather than assuming the results of one study are correct. Essentially, the Proposal changes the long established definition of ambient temperature without justification.
MCCLUNG, L.: Present wording in the Code is adequate to direct the qualified user to make appropriate adjustments to the ampacity for the temperature of its installation (for example, conduits on rooftops). Industrial users have been applying appropriate conductors safely and reliably for many years in these applications. No reputable field failure data was submitted to support the results of the experimental testing. The data submitted to the Panel covered one site specific application where it was recognized that the intense sunlight had immediate effect on the temperature rise in the conduit. Recognizing that the conductor temperance adders found in Table 310.15(B)(2)(c) are based on solar radiation of a single site tested condition, it is conceivable that impingement angle of the sun, roofing material and color, wind speed, atmosphere conditions, etc., will vary with location, thus directly affecting the ambient temperature and its associated ampacity. Additional site testing should be performed before making such a drastic change to the Code (i.e., a 60 A load that has normally been wired using a #6 AWG, 90 Deg C wire would require a #2 AWG, 90 Deg C wire). Such a drastic change would result in a mismatch of conductor and terminal sizing unless a reducer lug or splice is inserted at or prior to the termination.
WALL, C.: The FPN in the code is appropriate, much more so than the action taken on comment 6-54 and comment 6-45. Also see my reason for negative vote on comment 6-45.
Comment on Affirmative:
CLINE, S.: Many anecdotal substantiations were submitted. These do not meet an acceptable level of technical evidence. The testing data submitted with the base proposal was substantive and accepted.

6-39 Log #885 NEC-P06 **Final Action: Reject**
(310.10, FPN 2)

Submitter: David Wechsler, The Dow Chemical Company
Comment on Proposal No: 6-30
Recommendation: Retain the current FPN No. 2 and reject this and Proposal 6-51.
FPN No. 2: Conductors installed in conduit exposed to direct sunlight in close proximity to rooftops have been shown, under certain conditions, to experience a temperature rise of 17°C (30°F) above ambient temperature on which the ampacity is based.

Substantiation: This FPN provides a needed warning. The solution may not necessarily require a different electrical installation, but may be a different physical installation using, but not limited to a sun shield of some kind.

The data and test work that has been performed to support this proposal is an excellent example of good scientific project work. It clearly demonstrates that the sun can heat up objects and depending on the surroundings the heat buildup may be more than what might have been considered. While the details of the sun causing heat build up with an electrical conduit may not have been fully documented until now, many are familiar with heat buildups in such places as attics, crawl spaces, etc.

However, what seems to be is missing from the data findings are not the fact that the temperature within a conduit was recorded as rising, but what in fact happens at the terminations and with the temperature of the conductors. What adverse effect has been documented that would make the current practice unsafe? The sun has been around for a bit longer than this code language, but where is the data that demonstrates a real installation/safety problem? After all, implementing this proposal seems to result in a derating factor of almost 30 percent and it wuold be hoped that the committee has recognized that there was a major serious problem with this type of installation. In contacting more than a dozen electrical industrial contractors serving the Texas Gulf Coast area from Brownsville to Baytown, which does have some pretty hot summers, no one could cite any case where the hot temperatures had produced a faulty electrical installation. (i.e., they had no repair calls to replace wiring installations on roof installations).

Lastly, FPN No. 1 of this section indicates that derating must include more than just the temperature of the air. It states: "The principal determinants of operating temperature are as follows:

(1) Ambient temperature — ambient temperature may vary along the conductor length as well as from time to time.

(2) Heat generated internally in the conductor as the result of load current flow, including fundamental and harmonic currents.

(3) The rate at which generated heat dissipates into the ambient medium. Thermal insulation that covers or surrounds conductors affects the rate of heat dissipation.

(4) Adjacent load-carrying conductors — adjacent conductors have the dual effect of raising the ambient temperature and impeding heat dissipation."

The complete information needed to support the proposed change seems lacking.

For these reasons, this proposal and Proposal 6-51 should have been rejected.

See comment made on 6-51.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comments 6-38 and 6-48.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-38.

MCCLUNG, L.: See My Explanation of Negative on Comment 6-38.

WALL, C.: See my statement on comment 6-38.

Comment on Affirmative:

CLINE, S.: See my affirmative comment on Comment 6-38.

6-40 Log #1824 NEC-P06 **Final Action: Reject**
(310.10, FPN 2)

Submitter: Michael Walls, American Chemistry Council

Comment on Proposal No: 6-30

Recommendation: Proposal 6-30 should have been rejected.

Substantiation: A fine print note (FPN) referencing that there is a possibility that rooftop conduits may cause conductors to become warmer than ambient temperatures is appropriate in the NEC.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Proposal 6-51. FPN No. 2 is no longer needed, because the concept has been incorporated in the 310.15(B)(2)(c) text.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-38.

MCCLUNG, L.: See My Explanation of Negative on Comment 6-38.

WALL, C.: See my statement on comment 6-38.

Comment on Affirmative:

CLINE, S.: See my affirmative comment on Comment 6-38.

2-272 Log #39 NEC-P02 **Final Action: Accept**
(310.12, FPN (New))

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 6-33

Recommendation: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 2 for Action. This action will be considered by Code-Making Panel 2 as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the direction of the Technical Correlating Committe and Rejects Proposal 6-33.

Panel Statement: See the panel action and statement on Comment 2-14.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

KING, D.: See my explanation of negative on Comment 2-14.

6-41 Log #284 NEC-P06 **Final Action: Accept in Principle**
(310.13)

Submitter: Code-Making Panel 5,

Comment on Proposal No: 6-7

Recommendation: Accept the proposal wording as revised. Equipment grounding conductors shall be permitted to be sectioned within a listed multi-conductor cable provided the combined circular mil area in each cable ~~area~~ complies with 250.122.

Substantiation: CMP-5 supports the revised text developed by CMP-6 and the action taken on this proposal to Accept in Principle in Part. CMP-5 supports CMP-6's recognition that listed multiconductor cables with sectioned equipment grounding conductors are permitted where the combined circular mil area complies with 250.122. CMP-5 also supports CMP-6's actions to not accept the submitter's proposed text where the paralleling of MC cables was proposed. For clarity purposes, CMP-5 notes that the 1/0/AWG sizing requirement in 310.4 does not apply to equipment grounding conductors; where phase conductors are run in parallel, a full size equipment grounding conductor sized per 250.122 must be installed in each raceway or cable.

This comment has been balloted through CMP-5 with the following ballot results:

15 Eligible to Vote

14 Affirmative

1 Not Returned (W. Helfrich)

Mr. D. Mohla voted affirmatively stating: "Change the word "recognition" in line 2 of the CMP-5 statement to "acceptance".

Delete the second sentence in the CMP-5 statement starting from CMP-5 also supports CMP-6's action...MC cables was proposed". There is no reference or mention of MC cable or paralleling of MC Cable either in the proposal or CMP-6 action."

Mr. D. Brender voted affirmatively stating: "Affirm Panel 5 action to accept, but revise the proposed additional paragraph to 310.13 to read: "Equipment grounding conductors shall be permitted to be sectioned within a listed multi-conductor cable or flexible cord provided the conductor sections are identical and the combined circular mil area of the sections are not smaller than required by complies with 250.122."

Substantiation: Sectioned equipment grounding conductors are often used in flexible cords as well as in metal-clad cables. This section needs to provide for that use. The section needs to require that where the equipment grounding conductor is sectioned, all sections are identical so any ground-fault current will be carried equally by each section. The last proposed language addition is intended to be an editorial improvement."

Panel Meeting Action: Accept in Principle

The panel action on Proposal 6-7 relocated the revised requirement into 310.13, which addresses the construction of a Type MC cable. See the panel action on Comments 6-2 and 6-3.

Panel Statement: The panel action on Proposal 6-7 relocated the revised requirement to 310.13, which addresses the construction of a Type MC cable. See the panel actions and statements on Comments 6-2 and 6-3.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-42 Log #2110 NEC-P06 **Final Action: Accept**
(Table 310.13)

Submitter: Joe Zimnoch, The Okonite Company
Comment on Proposal No: 6-63
Recommendation: Change title of Table 310.13 to read:
Conductor Applications and Insulations Rated 600 Volts
Substantiation: Currently, 310.13 and Table 310.13 do not show a voltage rating.
Panel Meeting Action: Accept
Panel Statement: The panel understands that the comment is on Proposal 6-40a, rather than 6-63, and the requested change in title applies only to Table 310.13(A) and not 310.13, which includes conductors rated higher than 600 V. The word "Rated" was added in the panel action on Proposal 6-40a.
The panel agrees that Table 310.13(A) only includes conductors rated 600 V and does not include conductors rated less than 600 V and the revised title is consistent with the titles of the other 310.13 Tables.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-43 Log #676 NEC-P06 **Final Action: Accept in Principle**
(310.13, 310.6 Exception, 310.10, 310.15, Tables 310.16-310.20, Tables 310.67 through 310.86)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 6-40a
Recommendation: The Proposal should be Accepted in Principle with the following changes in the titles of the following tables:
Correct the title of Table 310.13(C) (formerly Table 310.62) from "Thickness of Insulation for 601- to 2000-Volt Nonshielded Types RHH and RHW" to "Thickness of Insulation for Nonshielded Types RHH and RHW Solid Dielectric Insulated Conductors Rated 2000 Volts.
Correct the title of Table 310.13(D) (formerly Table 310.63) from "Table 310.13(D) Thickness of Insulated Conductors Rated 2400 Volts and Jacket for Nonshielded Solid Dielectric Insulation" to "Table 310.13(D) Thickness of Insulation and Jacket for Nonshielded Solid Dielectric Insulated Conductors Rated 2400 Volts"
Substantiation: Revising the titles will provide consistent wording between Tables 310.13(C), 310.13(D), and 310.13(E).
Revising the title of Table 310.13(D) will also more accurately convey the information provided in the table. The present title "Thickness of Insulated Conductor" implies that it includes both the conductor and the insulation, which is not correct. The revised title correctly states that the table provides the thickness of the insulation and jacket.
Panel Meeting Action: Accept in Principle
In addition to accepting the comment, the panel reverses the table numbers and location of Tables 310.13(B) and 310.13(C).
In 328.100, revise Table 310.13(B) to Table 310.13(C).
In 310.10 FPN, revise Table 310.13(B) to Table 310.13(C).
In 310.15(B)(1) revise Table 310.13(C) to Table 310.13(B).
In Tables 310.67 through 310.86, revise Table 310.13(B) to Table 310.13(C) in the first line of each Table.
In 336.104, revise Table 310.13(C) to Table 310.13(B).
In 396.10(B)(1), revise Table 310.13(C) to Table 310.13(B).
Panel Statement: The revisions made in this comment are editorial only.
Reversing Tables 310.13(B) and (C) provides a more logical sequence of increasing voltage.
The other revisions in the panel action provide correlation with the panel action on this comment.
NFPA staff should make the following editorial correlations and refer the panel action to the appropriate panels for information:
Code-Making Panel 5 – 300.3(A) – no change required.
Code-Making Panel 7: 320.104 and 322.112 refer to Table 310.13(A) – no change required.
328.100 – revise Table 310.13(B) to Table 310.13(C).
330.112(A) and (B), 334.112, 340.112 – no change required.
336.104 – revise Table 310.13(C) to Table 310.13(B).
396.10(B) – revise Table 310.13(C) to Table 310.13(B).
Code-Making Panel 12:
610.13 – no change required.
Note to Table 610.14(A) – revise Table 310.13 to Table 310.13(A).
Code-Making Panel 15 – 520.42, FPN – no change required.
Code-Making Panel 19 – 552.10(B)(2) and 675.4(A) – no change required.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-44 Log #471 NEC-P06 **Final Action: Reject**
(310.15(4)(a))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 6-44
Recommendation: Accept proposal.
Substantiation: A common neutral may carry current the same as individual neutrals but only unbalanced currents. The proposal would clarify that the provision of 310.15(B)(4)(a) apply to the neutral of more than the circuit of that section.
Panel Meeting Action: Reject
Panel Statement: The submitter is not clear on what neutrals or what type of circuits within his substantiation he wants the panel to address. It is possible for the common neutral to be a current-carrying conductor as in 310.15(B)(4)(b) and 310.15(B)(4)(c).
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-45 Log #1070 NEC-P06 **Final Action: Accept in Principle**
(310.15(B)(2)(1))

TCC Action: The Technical Correlating Committee directs that the FPN be identified as "FPN to Table 310.15(B)(2)(c)" and located immediately following Table 310.15(B)(2)(c).
The Technical Correlating Committee directs that the second sentence of the FPN be deleted as it can be interpreted as a requirement.
Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 6-51
Recommendation: Accept the new text as revised by the CMP, but add the following Fine Print Note, in accordance with Mr. Kent's comment:
The numbers on which the recommendations are based are the result of averaging; those wishing to avoid all risk of damaging overheating of conductor insulation will take into account the most-extreme sustained temperatures in their localities.
Substantiation: Maximum temperatures obtained from reliable sources such as the National Oceanographic and Atmospheric Administration (USNOAA) are not instantaneous temperatures, but rather temperatures sustained long enough to potentially cause irreversible changes to conductor insulation, according to CDA experts I consulted. A local USNOAA expert warned, moreover, that the maximum temperatures they record are increasing. I agree that the submitter was not seeking full protection, but my understanding is that this was a matter of real politik, just trying to get something passed.
Panel Meeting Action: Accept in Principle
Add FPN immediately before the Table to read "FPN: The temperature adders in Table 310.15(B)(2)(c) are based on the results of averaging the ambient temperatures. The highest sustained ambient temperature in the location should be considered to minimize the risk of damage to the insulation by overheating."
Panel Statement: The addition of the FPN responds to the Comments on Affirmative votes on Proposal 6-51 by G. Kent and W. Laidler and was revised for clarity. This action as written provides what the submitter has requested, and is placed where appropriate.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-38.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-38.
WALL, C.: Documented evidence of actual failures of conductors installed on rooftops in the field was not provided. Only a non-peer reviewed study was provided by those that will potentially benefit from this change.
The study, "Effect of Rooftop Exposure on Ambient Temperatures Inside Conduits", states that "Failure is defined as exceeding the temperature rating of a given cable….", and quotes NEC section 310.10 as the reference. This is incorrect. NEC section 310.10 FPN No.1 states: "The temperature rating of a conductor (see Tables 310.13 and 310.61) is the maximum temperature, at any location along its length, that the conductor can withstand over a prolonged time period without serious degradation." It is the long term exceeding of the conductor temperature rating that causes degradation of the insulation and ultimate failure. The study did not provide information about the time period that the temperatures in the conduits were sustained; therefore, the study rushed to a conclusion that the conductors would fail when the conductor temperature rating was exceeded. Neither did the study make observations of the condition of the insulation of the conductors in the conduits to determine whether failure had occurred. Temperature ratings of conductors are determined utilizing the appropriate UL standards such as UL 1581. Following the requirements of UL 1581, a 90°C conductor temperature rating would be determined in part by checking insulation elongation after heating samples of the conductor to 102% of its rating for intervals of 90, 120 and 150 days. By deduction, a conductor

can exceed its temperature rating for prolonged periods of time. Additionally, UL 83 requires that a 90°C conductor undergo a heat shock test by heating to 120°C for one hour and being observed for cracks; the implication being that exceeding the temperature rating for short periods of time does not cause failure.

The study informs the reader that temperatures in RNC were higher than those in EMT. If that is the case, should RNC even be permitted on rooftops, or should there be different adjustment factors for RNC? Additionally, the study found that light colored roofs cause higher temperatures in conduits, but the conclusion makes no provision for this.

After reviewing the study one has to question the statistical validity of the study. It would be refreshing to see the cable manufacturers conduct a legitimate study in cooperation with the conduit manufacturers and a nationally recognized testing laboratory.

Under the proposed de-rating methodology, conductors rated 75°C at an ambient of 30°C, run across a roof with ½" of clearance must be de-rated to 33 percent of Table 310.16 ampacity. Such a change is unwarranted and puts an unnecessary burden on the end use customer.

Comment on Affirmative:

CLINE, S.: See my affirmative comment on Comment 6-38.

6-46 Log #470 NEC-P06 **Final Action: Accept in Principle**
(310.15(B)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 6-47
Recommendation: Accept proposal.
Substantiation: The panel statement affirms the proposal substantiation; separate aggregate lengths are not intended to contribute to the 24 in. length requirement.
Panel Meeting Action: Accept in Principle

The panel accepts the addition of the words "a continuous length" and revises the phrase as follows: "or where single conductors or multiconductor cables are installed without maintaining spacing ~~stacked or bundled~~ for a continuous length longer than 600 mm (24 in.) ~~without maintaining spacing~~ and are not installed in raceways, the allowable ampacity of each conductor…"

Panel Statement: The panel action will also correlate with the Panel 1 action on Proposal 1-19.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-47 Log #40 NEC-P06 **Final Action: Accept**
(310.15(B)(2)(c))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 6-51
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comments 6-45, 6-48 and 6-54.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:

HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-38.

6-48 Log #573 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

Submitter: William M. Lewis, Martinsville, IN
Comment on Proposal No: 6-51
Recommendation: Proposal 6-51 should have been Rejected.
Substantiation: The issue raised in the proposal has not created a problem of failure of conductors installed on rooftops. If there are no failures based on years and years of operations, why penalize users by making installations more costly and difficult to design and install? I was involved in maintenance and installation of conductors on rooftops for over 30 years and witnessed no problems. Also, if the rule does stay, it is very inexact as to how it is to be applied. How many hours per day exposed or shaded? What time of day is the exposure? There are a myriad of other questions that would impact how to apply the rule.
Panel Meeting Action: Reject
Panel Statement: Correction for ambient temperature has always been required but guidance for determining the ambient temperature for use in applying the ampacity correction factors was never provided. The Panel Action on Proposal 6-51 provided a technical basis for establishing the ambient temperature in one specific type of installation that could be used for ampacity correction.

The proposal and the data provided with it show that there is an elevated exposure to heat when conductors are installed in a raceway in close proximity to a roof. This increase in temperature is exacerbated by the normal condition of the installed conductors when carrying current. This new language is nothing more than an improvement on the existing requirements.

310.10 requires that the maximum temperature of any conductor not be exceeded. Under Article 100, definition of Ampacity, "The current, in Amperes, that a conductor can carry continuously under the conditions of use without exceeding its temperature rating", is not dependent on time.

Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:

HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-38.

MCCLUNG, L.: See My Explanation of Negative on Comment 6-38.

WALL, C.: See my statement on Comment 6-45

Comment on Affirmative:

CLINE, S.: See my affirmative comment on Comment 6-38.

6-49 Log #617 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

Submitter: Ken Garr, Bruce Township, MI
Comment on Proposal No: 6-51
Recommendation: Delete the proposed new text and table.
Substantiation: This is a major proposed change - backed up with one study. The study does seem to have been carefully done. But, it is hard to avoid the question: for such a big change, with so much practical field experience, is there any known history of failures?

When one agrees with a code proposal, one says, "Of course." On the other hand, a common response to a proposal that one disagrees with is, "Where are the statistics to back this up?" In this case, we do have some statistics, but it seems like a very big change to make on the basis of one study.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 6-48.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:

HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-38.

MCCLUNG, L.: See My Explanation of Negative on Comment 6-38.

WALL, C.: See my statement on Comment 6-45

Comment on Affirmative:

CLINE, S.: See my affirmative comment on Comment 6-38.

6-50 Log #753 NEC-P06 **Final Action: Accept in Principle**
(310.15(B)(2)(c) (New))

Submitter: Thomas Thierheimer, Britain Electric Co.
Comment on Proposal No: 6-51
Recommendation: I support the concept of the proposal, however, there are many variables such as geographic location, altitude, color of roof, slope of roof, wind speed, etc., that all have an influence on the cooling or heating of the conduit due to external conditions. The process does not need to be complicated.

I suggest that the design process be simplified because there can be many variations in the roof selection due to the general contractor and the roofing contractor. Most of the variations will not, typically, be known or communicated to the electrical designer at the time the electrical design is completed.

I recommend that (as a more practical/simpler approach) the designer choose the maximum ambient temperature for the location of the project and add 30°F or 17°C to the maximum ambient temperature to arrive at the ambient temperature to be used in the NEC tables.

Example:

Maximum ambient temperature in Houston Texas (as selected by designer)=105°F. Conduit is routed across a roof that may be exposed to direct sunlight.

Add 30°F to this ambient for a 135°F "Effective Ambient Temperature".

Ambient Correction Factor (Table 310.16)=.71 for 90°C Wire Insulation,

Using a #8 AWG THHN/THWN 90°C Copper wire, in dry conditions (not underground) (3 current carrying conductors),

The wire ampacity is 55 Amperes (Table Ampacity) X.71 = 39 Amperes (see note below)

If there were more than 3 current carrying conductors in the conduit, the ampacity would then require an additional adjustment according to Table

310.15(B)(2)(a).
Substantiation: This was suggested by 310.10 FPN No. 2 (2005 NEC). This should be an adequate adjustment considering all of the possible variables and the possible enforcement problems related to the many variables that can occur regarding a roof design and conduit installations above the roof.
Panel Meeting Action: Accept in Principle
See Panel Actions and Statements on 6-45, 6-48, and 6-54.
Panel Statement: The Panel agrees that the average ambient temperature is more appropriate to use for ambient temperature corrections rather than the maximum ambient temperature. See Panel Actions and Statements on 6-45, 6-48
, and 6-54. Also, see sample average ambient temperatures provided in Comment 6-54.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-38.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-38.
WALL, C.: See my statement on Comment 6-45
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-38.

6-51 Log #799 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

Submitter: Richard E. Loyd, Sun Lakes, AZ
Comment on Proposal No: 6-51
Recommendation: Revise to read as follows:
(c) Conduits and Cables Exposed to Sunlight on Rooftops. Where conduits or open runs of cable are exposed to sunlight on or above rooftops,...(remainder of section unchanged.)
Substantiation: If conductors and cables in conduit require the proposed temperature adjustments, then the adjustments should also apply to open runs of cable. It is not necessary to have text relative to conductors or cables in conduit - that is the purpose of the condition CDA (Copper Development Assn.) presented a seminar on the testing and results in Philadelphia at the Eastern Section of the IAEI meeting September 30, 2006. The presenter was asked if they tested MC cable and if so how did it perform in comparison to conduit. The response was Yes and he then proceeded to show a chart comparing Type MC cable with the raceways and pointed out to the audience the chart showed conductors in MC cable temperature was slightly high than the conductors in Raceways.
Panel Meeting Action: Reject
Panel Statement: The test data submitted with Proposal 6-51 only contained test results obtained with conduit exposed to sunlight on rooftops and no supporting data has been submitted on multiconductor cables in similar installations to determine whether the adjustment will be the same, more, or less than for conduit.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-52 Log #884 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

Submitter: David Wechsler, The Dow Chemical Company
Comment on Proposal No: 6-51
Recommendation: Reject this and Proposal 6-30.
Substantiation: The data and test work that has been performed to support this proposal is an excellent example of good scientific project work. It clearly demonstrates that the sun can heat up objects and depending on the surroundings the heat buildup may be more than what might have been considered. While the details of the sun causing heat build up with an electrical conduit may not have been fully documented until now, many are familiar with heat buildups in such places as attics, crawl spaces, etc.
However, what seems to be is missing from the data findings are not the fact that the temperature within a conduit was recorded as rising, but what in fact happens at the terminations and with the temperature of the conductors. What adverse effect has been documented that would make the current practice unsafe? The sun has been around for a bit longer than this code language, but where is the data that demonstrates a real installation/safety problem? After all, implementing this proposal seems to result in a derating factor of almost 30 percent and it would be hoped that the committee has recognized that there was a major serious problem with this type of installation. In contacting more than a dozen electrical industrial contractors serving the Texas Gulf Coast area from Brownsville to Baytown, which does have some pretty hot summers, no one could cite any case where the hot temperatures had produced a faulty electrical installation. (i.e., they had no repair calls to replace wiring installations on roof installations).
Lastly, FPN No. 1 of 310.10 indicates that derating must include more than just the temperature of the air. It states: “The principle determinants of operating temperature are as follows:
(1) Ambient temperature — ambient temperature may vary along the conductor length as well as from time to time.
(2) Heat generated internally in the conductor as the result of load current flow, including fundamental and harmonic currents.
(3) The rate at which generated heat dissipates into the ambient medium. Thermal insulation that covers or surrounds conductors affects the rate of heat dissipation.
(4) Adjacent load-carrying conductors — adjacent conductors have the dual effect of raising the ambient temperature and impeding heat dissipation.”
The complete information needed to support the proposed change seems lacking.
For these reasons, this proposal and Proposal 6-30 should have been rejected.
See comment made on 6-30.
Panel Meeting Action: Reject
Panel Statement: Proposal 6-51 only addresses ambient temperature. The concerns addressed in the test report refer to the increased ambient temperature and did not demonstrate any resulting effect on terminations.
Actual field testing shows that there is a standard and calculable heating effect from the sun on conductors installed in conduits on rooftops. 310.15 requires correction for the effects of heating when these effects are known.
Correction for ambient temperature has always been required but guidance for determining the ambient temperature for use in applying the ampacity correction factors was never provided. The Panel Action on Proposal 6-51 provided a technical basis for establishing the ambient temperature in one specific type of installation that could be used for ampacity correction.
See Panel Statement on Comment 6-48.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-38.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-38.
WALL, C.: See my statement on Comment 6-45
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-38.

6-53 Log #1233 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

Submitter: Joseph Dodds, P.E., Trafford, PA
Comment on Proposal No: 6-51
Recommendation: Proposal should be Rejected.
Substantiation: The test data and substantiation submitted for this proposal are accurate and valid for the conditions tested; however, this proposal to derate the conduit exposed to sunlight on or above rooftops should be rejected. The proposal is assumed to apply for all conduit applications and is being used to make a general derating of conduit using only one set of test conditions. This assumption applying one test to all applications can be misleading. For example, the test results with a black or white roof will vary, but the restraints will apply regardless of roof color. The color and texture of the conduit external surface will also affect the temperature rise.
Many years ago electric utilities faced a similar problem for rating the temperature rise of various power conductors and connections in numerous application environments, both indoor and outdoor. The problem was resolved by using a universally accepted temperature rise test for the conductor. The temperature rise that occurs from the current passing through the conductor or conductors will be the same regardless of the ambient temperature. The Δ T (Temperature Rise) is then added to maximum ambient in the intended application to make sure that the material thermal limitations are not exceeded. This method will be acceptable in any application and will not disqualify a conductor where one set of conditions was used to set thermal limits for an infinite number of application conditions.
A standard temperature rise test for conductors should be established so that the user can make a determination of conduit performance in the unique application conditions by use of conductor temperature rise data. The details of the temperature rise tests should be developed with input from interested parties.
Panel Meeting Action: Reject
Panel Statement: Proposal 6-51 only addresses ambient temperature. The temperature adders in Table 310.15(B)(2)(c) were the result of averaging and did include testing on different color roofs since the Code has no control over the color of the roof. See Panel Statement on Comment 6-48.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:

HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-38.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-38.
WALL, C.: See my statement on Comment 6-45

6-54 Log #1250 NEC-P06 **Final Action: Accept in Principle (310.15(B)(2)(c))**

Submitter: Travis Lindsey, Travis Lindsey Consulting Services
Comment on Proposal No: 6-51
Recommendation: I support the panel action of Accept in Principle.
Substantiation: Actual field testing shows that there is a standard and calculable heating effect from the sun on conductors installed in conduits on rooftops. 310.15 requires correction for the effects of heating when these effects are known. Differential temperatures proved to be much higher than expected. When damage occurs to conductors, and equipment corrections are made, the cause of the cable damage is not necessarily known and, therefore, not reported.

The research project was created as a grass roots approach to gathering information. In planning the research, tests and results were laid out to be simple and meaningful. Within practical constraints, tests were designed to closely replicate ordinary construction methods, using common materials in an effort to establish similar operational characteristics typical in construction today.

The application of the temperature adders in Table 310.15(B)(2)(c) can be minimized by locating the raceway 3 1/2 in. to 12 in. above the roof; or completely eliminated by locating the raceway 36 in. above the roof or installing the raceway in shade.

There are other Code limitations that mitigate the effect of the ambient temperature adder. In applying the temperature limitations of 110.14(C) for equipment terminations, almost all 90°C insulated conductors can only be applied at 75°C, which is approximately an 11 percent reduction in allowable ampacity. Since derating is applied to the 90°C ampacities, the ambient temperature adder has no effect on the allowable ampacity until the ambient temperature exceeds 40°C (104°F).

The overcurrent protection limitation in 240.2 further reduces the impact of the ambient temperature correction on allowable ampacity of 14, 12 and 10 AWG conductors.

Some average outdoor ambient temperatures for selected cities during the period of June to August are shown below. These temperatures are based on ASHRAE Handbook of Fundamentals 2 percent design temperatures and are measured in the shade, not in the sun.

City	°F	City	°F
Birmingham, AL	94.0	St. Louis, MO	94.4
Phoenix, AZ	109.5	Las Vegas, NV	107.4
Bakersfield, CA	102.7	Newark, NJ	92.1
Los Angeles, CA	78.6	Albany, NY	87.3
Long Beach, CA	86.9	Islip, NY	87.3
Palm Springs, CA	110.8	Akron/Canton, OH	87.1
Wilmington, DE	90.5	Providence, RI	88.3
Atlanta, GA	92.3	Knoxville, TN	91.4
Chicago, IL	90.6	Houston, TX	96.0
Baltimore, MD	92.5	Charleston, WV	89.7
Boston, MA	89.6		

Some examples of the effect on conductor ampacity when the temperature adders for conductors in raceways in direct sunlight on rooftops are applied are shown below.

Example #1:
3/C 12 AWG THHW-2 in 1/2 in. RNC or EMT installed with the bottom of the RNC or EMT 1/2 in. or less above the rooftop (most severe condition)
Table 310.16 90°C ampacity = 30 amps @ ambient temperature of 30°C
Temperature adder from Table 310.15(B)(2)(c) for raceway location = 33°C
Adjusted ambient temperature = 63°C (30°C + 33°C)
Table 310.16 Correction Factor for 63°C ambient, 90°C conductor = 0.58
Adjusted ampacity (30 amps × 0.58) = 17 amps
240.2 overcurrent protection limitation = 20 amps
Since the adjusted ampacity is 17 amps, the standard fuse or circuit breaker rating would be 20 amps [see 240.2(B)].

Example #2:
3/C 500 kcmil THHW-2 in 2 1/2 in. RNC or EMT (NEC Table C.1) installed with the bottom of the RNC or EMT 3 1/2 in. to 12 in. above the rooftop.
Table 310.16 90°C ampacity = 430 amps @ ambient temperature of 30°C
Temperature adder from Table 310.15(B)(2)(c) for raceway location = 17°C
Adjusted ambient temperature = 47°C (30°C + 17°C)
Table 310.16 Correction Factor for 47°C ambient, 90°C conductor = 0.82
Adjusted ampacity (430 amps × 0.82) = 353 amps
Comparison: Table 310.16 75°C ampacity = 380 amps @ ambient temperature of 30°C

Panel Meeting Action: Accept in Principle
Insert a new FPN immediately following (c) to read: "FPN No. 1: One source for the average ambient temperatures in various locations is the ASHRAE Handbook – Fundamentals."

Panel Statement: The FPN was added to provide a reference on where the temperatures might be obtained and responds to the Comment on Affirmative vote by W. Laidler.
See panel action and statement on Comment 6-45 that added a FPN, which now should be identified as FPN No. 2.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-38.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-38.
WALL, C.: See my statement on Comment 6-45
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-38.

6-55 Log #1826 NEC-P06 **Final Action: Reject (310.15(B)(2)(c))**

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 6-51
Recommendation: Proposal 6-51 should have been rejected.

The implications to users of conduit /wire systems of this proposal are onerous. A derating to 33% of Table 310-16 ampacity for conductors run in conduits across roofs is completely unwarranted and verges on the ridiculous. Exactly what is the problem that we are tying to fix here? In the experience of ACC member companies, there has not been a single documented failure of conductors run in conduits across roofs that could be attributed to overheating. Existing derating according to ambient temperatures more than compensates for ampacity adjustments needed.

Industrial users of the NEC will be affected in installations to rooftop blowers and HVAC units, as well as other rooftop-mounted devices. **This proposal does not address any real problem** - only one that was perceived and dreamed up by those who would benefit from the use of larger copper for installations.

Here is an example of how this proposal, if accepted, would affect installations:

A current installation consists of a rooftop ventilation fan, mounted on top of an industrial building. Roof construction is flat roof, graveled. Conduit runs approximately 200' from an electric room up through the building, and then passes 25' directly on the graveled roof. Size of the fan motor is 30 HP, with full-load amperes being 40 AMPS. 4 - #8 AWG THHW conductors are currently installed in a ¾" Rigid Metal Conduit (RMC) system, with liquid-tight flexible metallic conduit used between the motor junction box and the conduit. All of this meets the 2005 NEC.

Under the rules of this proposal, the temperature adjustment for the conductors would be 33 degrees C (60 degrees F). It is assumed that the ambient temperature is 78 - 86 degrees F (26 - 30 degrees C); thus, no temperature correction would normally be needed. However, a 33 degree C correction would make the new temperature for ampacity considerations 30 + 33 = 63 degrees C. Type THHW insulation would thus have an ampacity of 0.33 times that shown in Table 310.16, according to the correction factor table at the bottom of 310.16.

The ampacity needed to provide power for the motor is 1.25 x 40 = 50 amperes. To find the conductor size using the temperature correction required by this proposal, it is necessary to divide 50 by 0.33, which yields 151.5 amperes. Using Type THHW conductors, Table 310.16 requires the size to be 1/0 THHW (which is good for 150 amperes).

Referring back to Table C.8 in the 2005 NEC, a 2" Rigid Metal Conduit will be required to install the 4 - 1/0 conductors.

Current 2005 NEC: #8 AWG Conductors - ¾" conduit
Using This Proposal: 1/0 Conductors - 2" conduit

An actual cost comparison was made between these installations using REAL numbers. This estimate was performed by our construction contractor estimator.

¾" Conduit - 4 #8 AWG THHW Conductors:

Material: $459.46
Labor: $2033.20
Total: $2492.66

2" Conduit - 4 1/0 THHW Conductors:

Material: $1747.60
Labor: $2948.40
Total: $4696.00

Difference of $2203.34, or an 88% INCREASE IN INSTALLED COST.
Of course, a 2" conduit will not terminate in a 30 HP motor junction box, so a larger box would need to be constructed in order to accommodate the conduit size.

Does it really make sense to expect owners of companies to pay this much more to fix a problem that obviously does not really exist in the first place?
Substantiation: The implications to users of conduit /wire systems of this proposal are onerous. A derating to 33% of Table 310-16 ampacity for conductors run in conduits across roofs is completely unwarranted and verges on the ridiculous. Exactly what is the problem that we are tying to fix here? In the experience of ACC member companies, there has not been a single documented failure of conductors run in conduits across roofs that could be attributed to overheating. Existing derating according to ambient temperatures more than compensates for ampacity adjustments needed.

Industrial users of the NEC will be affected in installations to rooftop blowers and HVAC units, as well as other rooftop-mounted devices. **This proposal does not address any real problem** - only one that was perceived and dreamed up by those who would benefit from the use of larger copper for installations.

Here is an example of how this proposal, if accepted, would affect installations:

A current installation consists of a rooftop ventilation fan, mounted on top of an industrial building. Roof construction is flat roof, graveled. Conduit runs approximately 200' from an electric room up through the building, and then passes 25' directly on the graveled roof. Size of the fan motor is 30 HP, with full-load amperes being 40 AMPS. 4 - #8 AWG THHW conductors are currently installed in a ¾" Rigid Metal Conduit (RMC) system, with liquid-tight flexible metallic conduit used between the motor junction box and the conduit. All of this meets the 2005 NEC.

Under the rules of this proposal, the temperature adjustment for the conductors would be 33 degrees C (60 degrees F). It is assumed that the ambient temperature is 78 - 86 degrees F (26 - 30 degrees C); thus, no temperature correction would normally be needed. However, a 33 degree C correction would make the new temperature for ampacity considerations 30 + 33 = 63 degrees C. Type THHW insulation would thus have an ampacity of 0.33 times that shown in Table 310.16, according to the correction factor table at the bottom of 310.16.

The ampacity needed to provide power for the motor is 1.25 x 40 = 50 amperes. To find the conductor size using the temperature correction required by this proposal, it is necessary to divide 50 by 0.33, which yields 151.5 amperes. Using Type THHW conductors, Table 310.16 requires the size to be 1/0 THHW (which is good for 150 amperes).

Referring back to Table C.8 in the 2005 NEC, a 2" Rigid Metal Conduit will be required to install the 4 - 1/0 conductors.

Current 2005 NEC: #8 AWG Conductors - ¾" conduit

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An actual cost comparison was made between these installations using REAL numbers. This estimate was performed by our construction contractor estimator.

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Labor: $2948.40
Total: $4696.00

Difference of $2203.34, or an 88% INCREASE IN INSTALLED COST. Of course, a 2" conduit will not terminate in a 30 HP motor junction box, so a larger box would need to be constructed in order to accommodate the conduit size.

Does it really make sense to expect owners of companies to pay this much more to fix a problem that obviously does not really exist in the first place?
Panel Meeting Action: Reject
Panel Statement: 310.15(B)(2)(c) does not mandate that the conduit be placed directly on the roof. In fact, Table 310.15(B)(2)(c) provides the user with conditions of installation to minimize the effect on conduits exposed to sunlight on rooftops. This requirement is only applicable for the conduit on the rooftop exposed to the sunlight. Because of this, it is possible the user could change wire and conduit at the transition to a different ambient.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-38.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-38.
WALL, C.: See my statement on Comment 6-45
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-38.

6-56 Log #1840 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 6-51
Recommendation: Reject the Proposal.
Substantiation: Mr. McClung's statements should be reconsidered by the panel at large. Are there any documented cases of this being an issue? The panel should not accept anecdotal substantiations and should instead value the track record of existing installations.

As written in the proponent's substantiation, there are already existing NEC rules that govern conductors installed in high ambient temperatures. This is one location where Article 310 should continue to use a performance based requiremet (310.10) as opposed to a prescriptive one (proposed).
Panel Meeting Action: Reject
Panel Statement: As stated by the submitter there are already high ambient temperature adjustments required by the NEC. Correction for ambient temperature has always been required but guidance for determining the ambient temperature for use in applying the ampacity correction factors has not been provided. The Panel Action on Proposal 6-51 provided a technical basis for establishing the ambient temperature in one specific type of installation that could be used for ampacity correction and the Panel Actions on Comments 6-45 and 6-54 provide additional clarification on the average ambient temperature to be used.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-38.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-38.
WALL, C.: See my statement on Comment 6-45
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-38.

6-57 Log #2211 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 6-51
Recommendation: If the Panel continues to accept this proposal, revise the text to read as follows:
(c) Conduit and Cables Exposed to Sunlight on Rooftops. Where open runs of cables or conductors or cables ~~are~~ installed in conduits are exposed to direct sunlight on or above rooftops, the adjustments shown in Table 310-15(B)(2)(c) shall be added to the outdoor temperature to determine the applicable ambient temperature for application of the correction factors in Tables 310.16 and 310.18.
Table 310.15(B)(2)(c) Ambient Temperature Adjustment for Conduits and Cables Exposed to Sunlight On or Above Rooftops.
Substantiation: Based on presentations by the submitter of this proposal at IAEI Section meetings this Fall, it is our understanding that in addition to conduit, some cables were tested as exposed runs and showed a need for derating. This data was not included, however, in the study that was submitted as substantiation for Proposal 6-51. Since there are other types of products that may be installed on rooftops, the panel should review test results for those products as well to determine the derating necessary. If this cannot be determined in this code cycle, this proposal should be held for further study. For years there has been no requirement for derating conductors in conduits on rooftops and no field problems have been shown to exist. Delaying consideration of this proposal until this study of all products is complete will not be detrimental.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 6-51.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-58 Log #354 NEC-P06 **Final Action: Accept in Principle**
(310.15(B)(2)(a), FPN No. 2)

Submitter: Code-Making Panel 8,
Comment on Proposal No: 6-52
Recommendation: CMP-8 supports the action on this proposal by CMP-6.
Substantiation: CMP-8 supports the action on this proposal. CMP-8 Accepted Proposal 8-127 which revised 366.23(A) to state: "Adjustment Factors".

This comment has been balloted through CMP-8 with the following ballot results:

12 Eligible to Vote
12 Affirmative

Mr. R. Loyd voted affirmatively stating: "Proposal 6-52 was to Accept. The word "adjustment" should be changed in two places."
Panel Meeting Action: Accept in Principle
In FPN No. 2, change "correction factor" to "adjustment factor" in both places and change 376.22 to 376.22(B).
Panel Statement: The panel agrees with the affirmative comment by R. Loyd that the change of the term from "correction" to "adjustment" applies in both places in FPN. No. 2. The panel action correlates with the Panel 8 action to accept in principle Proposal 8-157 to change "derating factors" to "adjustment factors" in 376.22(B).
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-59 Log #262 NEC-P06 **Final Action: Reject**
(Table 310.15(B)(2)(a) Exception No. 6 (New))

Submitter: Stanley J. Folz, Morse Electric, Inc.
Comment on Proposal No: 6-49
Recommendation: Text should remain as originally submitted.
Substantiation: Please indicate what testing the Panel is referring to that takes into account the light loads encountered in a dwelling.
Panel Meeting Action: Reject
Panel Statement: The information came from the Copper Development Association and was available for public comment in the 2005 Code cycle.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Abstain: 1
Explanation of Abstention:
HUDDLESTON, JR., R.: This Code Panel member believes that it is rather flippant for the Panel to disregard the submitter's request for documentation for evidence, as reported in the Panel Statement made after the Proposal was submitted to allow an exception for de-rating in a dwelling unit. If the Panel wishes to base its decisions on evidence, than that evidence should be available to the public and to those who submit Proposals and Comments to the Panel. If the evidence does not exist or is faulty, then the Panel should reconsider its actions. However, simply stating that the evidence was available 3 years ago is not the kind of response that a Panel member should provide. This Panel hopes that the submitter was not unduly insulted by this answer.

6-60 Log #343 NEC-P06 **Final Action: Reject**
(310.15(B)(2)(c))

Submitter: Joel Nelms, R & J Electric LLC
Comment on Proposal No: 6-51
Recommendation: Proposal 6-51 should have been rejected.
Substantiation: The implications to users of conduit/wire systems of this proposal are oppressive. A derating to 33 percent of Table 310.16 ampacity for conductors run in conduits across roofs is completely unwarranted and is just a ploy to generate revenue for manufacturers. In the 32 years of industrial experience that I personally have, I have not known of a single documented failure of conductors run in conduits across roofs that could be attributed to overheating. Existing derating according to ambient temperatures more than compensates for ampacity adjustments needed.
This proposal does not address any real problem - only one that was perceived and dreamed up by those who would benefit from the use of larger copper for installations. Maybe if the Code Panel committees were made up of fewer representatives from manufacturers and more representation from people who actually worked in the electrical field, the Code would serve the purpose for which it was intended.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 6-48.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-38.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-38.
WALL, C.: See my statement on Comment 6-45
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-38.

6-61 Log #57 NEC-P06 **Final Action: Accept**
(310.15(B)(6))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 9-7e
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 6 for action. This action will be considered by Code-Making Panel 6 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 6-63.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-62 Log #1072 NEC-P06 **Final Action: Accept in Principle**
(310.15(B)(6))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 6-61
Recommendation: Replace "...lighting and appliance branch circuit panelboard..." with "branch circuit distribution panelboard."
Substantiation: The term, "...lighting and appliance branch circuit panelboard..." has been eliminated for 2008, and the proposed substitution uses commonly understood language.
Panel Meeting Action: Accept in Principle
See the panel action and statement on Comment 6-63.
Panel Statement: See the panel actions and statements on Comment 6-63.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-63 Log #1915 NEC-P06 **Final Action: Accept**
(310.15(B)(6))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-61
Recommendation: Revise the second sentence to read: "For application of this section, the main power feeder shall be the feeder between the main disconnect and the ~~lighting and appliance branch circuit~~ panelboard that supplies, either by branch circuits, or by feeders, or both, all loads that are part or associated with the dwelling unit."
Substantiation: The submitter wishes to express his sincere appreciation to CMP 6 for their panel statement. It is a perfectly worded statement of intent, one that the submitter has been pursuing for the last six cycles or so. This comment attempts to make the text of the rule convey the objectives of the statement. The wording clarifies that the dwelling could have a subpanel, as long as it is fed from the main panel so that the load diversity of the subpanel loads is included within the load profile of the main feeder. The comment wording also includes associated loads, as would be the case where there was a detached garage. Finally, the comment deletes the terminology "lighting and appliance branch-circuit" because CMP 9 is removing this from Article 408 (Proposal 9-117).
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-64 Log #1170 NEC-P06 **Final Action: Reject**
(Table 310.63)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 6-68
Recommendation: Accept Proposal 6-68.
Substantiation: Accepting this proposal will correlate with Edison Electric Institute's companion comments on Proposals 6-15 and 6-19.
Code-Making Panel 6 lacks consideration to the fact that nonshielded cables have been used safely for decades. The Edison Electric Institute supports efforts to bring this change about. It may be more acceptable to CMP-6 to allow use up to 5,000 volts rather than 8,000 volts as 4.16kV and 4.8kV applications are more prevalent.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the panel action and statement on Proposal 6-68.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: The Panel Statement in Comments; 6-10, 6-11, 6-12, 6-13, 6-14, 6-15, 6-16, 6-17, 6-18, 6-19, 6-20, 6-21, 6-22, 6-23, 6-24, 6-25, and 6-26; "The potential hazard that arises by using non-shielded cable above 2.4 kV exists in all locations in all conditions whether maintained by qualified or unqualified personnel. This includes conduit and metal-clad cable installations"; is erroneous, misleading and a distortion of the facts. In no way does it justify deletion of the usage of non-shielded 5 kV from the Code. 5 kV

non-shielded cable used above 2.4 kV (i.e., 3.3 kV, 4.16 kV, etc.), properly specified with the correct insulation wall thicknesses and a non tracking type jacket with or without an overall metallic sheath or armor, properly installed and terminated by a qualified individual, is equally as safe as medium voltage shielded cable.
As one of the "user" representatives, IEEE needs to identify the necessity for major industrial/commercial entities to continue to have available the 5 kV non-shielded cables for wiring medium voltage motors and other medium voltage equipment where equipment manufacturer's (NEMA members) traditionally have not included adequate space for shielded cable terminations. (NOTE: This usage applies to both installed and new equipment).
Rather than penalizing the user of this type of cable, the Panel should work with the users to establish the necessary rules to assure proper application similar to that which the Technical Correlating Committee recommended for the 5000 volt non-shielded cable for airfield series lighting when installed in accordance with the FAA Advisory Circulars (ACs).
WALL, C.: See my statement on Comment 6-12
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-65 Log #1171 NEC-P06 **Final Action: Reject**
(Table 310.63)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 6-69
Recommendation: Proposal 6-69 should be accepted-in-principle by accepting Proposal 6-68.
Substantiation: See EEI's companion comment on Proposal 6-68. By accepting Proposal 6-68, additions to Table 310.63 need to be made in consideration of the extended conductor range and to include 5000 volt nonshielded cable values from the 2002 NEC edition.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the panel action and statement on Proposals 6-68 and 6-69.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-64.
WALL, C.: See my statement on Comment 6-12
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-66 Log #1830 NEC-P06 **Final Action: Reject**
(Table 310.63)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 6-68
Recommendation: Proposal 6-68 should have been accepted as submitted.
Substantiation: See my comments on Proposals 6-13 through 6-19.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the panel action and statement on Proposal 6-68.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-64.
WALL, C.: See my statement on Comment 6-12
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.
ZIMNOCH, J.: See my affirmative comment on Comment 6-6.

6-67 Log #1894 NEC-P06 **Final Action: Reject**
(Table 310.63)

Submitter: Paul S. Hamer, Chevron Energy Technology Company
Comment on Proposal No: 6-68
Recommendation: Proposal 6-68 should be "accepted in principle," in line with Mr. McClung's Explanation of Negative.
Substantiation: When conductors are enclosed in an overall metallic sheath, armor, or conduit, there is no shock hazard since the conductor's electric field is confined to within the metallic sheath, armor, or conduit. The Panel Statement for rejection of this Proposal (by referring back to the 2005 Code cycle) does not respect the NFPA Regulations Governing Committee Projects 4-3.5.1, which states "...Such statement shall be sufficiently detailed so as to convey the TC's rationale for its action so that rebuttal may, if desired, be submitted during the Comment period...". The Panel must provide reasonable rationale if the Panel Action on the original Proposal is other than "accept." It has not fulfilled this obligation in the ROP.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the panel action and statement on Proposal 6-68.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
HUDDLESTON, JR., R.: See My Explanation of Negative on Comment 6-6.
MCCLUNG, L.: See My Explanation of Negative on Comment 6-64.
WALL, C.: See my statement on Comment 6-12
Comment on Affirmative:
CLINE, S.: See my affirmative comment on Comment 6-6.

ARTICLE 312 — CABINETS, CUTOUT BOXES, AND METER SOCKET ENCLOSURES

9-5 Log #1073 NEC-P09 **Final Action: Accept**
(312.4)

TCC Action: The Technical Correlating Committee directs that the text following the revised section title be changed to correlate with the new title as follows:
"312.4 Repairing Noncombustible Surfaces. Plaster, drywall, or plasterboard Noncombustible surfaces...".
Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 9-10
Recommendation: Revise text to read as follows:
Repairing ~~Plaster and Drywall and Plasterboard~~ Noncombustible Surfaces.
Substantiation: I agree with Mr. Holt that all surfaces warrant repair, for reasons of workmanship. I agree with the CMP that inspectors can cite 110.12 to reject unusually shoddy workmanship, so long as the shoddiness is not merely a matter of appearance, in which case such citation would be inconsistent with 90.1(A). Rather, the element of workmanship involved is to close the wall. Almost any barrier will impede the spread of fire a bit, according to a firestopping expert's presentation to our IAEI chapter. A cover plate manufacturer warned me explicitly, though, that because a cover plate does not sit flat against a wall and box, but usually touches only at the lines where the wall meets the plate's edges, the entire space under a cover plate is part of the enclosure. This would include any opening in wood paneling, for example. Hence, it is not accurate to say that openings in combustible surfaces do not present the same problem as other surfaces merely because enclosure installed in such surfaces must be brought flush.
However, for a start, let's at least add cement, tile, Durock, and similar walls, the first having been mentioned by the Panel's Statement. Firewalls are less effective when breached. While "repair" is not the same as true restoration, it must be better than leaving gaps.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-6 Log #1074 NEC-P09 **Final Action: Reject**
(312.4)

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 9-10
Recommendation: Accept as proposed by Mr. Holt.
Substantiation: I agree with Mr. Holt that all surfaces warrant repair, for reasons of workmanship. I agree with the CMP that inspectors can cite 110.12 to reject unusually shoddy workmanship, so long as the shoddiness is not merely a matter of appearance, in which case such citation would be inconsistent with 90.1(A). Rather, the element of workmanship involved is to close the wall. Almost any barrier will impede the spread of fire a bit, according to a firestopping expert's presentation to our IAEI chapter. A cover plate manufacturer warned me explicitly, though, that because a cover plate does not sit flat against a wall and box, but usually touches only at the lines where the wall meets the plate's edges, the entire space under a cover plate is part of the enclosure. This would include any opening in wood paneling, for example. Hence, it is not accurate to say that openings in combustible surfaces do not present the same problem as other surfaces merely because enclosure installed in such surfaces must be brought flush.
Panel Meeting Action: Reject
Panel Statement: CMP 9 understands that a cover does not necessarily completely seal an electrical enclosure in ordinary locations. It does not follow, however, that there is a safety issue if some gap remains. The present requirements are sufficient. Fire separation ratings, for example, assume a 1/8-inch gap around the perimeter of an enclosure. There has been no test data or loss experience presented to demonstrate the existence of a problem.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-7 Log #1241 NEC-P09 **Final Action: Reject**
(312.4)

Submitter: Joseph A. Brinley, Lewisburg, WV
Comment on Proposal No: 9-10
Recommendation: Revise text to read as follows:
Repairing ~~Plaster and Drywall or Plasterboard~~ Surfaces ~~Plaster, drywall, or plasterboard~~ Surfaces that are broken or incomplete shall be repaired so there

will be no gaps or open spaces greater than 3 mm (1/8 in.) at the edge of the cabinet or cutout box employing a flush-type cover.
Substantiation: Recommend that this proposal should be reconsidered to be accepted. This would be a sound installation practice seeing that not all installations are in drywall or plasterboard no matter if the installation requires a fire rating or not. This proposal should be revisited during the comment stage for consideration to accept.
Panel Meeting Action: Reject
Panel Statement: There is not necessarily a safety issue if some gap remains, particularly where the box extends to the surface as in combustible finishes. The present requirements are sufficient. There has been no test data or loss experience presented to demonstrate the existence of a problem.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-8 Log #2339 NEC-P09 **Final Action: Reject**
(312.5 Exception)

Submitter: James MAldonado, City of Tempe, Arizona
Comment on Proposal No: 9-12
Recommendation: I recommend that this panel reconsider the action taken in the ROP process and accept this proposal.
Substantiation: The methods proposed in this proposal has been successfully tested for over thirty years in the most sever weather conditions in the country. The panels themselves are not even listed for our ambient temperature, but the method proposed has worked successfully with no reported failures or fires if installed in the manner proposed. If this method were submitted to an NRTL for evaluation, it would not be subjected to the ambient temperatures our tests have put them through, neither would the test last for 30 years of real life experience. In the panels statement for rejecting this proposal it was stated that "The use of short fittings as described is a potential hazard because an arc in the panel may no longer be contained by the enclosure." A typical two screw NM cable connector has more open space on the sides of the cable than will be present in the proposed installation. The proposal also addresses the sealing of those openings in item (d) of this proposal. There is no danger of conductors being pulled out of the panels. This method also allows for a weather tight seal at the penetration of the connector through a stucco system or any other wall surface. The code allows for a cable connector to be attached to the back of panels and this type of installation has allowed for water entry into the enclosure when water runs behind the back of a surface mounted panel that is properly installed, with the required stand off from the wall surface.
Panel Meeting Action: Reject
Panel Statement: CMP 9 reaffirms the panel action and statement on Proposal 9-12 and asserts that the safest installation is one that adheres to the requirements of the NEC. In regards the statement about the entry of water through a cable connector, products covered by this article and installed in wet or damp locations must adhere to 312.2.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ARTICLE 314 — OUTLET, DEVICE, PULL, AND JUNCTION BOXES; CONDUIT BODIES; FITTINGS; AND MANHOLES

9-9 Log #1484 NEC-P09 **Final Action: Accept in Principle in Part**
(314.4)

Submitter: Robert A. McCullough, Ocean County Construction Inspection Department
Comment on Proposal No: 9-18
Recommendation: Rewrite section as follows:
314.4 Grounding and Bonding. Except as permitted in 250.112(1), the following shall be grounded and bonded in accordance with Parts I, IV, V, VI, VII, and X of Article 250 as applicable to where the equipment is located in the electrical system.
1. Metal Boxes.
2. Metal conduit bodies.
3. Metal fittings.
4. Metal covers, plates, and canopies.
5. Exposed metal surface extensions.
6. Other metal enclosures and exposed conductive surfaces.
FPN: For additional grounding and bonding requirements, see 410.42(A) for metal luminaire canopies, and 404.12 and 406.5(B) for metal faceplates.
Substantiation: Each of the list items has its own section and grounding/bonding requirements throughout Article 314. It seems to make more sense to have a generic requirement for grounding and bonding as applicable in one place. The language the panel accepted from the Technical Correlating Committee only references Part VI of Article 250 for equipment grounding but, as the panel pointed out in rejecting a similar change to 314.30, several of these items may in fact enclose or contain service conductors so the connection to an EGC would not be correct. This proposed language guides the user to the appropriate part in Article 250 based on what type of circuit or conductors are used. The FPN uses the current language from 314.25. Companion comments are being submitted to delete the specific grounding/bonding language from 314.22, 314.25(A), 314.28(C), and 314.30(D). I don't believe these would introduce new material as the groundwork has been set by virtue of other related proposals in concept in Proposal 9-8.
Panel Meeting Action: Accept in Principle in Part
Accept the revision in principle to 314.4 up to and including the word applicable. Reject all other recommended revisions. This should read as follows:
314.4 Metal Boxes. Metal boxes shall be grounded and bonded in accordance with Parts I, IV, V, VI, VII, and X of Article 250 as applicable, except as permitted in 250.112(I).
Panel Statement: The Panel accepts the concept of specifying the parts of Article 250 to which the rule should apply. This change brings the section into compliance with the Style Manual. The additional language of bonding was added to include those parts referenced that are applicable. While the Panel recognizes the streamlining feature of locating of all of the grounding and bonding requirements in one place, it believes that it negatively affects the usability of the code.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-10 Log #1237 NEC-P09 **Final Action: Accept**
(314.4 and 314.30(D))

TCC Action: The Technical Correlating Committee understands that the panel action on this comment modifies 314.30(D) only and 314.4 is as modified by the panel action on Comment 9-9.
Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 9-18
Recommendation: Revise the actions taken by CMP-9's as described in the Panel Meeting Action on Proposal 9-18 as follows:
1) Accept the Panel action on 314.4.
2) Revise the last sentence of 314.30(D) of the 2005 NEC to read as follows:
Covers. Metal covers and other exposed conductive surfaces shall be bonded in accordance with 250.92(A) ~~250.96(A)~~ if the conductors in the handhole are service conductors or in accordance with 250.96(A) if the conductors in the handhole are feeder or branch-circuit conductors.
Substantiation: Changes are proposed in 314.30(D) to identify the appropriate rules in Article 250 that apply to bonding metal handhole covers depending upon whether the conductors in the handhole are service conductors or are feeder or branch circuit conductors. The purpose is to connect all exposed conductive surfaces together for electrical continuity as required in 250.92(A) and 250.96(A) as applicable.
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-11 Log #423 NEC-P09 **Final Action: Accept in Principle**
(314.6(C)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-34
Recommendation: Accept proposal.
Substantiation: The proposal relates cross-sectional area to the conduit body hub rather than the largest conduit or tubing to which it is attached. And the panel statement indicates the area is based on the largest hub. A cross sectional area based on the largest conduit or tubing to which it is attached does not take into account a 2 in. conduit body with reducers to accept a 1/2 in. conduit. Attached raceways are not always the same size as the hub.
Panel Meeting Action: Accept in Principle
Replace "it is" with "they can be" to read as:
In 314.16(C)(1) revise as: "Conduit bodies enclosing 6 AWG conductors or smaller, other than short-radius conduit bodies as described in 314.5, shall have a cross-sectional area not less than twice the cross-sectional area of the largest conduit or tubing to which they can be attached. The maximum number of conductors permitted shall be the maximum number permitted by Table 1 of Chapter 9 for the conduit or tubing to which it is attached."
Panel Statement: This is not meant to change the field applicability of conduit body designs, or preclude the use of oversized conduit bodies. The Panel is only modifying the first sentence of the existing code language.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:
BREITKREUTZ, B.: This comment should be rejected because the existing code language is clear without the proposed change.

9-12 Log #963 NEC-P09 **Final Action: Accept**
(314.16)

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 9-26
Recommendation: Revise as follows:

314.16 Number of Conductors in Outlet, Device, and Junction Boxes, and Conduit Bodies. Boxes and conduit bodies, shall be of sufficient size to provide free space for all enclosed conductors. In no case shall the volume of the box, as calculated in 314.16(A), be less than the fill calculation as calculated in 314.16(B). The minimum volume for conduit bodies shall be as calculated in 314.16(C). The provisions of this section shall not apply to terminal housings supplied with motors or generators.

FPN: For volume requirements of motor or generator terminal housings, see 430.12.

Boxes and conduit bodies enclosing conductors 4 AWG or larger shall also comply with the provisions of 314.28.

Substantiation: Added the existing last line in 2005 text that was inadvertently left off in the proposed action.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-13 Log #1239 NEC-P09 **Final Action: Reject**
(314.16(B)(1))

Submitter: Rhett Roe, JATC #26 IBEW/NECA
Comment on Proposal No: 9-29
Recommendation: Revise text to read as follows:

314.16(B)(1) Conductor Fill. Each conductor that originates outside the box and terminates or spliced within the box shall be counted once, and each conductor that passes through the box without splice or termination shall be counted once. Each loop or coil ~~A looped,~~ of unbroken conductor ~~not less than twice the minimum length~~ required for free conductor in 300.14 shall be counted twice. The conductor fill shall be calculated using Table 314.16(B). A conductor, no part of which leaves the box, shall ~~not~~ be counted once.

Substantiation: Comment for the affirmative. Without a conductor length the Code section has no merit or substance.
Panel Meeting Action: Reject
Panel Statement: The removal of the reference to the length would make the requirement subjective and therefore difficult to enforce. In addition there was no substantiation given to support the change in the requirement for the conductors that do not leave the box. The Code provides very specific length provisions in 300.14. In addition, the comment would require pigtail jumpers to devices to be counted in wire fill, which would be a major change without substantiation. The action on Proposal 9-29 stands.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-14 Log #58 NEC-P09 **Final Action: Accept**
(314.16(B)(4))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 9-31
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal by replacing text that is vague and unclear, such as "precludes" and "judges". This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
See panel action on Comment 9-16.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-15 Log #962 NEC-P09 **Final Action: Reject**
(314.16(B)(4))

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 9-31
Recommendation: Revise as follows:

314.16 Number of Conductors in Outlet, Device, and Junction Boxes, and Conduit Bodies.

(B) Box Fill Calculations

(4) Device or Equipment Fill. For each yoke or strap containing one or more devices or equipment, a double volume allowance in accordance with Table 314.16(B) shall be made for each yoke or strap based on the largest conductor connected to a device(s) or equipment supported by that yoke or strap. ~~A device or utilization equipment of a width that precludes mounting in single 50 mm (2 in.) device box as described in Table 314.16(A) shall be judged on the basis of the minimum number of gangs required for this purpose.~~

Substantiation: The proposed added text does not give the user of the Code a method of determining the number of gangs required for the installation, it just states that the size of box should be **judged???** On the number of gangs required for the purpose. The text as written is not usable and certainly not enforceable and thus should be removed. Who judges the basis of the number of gangs and on what basis is this judged???
Panel Meeting Action: Reject
Panel Statement: CMP 9 believes the concept in the proposal is valid and has changed the text to meet the objections raised in this comment and also by the TCC. Refer to the action on Comment 9-16.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-16 Log #1916 NEC-P09 **Final Action: Accept**
(314.16(B)(4))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-31
Recommendation: Replace the sentence in the proposal with the following:

"A device or utilization equipment wider than a single 50 mm (2 in.) device box as described in Table 314.16(A) shall have double volume allowances provided for each gang required for mounting."

Substantiation: To address the TCC comment.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-17 Log #2170 NEC-P09 **Final Action: Reject**
(314.19)

Submitter: Timothy P. McNeive, Thomas & Betts Corporation
Comment on Proposal No: 9-52
Recommendation: Reject the Panel's action and replace with the following:

314.16(B)(4) Device or Equipment Fill. For each yoke or strap containing one or more devices or equipment, a double volume allowance in accordance with Table 314.16(B) shall be made for each yoke or strap based on the largest conductor connected to the device(s) or equipment supported by that yolk or strap. Devices or equipment greater than 131 cm3 (8 in.3), shall have their volume identified and shall be calculated at 100 percent of their full volume.

314.19 Boxes Enclosing Flush Devices and Other Utilization Equipment. Boxes, including their optional accessories that provide for additional volume capacity, used to enclose flush devices and all or part of other utilization equipment or its live parts, shall be of such a design that the devices and utilization equipment or its live parts will be completely enclosed on the back and sides and substantial support for the devices and equipment will be provided. Screws for supporting the box shall not be used in attachment of the device or equipment contained therein.

Substantiation: I respect the extensive effort of the task group convened by CMP 9. However, I feel that the resulting proposal goes far beyond the scope of addressing the 2005 NEC proposal 9-34 and the subsequent comment 9-62. This 2008 proposal introduces prescriptive restrictions on specific box designs where legitimate, Code compliant applications still exist. The present requirements in 314.16 and 314.19 have served electrical safety for many years as is acknowledged in the proposal's substantiation. The concern introduced by Mr. Hagerty in 2005 NEC proposal 9-34 is valid. Although CMP 9 rejected the original proposal and the comment (9-62), clearly the new proposal to the 2008 NEC, and the panel's action, now reflects a change in the panel's position.

The panel statements in rejecting proposal 9-34 and comment 9-62 during the 2005 cycle, correctly places the responsibility on the equipment manufacturer to instruct the installer as to the minimum box volume and box depth to be used. Of course, this can be accomplished by a box alone or with a box and available accessories such as box extenders, raised covers, etc. So care needs to be taken not to place all of the burden on the box alone. The commenter in 9-62 correctly states that the information provided by the manufacturer must be driven by requirements in the NEC. The original proposal in 9-34 attempts to implement requirements in the NEC that will lead to appropriate installation of such equipment.

My comment focuses on minor amendment of the original proposal in 9-34 and appropriate amendment of 314.19, which I believe fully addresses the safety concern and permits the good code language in 314.16 and 314.19 to continue to serve our safety needs, as it has for so many years. The "standard"

box sizes in NEC Table 314.16(A), and many additional boxes, with and without accessories that provide for increasing the volume of a box, are available to serve virtually all applications. The box volume calculations in 314.16 are well known and have been utilized for many years to provide the necessary level of safety in our electrical systems. Additional pre calculations and resulting prescriptions suggested in the current proposal are unnecessary and I believe, go beyond the scope of the NEC.

Panel Meeting Action: Reject

Panel Statement: The problem cited in Proposal #34 and Comment #62 of the 2005 code cycle was that of insufficient box depth not insufficient box volume as suggested in this comment. CMP-9 has appropriately addressed the problem with Proposal 9-52. The acceptance of this comment would also result in additional marking requirements by device manufacturers. As noted in the substantiation to proposal 9-52, it was the objective of the task group not to introduce additional product markings. See Panel action and statement on Comment 9-20.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-18 Log #1564 NEC-P09 **Final Action: Reject**
(314.22)

Submitter: Robert A. McCullough, Ocean County Construction Inspection Department

Comment on Proposal No: 9-45

Recommendation: Rewrite panel's version of the section as follows:

314.22 Surface Extensions. Surface extensions shall be made by mounting and mechanically securing an extension ring over the box. ~~Equipment grounding shall be in accordance with Part VI of Article 250.~~

Exception: A surface extension shall be permitted to be made from the cover of a box where the cover is designed so it is unlikely to fall off or be removed if its securing means becomes loose. The wiring method shall be flexible for a length sufficient to permit removal of the cover and provide access to the box interior, and arranged so that any grounding and bonding continuity is independent of the connection between the box and cover.

Substantiation: This is a companion comment to one submitted for 314.4 to establish one generic requirement for grounding and bonding as applicable. I don't believe this would introduce new material as the groundwork has been set by virtue of other related proposals in concept in Proposal 9-18.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 9-9.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-19 Log #867 NEC-P09 **Final Action: Reject**
(314.22 Exception)

TCC Action: The Technical Correlating Committee understands that this comment applies to Proposal 16-47 rather than Proposal 9-45.

Submitter: John P. Masarick, Independent Electrical Contractors Inc.

Comment on Proposal No: 9-45

Recommendation: The panel is encouraged to continue to Accept in Principle Proposal 16-45 and continue to Reject the addition of the FPN.

Substantiation: The reasons to continue to Accept in Principle the Proposal and Reject the addition of the FPN are as follows:

1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting A
ction: Reject

Panel Statement: The recommendation deals with Proposal 16-45, which deals with a section not under the purview of Panel 9. The proposal (9-45) is not related to the recommendation or the substantiation contained in comment 9-19. Panel 9 believes that this should have been referred to Panel 16. Panel 9 expresses no opinion on the technical content of this comment.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-20 Log #1414 NEC-P09 **Final Action: Accept in Principle**
(314.24)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)

Comment on Proposal No: 9-52

Recommendation: The panel action on Proposal 9-52 should have been Accept in Principle in Part. NEMA recommends revision the text of Proposal 9-52 as follows:

314.24 Minimum Depth of Boxes for Outlets, Devices and Utilization Equipment~~, Outlet and device boxes shall have sufficient depth to allow equipment installed within them to be mounted properly and without likelihood of damage to conductors within the box.~~

(A) Outlet Boxes Without Enclosed Devices or Utilization Equipment.

(1) No box shall have an internal depth of less than 12.7 mm (1/2 in.)

(B) Outlet and Device Boxes With Enclosed Devices.

(1) Boxes intended to enclose ~~flush~~ devices shall have an internal depth of not less than 23.8 mm (15/16 in.)

~~(A)~~(C) ~~or~~ Utilization Equipment. Outlet and device boxes that enclose ~~devices or~~ utilization equipment shall have a minimum internal depth that accommodates the rearward projection of the equipment and the size of the conductors that supply the equipment. The internal depth shall include, where used, that of any extension boxes, plaster rings, or raised covers, the internal depth shall comply with all applicable provisions of (1) through (5),

(1) Large Equipment. Boxes that enclose ~~devices or~~ utilization equipment that projects more than 48 mm (1 7/8 in.), rearward from the mounting plane of the box shall have a depth that is not less than the depth of the equipment plus 6 mm (1/4 in.).

(2) Conductors Larger Than 4 AWG. Boxes that enclose ~~devices or~~ utilization equipment supplied by conductors larger than 4 AWG shall be identified for their specific function.

(3) Conductors 8, 6, or 4 AWG. Boxes that enclose equipment supplied by 8, 6, or 4 AWG conductors shall have an internal depth that is not less than 52.4 mm (2 1/16 in.)

(4) Conductors 12 or 10 AWG. Boxes that enclose utilization equipment supplied by 12 or 10 AWG conductors shall have an internal depth that is not less than 30.2 mm (1 3/16 in.). Where the equipment projects rearward from the mounting plane of the box by more than 25 mm (1 in.), the box shall have a depth not less than that of the equipment plus 6 mm (1/4 in.).

(5) Conductors 14 AWG and Smaller. Boxes that enclose utilization equipment supplied by 14 AWG or smaller conductors shall have a depth that is not less than 23.8 mm (15/16 in.).

Exception to (1) through (5): Utilization equipment that is listed to be installed with specified boxes shall be permitted.

~~(B) Outlet Boxes Without Enclosed Devices or Utilization Equipment. Outlet boxes that do not enclose devices or utilization equipment shall have a minimum internal depth of 12. mm (1/2 in.).~~

Substantiation: The title of the Section should be changed to "Minimum Depth of Boxes" to accurately reflect the subject of the paragraph. The current wording in 314.24 "No box shall have an internal depth of less than 12.7 mm (1/2 in.) was reformatted to be paragraph (A). The current wording in 314.24 "Boxes intended to enclose flush devices shall have an internal depth of not less than 23.8 mm (15/16 in.)" was reformatted to be paragraph (B). Then the proposal text dealing with utilization equipment was added as a paragraph (C). All references to devices were removed from paragraph (C).

The task group did an excellent job addressing the problem presented in Public Comment 9-62 on Proposal 9-34 in the 2005 NEC cycle by adding minimum depth box requirements for enclosed utilization equipment. However, the rewrite of the section would have affected the requirements for standard devices. The proposals and subsequent comments did not cite problems with requirements for standard devices. Therefore, there is no reason to change the requirements for these products.

Panel Meeting Action: Accept in Principle

Accept the Comment as written with the following five modifications:

1. Retain the parent rule in 314.24 revised as follows: "Outlet and device boxes shall have sufficient depth to allow equipment installed within them to be mounted properly and with sufficient clearance to prevent damage to conductors within the box."
2. In (A), delete "(1)" so the rule ("No box shall have …) is a sentence following the subsection title.
3. In (B), delete "(1)" so the rule ("Boxes intended to enclose …)" is a sentence following the subsection title.
4. In (B), retain the word "flush".
5. In (C)(3), insert the word "utilization" before the word "equipment".

Panel Statement: CMP 9 agrees with the revised conceptual approach in the comment, but does not want to lose all control over the potential for devices being installed in shallow boxes in a manner that will damage conductors.

The second and third changes are editorial and prevent orphaned, single-topic subsections. The fourth change retains a provision in the 2005 NEC. No technical substantiation has been presented to remove this word. The fifth change provides parallel construction with the other numbered paragraphs, and corrects what appears to have been an inadvertent omission.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-21 Log #1565 NEC-P09 **Final Action: Reject**
(314.25(A))

Submitter: Robert A. McCullough, Ocean County Construction Inspection Department
Comment on Proposal No: 9-18
Recommendation: Rewrite section as follows:
314.25(A) Nonmetallic or Metal Covers and Plates. Nonmetallic or metal covers and plates shall be permitted. ~~Where metal covers or plates are used, they shall comply with the grounding requirements of 250.10.~~
~~FPN: For additional grounding requirements, see 410.42(A) for metal luminaire (fixture) canopies, and 404.12 and 406.5(B) for metal faceplates.~~
Substantiation: This is a companion comment to one submitted for 314.4 to establish one generic requirement for grounding and bonding as applicable. I don't believe this would introduce new material as the groundwork has been set by virtue of other related proposals in concept in Proposal 9-18.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 9-9.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-22 Log #472 NEC-P09 **Final Action: Accept**
(314.27(D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 9-60
Recommendation: Reject proposal.
Substantiation: The explanations of Negative Votes by panel members is valid. Code rules should not be based on speculation of what might be.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
BELISLE, R.: The panel should have given the topic further consideration. In no case, would the additional proposed language create a hazard. In each and every case, it would certainly be a safer installation. There was much discussion about "what if's" and "conspiracies", yet no consideration to what is currently happening in the industry.
RUPP, B.: See my explanation of negative vote on Comment 9-28.
SZENDRE, M.: While I believe the original Proposal 9-60 was too broad and needed modifying, I believe we need to provide for supporting a fan in locations in residences where the probability is high for one being installed in the future.

9-23 Log #812 NEC-P09 **Final Action: Reject**
(314.27(D))

Submitter: Mike Weitzel, Richardson, TX
Comment on Proposal No: 9-60
Recommendation: Continue to Accept the Proposal, and revise as follows:
(D) Boxes at Ceiling-Suspended (Paddle) Fan Outlets. Outlet boxes or outlet box systems used as the sole support of a ceiling-suspended (paddle) fan shall be listed, shall be marked by their manufacturer as suitable for the purpose, and shall not support ceiling-suspended (paddle) fans that weight more than 32 kg (70 lb). For outlet boxes or outlet box systems designed to support ceiling-suspended (paddle) fans that weight more than 16 kg (32 lb), the required marking shall include the maximum weight to be supported.
"In dwelling unit occupancies," where two or more separately switched, ungrounded conductors are provided to a ceiling mounted outlet box, the outlet box or outlet box system shall be listed for sole support of a ceiling-suspended (paddle) fan.
Substantiation: I support the proposal, but recommend that text be added to clarify the issue and meet the submitter's intent that the new language be limited to dwelling unit occupancies only. As proposed by the submitter, the new requirement would unnecessarily apply to all occupancies in all conditions. Its scope of applicability should be limited to dwelling units.
Panel Meeting Action: Reject
Panel Statement: CMP 9 has reconsidered the overall merits of this proposal, and decided to reject it based on the reasoning presented in Comments 9-22, 9-25, 9-27, 9-28, 9-30, and 9-31.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
BELISLE, R.: See my explanation of negative vote on Comment 9-22.
RUPP, B.: See my explanation of negative vote on Comment 9-28.
SZENDRE, M.: See my explanation of negative vote on Comment 9-22.

9-24 Log #817 NEC-P09 **Final Action: Reject**
(314.27(D))

Submitter: Rod Belisle, NECA-IBEW Electrical Training Center
Comment on Proposal No: 9-60
Recommendation: Accept in principle with the following change:
Add: In Installations employing a cable wiring method, before the proposed new text.
Complete paragraph to read:
In Installations employing a cable wiring method, Where two or more separately switched, ungrounded conductors are provided to a ceiling mounted outlet box, the outlet box or outlet box system shall be listed for sole support of a ceiling-suspended (paddle) fan.
Substantiation: The panel is trying to resolve a longstanding problem which exists in the residential community that creates a hazard to future inhabitants. The problem lies in the fact that builders are requesting electrical contractors to prewire for ceiling-suspended paddle fans, but not willing to install the completed installation, i.e., a Fan rated box or assembly. As written, this proposal would extend its effect to all electrical installations, which was not the intent of the submitter.
Panel Meeting Action: Reject
Panel Statement: CMP 9 has reconsidered the overall merits of this proposal, and decided to reject it based on the reasoning presented in Comments 9-22, 9-25, 9-27, 9-28, 9-30, and 9-31.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
BELISLE, R.: See my explanation of negative vote on Comment 9-22.
RUPP, B.: See my explanation of negative vote on Comment 9-28.
SZENDRE, M.: See my explanation of negative vote on Comment 9-22.

9-25 Log #908 NEC-P09 **Final Action: Accept**
(314.27(D))

Submitter: Patsy Spirelli, Spirelli Electric Inc. / Rep. Putnam County Electrical Contractors Association
Comment on Proposal No: 9-60
Recommendation: Delete the following text:
Where two or more separately switched ungrounded conductors are provided to a ceiling mounted outlet box, the outlet box or outlet box system shall be listed for sole support of a ceiling - suspended (paddle) fan. [ROP 9-60]
Substantiation: This entire wording should be deleted. There are too many areas where it is not practical (i.e., bathrooms, hallways, closets, etc.)
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
BELISLE, R.: See my explanation of negative vote on Comment 9-22.
RUPP, B.: See my explanation of negative vote on Comment 9-28.
SZENDRE, M.: See my explanation of negative vote on Comment 9-22.

9-26 Log #942 NEC-P09 **Final Action: Reject**
(314.27(D))

Submitter: Robert G. Fahey, City of Evansville
Comment on Proposal No: 9-60
Recommendation: Revise text to read as follows:
(D) Boxes at Ceiling-Suspended (Paddle) Fan Outlets. Outlet boxes or outlet box systems used as the sole support of a ceiling-suspended (paddle) fan shall be listed, shall be marked by their manufacturer as suitable for this purpose, and shall not support ceiling-suspended (paddle) fans that weight more than 32 kg (70 lb). For outlet boxes or outlet box systems designed to support ceiling suspended (paddle) fans that weight more than 16 kg (35 lb), the required marking shall include the maximum weight to be support. ~~Where two or more separately switched, ungrounded conductors are provided to a ceiling mounted outlet box, the outlet box or outlet box system shall be listed for sole support of a ceiling suspended (paddle) fan.~~ In a dwelling unit, a ceiling outlet box installed for use as a lighting fixture outlet in a habitable room, such as a bedroom, living room, dining room, recreation room or kitchen and located where a ceiling fan could be installed shall be a type listed for ceiling fan support.
Substantiation: The proposed wording will not solve the problem with people installing ceiling fans on ceiling outlet boxes in dwelling units where the boxes are not designed for the ceiling fans. There are many ceiling fans with remote controls in which a second ungrounded conductor is not needed to make the

ceiling fan and light operate separately. The State of Wisconsin has required for the last few Code cycles a listed, ceiling fan box to be installed in all habitable rooms, including the kitchen in dwelling units. The proposed wording I have added is from the State of Wisconsin Electrical Code. This wording has worked in Wisconsin for assuring the safe installation of a future ceiling fan in these areas where it is likely the homeowner will be installing the ceiling fan. The proposed revised wording would also specify this would only apply to dwelling units, this rule would not apply to commercial or industrial buildings.

Panel Meeting Action: Reject

Panel Statement: The Comment introduces text that is unenforceable and does not comply with the Style Manual (e.g., the use of "could" and "such as"). The Panel has addressed this subject for multiple code cycles and has consistently determined that the requirement for fan boxes in ceiling outlets for the support of luminaries in all or most habitable rooms is excessive.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-27 Log #1045 NEC-P09 **Final Action: Accept**
(314.27(D))

Submitter: Gilbert L. Thompson, MEIA Codes and Standards

Comment on Proposal No: 9-60

Recommendation: The Panel should reconsider their action and delete the new language for part (D) and reject the proposal not accept it. The inspector's association agrees with the negative comments of Mr. Hartwell, Mr. LeMay and especially Mr. McCullough that the proposal should be rejected. The submitter has not provided any data to support such a drastic change. It also appears that this seems to be an industry recommendation for their own special interests.

Substantiation: For safety's sake, UL is already requiring warning labels and instructions on how to install paddle fans. To require that every ceiling box that's installed so it accommodates fans could cause expenses and wiring problems. As an example: some foyers, hallways, clothes closets, bathrooms and soffits (the ceiling types) contain two switch legs - one for the light, some for fans, outside lights, sconce lights, multiple control of fixtures, etc. and will never have paddle fans attached as there is not enough room or the boxes were installed for special fixtures. To take away a person's choice and dictate as to how they wire, goes against good reasoning. The present wording in this section takes safety and consideration while allowing flexibility in the wiring design.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

BELISLE, R.: See my explanation of negative vote on Comment 9-22.

RUPP, B.: See my explanation of negative vote on Comment 9-28.

SZENDRE, M.: See my explanation of negative vote on Comment 9-22.

9-28 Log #1210 NEC-P09 **Final Action: Accept**
(314.27(D))

Submitter: James W. Carpenter, International Association of Electrical Inspectors

Comment on Proposal No: 9-60

Recommendation: The Proposal should be Rejected.

Substantiation: Electrical inspectors should not be put in the position of enforcing requirements motivated by an assumption of future actions on the part of an owner. There was no fact-finding work to support the proposal, only a very questionable assertion of a likely outcome. UL 507 requires clearly visible markings on the outside of the carton for ceiling-suspended (paddle) fans as well as statements in the installation instructions regarding proper support for these fans.

The scenario presented in the proposal therefore amounts to a subterfuge. If the new owners are aware that they will be installing paddle fans on substandard boxes, then it is a conspiracy and the NEC cannot be written in such a way as to preclude such effects. If the new owners are not aware of the rules, and if the builders tell them that a fan with conventional mounting arrangements is an option, then such owners are the victims of a fraud. Listed fan boxes present such little marginal cost in comparison to the significant risk to those who would perpetrate such a practice that the likelihood of this practice being widespread seems remote. Although wiring such ceiling boxes for future fan use is noted from time to time, the usual condition is to supply fan boxes in those cases. Furthermore there are other legitimate reasons for running multiple switched conductors to ceiling boxes.

Many chandeliers are wired with one set of lamps controlled independently from the remaining lamps. Many ceilings are wired with multi-circuit lighting track for which such switching arrangements are required. An additional switched conductor may be run to an overhead outlet box because the electrician knows that although the wall will not be accessible after construction, the ceiling will be (as in an unfinished attic) and there will be an additional light provided for accent lighting. Some wiring layouts, even at the time of the rough inspection, have an additional switched conductor entering a ceiling box and then extended to a switched receptacle or second lighting outlet in the same room.

In addition, fan boxes are not and never have been the only acceptable method of hanging a paddle fan. They are only required when the box is the sole support of the fan. One major paddle fan manufacturer is now producing an enormous volume of paddle fans (sold through major home supply channels) that come complete with installation directions that do not recognize fan box support, and that instead call for direct support of the fan bracket using long screws that extend through the standard mounting hole pattern of steel boxes and into framing above the box.

The proposal applies to any ceiling outlet box, even one too close to a wall to be used for a paddle fan, and even one in a commercial or industrial occupancy for which no conceivable paddle fan use would be likely. In addition, there are many applications for which no fan box is now and ever would be likely available. For example, there are no plaster rings now listed for fan support, because of the obvious difficulties involved in attempting to cover all possible combinations in a testing laboratory. The inspection community should never be forced to routinely apply 90.4 (which requires special permission) for all these legitimate applications, both residential and nonresidential.

The proposal violates the fundamental principles of the scope of the NEC in 90.1. A ceiling outlet box wired as described in the proposal is entirely safe until and unless a paddle fan is mounted in such a way that the box is the sole support of the fan. And 90.1(B) clearly tells us that NEC compliant installations today may not be suitable for future uses tomorrow.

What stands between today and tomorrow is qualified, disinterested third-party inspection. If some jurisdictions are seeing the instances described in the proposal substantiation, it can only be because these jurisdictions have failed to create a regulatory environment that supports such inspections. This was the importance of the "Inspection Initiative" in the 1990s. Without inspection (and also without product standards) the NEC becomes invalid on its face, and our electrical safety system unravels. Rules based on a presumption of the absence of inspection create a completely misleading sense of security.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

BELISLE, R.: See my explanation of negative vote on Comment 9-22.

RUPP, B.: NEMA understands that the wording of the original proposal would add requirements to installations that were not intended to be covered, however the panel should have worked to correct the problems rather than reversing its action at the proposal stage. It is our opinion that the practice of installing "spare" circuit conductors to a location such as a bedroom light without installing an outlet box or system designed to support a fan is a potential safety issue.

SZENDRE, M.: See my explanation of negative vote on Comment 9-22.

9-29 Log #1313 NEC-P09 **Final Action: Reject**
(314.27(D))

Submitter: Joseph A. Hertel, Safety and Buildings

Comment on Proposal No: 9-60

Recommendation: Revise the proposed accepted text to read:

(D) In a dwelling unit, a ceiling outlet box installed for use as a lighting fixture outlet in a habitable room or kitchen and located where a ceiling fan could be installed shall be a type listed for ceiling fan support.

Substantiation: I can agree with the recommendation for fan boxes. The State of Wisconsin has had this requirement for several cycles and found that it eliminates the actual or perceived problems with ceiling paddle fan installation. The proposed language would apply to all facilities. The problem with homeowners doing the work is in dwellings, and commercial installations have not proven to be a problem.

Panel Meeting Action: Reject

Panel Statement: The Comment introduces text that is unenforceable and does not comply with the Style Manual (e.g., the use of "could"). The Panel has addressed this subject for multiple code cycles and has consistently determined that the requirement for fan boxes in ceiling outlets for the support of luminaries in all or most habitable rooms is excessive.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-30 Log #1917 NEC-P09 **Final Action: Accept**
(314.27(D))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 9-60

Recommendation: Reject the proposal.

Substantiation: I made most of my arguments in the explanation of negative vote attached to the proposal. However, in those comments, I expressed a willingness to entertain other approaches to the problem, such as actual notice

on the panelboard. I now believe that the proposal should not be accepted in any form, based on actual experience in the late spring. I was replacing a paddle fan (hung under the 1978 NEC on a conventional box) with a modern (Hu****) well-known brand with extensive market penetration, especially through home stores. While purchasing the fan, I picked up a fan box, certain that I would need it. To my amazement, the installation directions did not call for a fan box, but instead mandated a timber support across the back of a conventional outlet box. The fan came with screws designed to pass through the fan bracket and line up with the box support hole drillings, and long enough to securely engage the wooden cross support. So I hung the fan with no fan box, and even if I had installed the fan box, the listed fan and bracket assembly would have made that box irrelevant. The proposal substantiation is very far short of justifying a panel action that would violate fundamental code principles as expressed in 90.1.

Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
BELISLE, R.: See my explanation of negative vote on Comment 9-22.
RUPP, B.: See my explanation of negative vote on Comment 9-28.
SZENDRE, M.: See my explanation of negative vote on Comment 9-22.

9-31 Log #1972 NEC-P09 **Final Action: Accept**
(314.27(D))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 9-60
Recommendation: This Proposal should have been Rejected.
Substantiation: This is an extreme example of "what-if" code. The presumption that because there are two or more separately switched conductors in a box the box will be used for a fan is totally unsupported by any evidence. In fact, in installations like this, the extra conductors are often just that - extra conductors - and no switches are installed, so the conductors are not "separately switched" until the user decides to add the extra switches. That makes the rule difficult to enforce.

Furthermore, many fans available today do not even need the additional wire, as special switches are available that allow the single switched conductor to be used to control the fan, the fan speed, and even the intensity of the lights. Many other fans are supplied with wireless remote controls so that no special wiring is required. So, if the panel is really concerned about the possibility that a fan will be installed in the future, they must also assume that the people installing such fans will disregard all the instructions, and since a fan could be installed in any ceiling box with or without special wiring, the panel should just require all ceiling boxes to be suitable for fan support. In fact, how do we know someone won't take out the smoke alarm and use that for a fan? The 3 comments on negative should get additional consideration by the panel.

Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
BELISLE, R.: See my explanation of negative vote on Comment 9-22.
RUPP, B.: See my explanation of negative vote on Comment 9-28.
SZENDRE, M.: See my explanation of negative vote on Comment 9-22.

9-32 Log #2156 NEC-P09 **Final Action: Reject**
(314.27(D))

Submitter: David H. Kendall, Carlon
Comment on Proposal No: 9-60
Recommendation: Proposal 2-197 should continue to be "Accept in Principle" and revised as follows:

Where two or more separate switched, ungrounded conductors are provided to a ceiling mounted outlet box, <u>in single or multi-family dwellings,</u> the outlet box or outlet box system shall be listed for sole support of a ceiling-suspended (paddle) fan.

Substantiation: The revised language limits this requirement to single or multi-family dwellings. The practice of supplying a ceiling box with two switches is a common practice in new construction. For example: A standard ceiling box listed for luminaires is used when a ceiling fan is not supplied by the builder in a bedroom. Two switches are wired to the box. One of the switches is connected to the luminaire and the other switch is not connected. The new homeowner decides over a period time to replace the luminaire with a ceiling fan with a light kit and connect both switches. The homeowner is unaware of the required markings for a ceiling fan box and mounts the ceiling fan to the standard ceiling box. The ceiling fan assembly is located over the bed of a child.

I know this is a fact because it occurred in my current house. Fortunately, I am educated in the proper markings of ceiling boxes and did replace the ceiling box with a fan rated box. I do not think this is either fraud or a conspiracy, but builders taking advantage of the current code language. No where in the current NEC does it require a ceiling box rated for ceiling fan support when a fan is not installed. Since a fan was not supplied by the builder they were not obligated nor required to install a fan rated ceiling box. The proposed text fixes this problem.

Also, it is acceptable for a chandelier and other "multiple reasons" to be supported by a box listed for ceiling fan support. Ceiling fan boxes are also required to be tested and listed for luminaire support per UL 514A and UL 514C. This proposal addresses a safety issue to protect innocent homeowners from injury, fire or shock.

Panel Meeting Action: Reject
Panel Statement: CMP 9 has reconsidered the overall merits of this proposal, and decided to reject it based on the reasoning presented in Comments 9-22, 9-25, 9-27, 9-28, 9-30, and 9-31.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
BELISLE, R.: See my explanation of negative vote on Comment 9-22.
RUPP, B.: See my explanation of negative vote on Comment 9-28.
SZENDRE, M.: See my explanation of negative vote on Comment 9-22.

9-33 Log #268 NEC-P09 **Final Action: Hold**
(314.27(D) Exception (New))

Submitter: Alan Halbert, EE Products Inc.
Comment on Proposal No: 2-265
Recommendation: Add a new exception to read:

314.27(D) Boxes at Ceiling-Suspended (Paddle) Fan Outlets. Outlet boxes or outlet box systems used as the sole support of a ceiling suspended (paddle) fan shall be listed, shall be marked by their manufacturers as suitable for this purpose, and shall not support ceiling-suspended (paddle) fans that weigh more than 32 kg (70 lb). For outlet boxes or outlet box systems designed to support ceiling-suspended (paddle) fans that weight more than 16 kg (35 lb), the required marking shall include the maximum weight to be supported.

<u>Exception: For outlet box systems that are not subject to national testing standards and install through the interior of the outlet box, the system shall not be required to be listed.</u>

Substantiation: The substantiation for this comment is provided in the abstract received by NFPA as supporting Material.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Hold
Panel Statement: This comment was held because it would introduce a concept that has not had public review by being included in a related proposal as published in the Report on Proposals.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-34 Log #59 NEC-P09 **Final Action: Accept**
(314.27(E) (New))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 9-63
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal by replacing text that is vague and unclear, such as "comparable size and weight". This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See the action on Comment 9-35, which responds to the concerns in this comment.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-35 Log #1918 NEC-P09 **Final Action: Accept**
(314.27(E) (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 9-63
Recommendation: Revise the action text to read as follows:

E. Utilization Equipment. Boxes used for the support of utilization equipment other than ceiling-suspended (paddle) fans shall meet the requirements of 314.27(A) and (B) for the support of a luminaire (fixture) that is the same size and weight.

Exception: Utilization equipment weighing not more than 3 kg (6 lb) shall be permitted to be supported on other boxes or plaster rings that are secured to other boxes, provided the equipment or its supporting yoke is secured to the box with no fewer than two No. 6 or larger screws.

Substantiation: To address the TCC concerns.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-36 Log #961 NEC-P09 **Final Action: Reject**
(314.28(A)(2))

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 9-67
Recommendation: Add a comma after "Angle" and delete the extra "or" in the title as follows:
314.28 Pull and Junction Boxes and Conduit Bodies
(A) Minimum Size.
(2) Angle, ~~or~~ U Pulls, or Splices. Where splices or where angle or U pulls are made, the distance between each raceway entry inside the box and the opposite wall of the box shall not be less than six times the metric designator (trade size) of the largest raceway in a row. This distance shall be increased for additional entries by the amount of the sum of the diameters of all other raceway entries in the same row on the same wall of the box. Each row shall be calculated individually, and the single row that provides the maximum distance shall be used.
Substantiation: Added a comma and deleted an extra "or" for grammatical reasons in the title of the rewritten text.
Panel Meeting Action: Reject
Panel Statement: The title is grammatically correct. The rule covers both angle and U pulls (principal application). These are related and should be grouped. The rule also, coincidentally, covers the spacing requirements for spliced conductors, which is an additional application.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-37 Log #1566 NEC-P09 **Final Action: Reject**
(314.28(C))

Submitter: Robert A. McCullough, Ocean County Construction Inspection Department
Comment on Proposal No: 9-18
Recommendation: Delete text as follows:
Delete what is now the last sentence after the panels action on proposal 9-68. ~~Where used, metal covers shall comply with the grounding requirements of 250.110~~.
Substantiation: This is a companion comment to one submitted for 314.4 to establish one generic requirement for grounding and bonding as applicable. I don't believe this would introduce new material as the groundwork has been set by virtue of other related proposals in concept in Proposal 9-18.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 9-9.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-38 Log #960 NEC-P09 **Final Action: Accept in Principle**
(314.30)

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 9-71
Recommendation: Revise as follows:
314.30 Handhole Enclosures.
Handhole enclosures shall be identified for use in underground systems. ~~and~~ Handhole enclosures shall also be designed and installed to withstand all loads likely to be imposed on them.
FPN: See ANSI/SCTE 77-2002, Specification for Underground Enclosure Integrity, for additional information on deliberate and non-deliberate traffic loading that can be expected to bear on underground enclosures.
Substantiation: The sentence has been restructured into two separate sentences to make more grammatical sense and a hyphen has been inserted into "non-deliberate" in the FPN.
Panel Meeting Action: Accept in Principle
Revise the text of the rule to read as follows: "Handhole enclosures shall be designed and installed to withstand all loads likely to be imposed on them. They shall be identified for use in underground systems." Make no change in the FPN.
Panel Statement: CMP 9 agrees with the concept of restating the rule using two sentences, but prefers to lead the rule with the more general provision.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-39 Log #275 NEC-P09 **Final Action: Reject**
(314.30(C))

Submitter: Dennis Downer, Morrisville, VT
Comment on Proposal No: 9-72
Recommendation: Revise text to read as follows:
314.30 Handhole Enclosures.
(C) Handhole Enclosures ~~Without Bottoms.~~ Where handhole enclosures ~~without bottoms~~ are installed, all enclosed cables, conductors and any splices or terminations, if present, shall be listed as suitable for wet locations.
Substantiation: Where handhole enclosures are installed, what difference does it make if the enclosure has a bottom or not, the box has the possibility of having water enter the enclosure, the enclosed conductors, cables and any splices or terminations, if present, shall be listed as suitable for wet locations. Also, the word Cables should be added to make it consistent with 300.5(B).
Panel Meeting Action: Reject
Panel Statement: As noted in the panel statement on the underlying proposal, the panel action on Proposal 9-77 accomplishes the technical objectives of this comment which merely restates that proposal verbatim. The wet location rule will now apply to all conductors and splices within handhole enclosures regardless of whether they enter as cable assemblies or from raceways. The comment presents no substantiation to support changing the CMP 9 actions on this subject.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-40 Log #1567 NEC-P09 **Final Action: Reject**
(314.30(D))

Submitter: Robert A. McCullough, Ocean County Construction Inspection Department
Comment on Proposal No: 9-18
Recommendation: Delete text as follows:
Delete the last sentence: ~~Metal covers and other exposed conductive surfaces shall be bonded in accordance with 250.96(A).~~
Substantiation: This is a companion comment to one submitted for 314.4 to establish one generic requirement for grounding and bonding as applicable. I don't believe this would introduce new material as the groundwork has been set by virtue of other related proposals in concept in Proposal 9-18.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 9-9.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-41 Log #1568 NEC-P09 **Final Action: Reject**
(314.40(D))

Submitter: Robert A. McCullough, Ocean County Construction Inspection Department
Comment on Proposal No: 9-18
Recommendation: Rewrite section as follows:
(D) Grounding and Bonding Provisions. A means shall be provided in each metal box for the connection of an equipment grounding conductor or a bonding jumper. The means shall be permitted to be a tapped hole or equivalent.
Substantiation: This is a companion comment to one submitted for 314.4 to establish one generic requirement for grounding and bonding as applicable. I don't believe this would introduce new material as the groundwork has been set by virtue of other related proposals in concept in Proposal 9-18.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 9-9.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-42 Log #818 NEC-P09 **Final Action: Reject**
(314.72)

TCC Action: It was the action of the Technical Correlating Committee that this comment be reported as Reject since it contains unenforceable and vague terminology, such as "during customary installation activity" and "at the time of manufacture, be protected…".
Submitter: Rod Belisle, NECA-IBEW Electrical Training Center
Comment on Proposal No: 9-81
Recommendation: "Accepting in principle" and insert the proposed language into new sections 312.10(D) and 314.40(E).
Substantiation: The CMP stated in their substantiation that sharp edges do create a hazard and provide "legitimate concerns," but deferred to take action due to inappropriate numbering of the proposal as submitted. The CMP also stated that this is a product standard issue. Product standards are driven by need, request of the consuming public, installers and code experts. The CMP should act on this proposal by "Accepting in principle" and insert the proposed language into new sections 312.10 (D) and 314.40 (E).

These locations would apply to all boxes and enclosures of concern, and meet the intent of the submitter's request.

Panel Meeting Action: Accept in Principle

I. Add the following new subsection to 312.10, renumbering the present 312.10(B) and 312.10(C) as 312.10(C) and 312.10(D) respectively:

(B) Enclosure Edges. All sharp edges of metal enclosures within the scope of this article that are subject to hand contact during customary installation activity shall, at the time of manufacture, be protected or shall be de-burred and rounded to minimize the risk of injury. This requirement shall take effect January 1, 2011.

II. Add the following new subsection to 314.40, renumbering the present 314.40(D) as 314.40(E):

(D) Enclosure Edges. All sharp edges of metal pull and junction boxes over 1650 cm3 (100 in.3) in size that are subject to hand contact during customary installation activity shall, at the time of manufacture, be protected or shall be de-burred and rounded to minimize the risk of injury. This requirement shall take effect January 1, 2011.

Panel Statement: CMP 9 agrees with the Comment and has modified it editorially to locate it with related material covering metal enclosures, and rewording to focus on the likelihood of hand injuries on larger enclosures. CMP 9 understands that these requirements may compel significant changes in product standards and manufacturing procedures, and has delayed the effective date accordingly.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 9 Negative: 2

Explanation of Negative:

OSBORNE, R.: Panel members agree that the concern with sharp edges is one to be addressed by the product standards. This fact is illustrated in the original panel action, the panel statement, and the proposed Code language, which indicate that sharp edges shall be protected or de-burred at the time of manufacture. The panel appears to be taking a "back door" approach to address the concern, rather than pursuing changes to the applicable product standards (if needed) and holding manufacturers accountable for products that have edges which are unacceptably sharp. Standard development organizations, such as Underwriters Laboratories, use an open process for revising standards. This process is similar to that used by NFPA to develop the Code. While many standards have requirements to address sharp edges, the opportunity exists for individuals to submit proposed changes to these standards and add or modify requirements as they relate to this issue.

Many certification organizations also have in place a process by which products with identified concerns can be reviewed. This process can be used to determine if the problem should be addressed by new or revised requirements in the standard, or if adequate requirements exist, if the problem is systemic to the industry or specific to a manufacturer. One type of product identified as having concerns with sharp edges is enclosed panelboards. The product standard for panelboards (UL 67) has detailed requirements for sharp edges, including reference to the Standard for Sharpness of Edges on Equipment (UL 1439) and UL has not received complaints of sharp edges and the form of field complains on these products. Anecdotal evidence is not sufficient to enact change to the product standard and Code. Properly documented field complaints can be used to identify whether a problem is specific to an industry, a manufacturer, a specific factory, or is a perception rather than a reality. What constitutes a sharp edge is subjective, and with any subjective requirement, places the inspector at a disadvantage when applying the requirements. Additionally, the ability of the AHJ to decide on the approval of equipment is already provided in 90.4. Should inspectors conclude that sufficiently sharp edges exist on equipment, they can reject the installation citing 90.4.

It is suggested that panel members refocus their efforts and address this concern in the proper forum rather than introducing requirements which are acknowledged by the authors as being misplaced.

RUPP, B.: NEMA continues to consider this to be a standards issue and this information does not belong in the installation code. Concerned people should contact the manufacturer of a particular type of equipment causing an issue and should actively participate on the technical panels of the product standards to affect changes where necessary.

Comment on Affirmative:

MCCULLOUGH, R.: I believe the Panel's action to be proactive on this issue is correct and, by placing the revised text in the construction specifications part of Articles 312 and 314, will force changes in the appropriate product standards as well as the manufacturing process. The delay date to allow for these changes should be sufficient. This change needs to occur at these levels rather than be in a rule enforced by the AHJ. Otherwise, there would be no consistency in enforcement. I also believe that as an editorial revision, 314.70(3) should be changed to include this new (D) as well. The same concerns of personal injury are valid for boxes used on systems over 600 volts.

SENGUPTA, S.: Comment: Delete the last sentence: "This requirement shall take effect January 1, 20011." from 312.10(B) and 314.40(E).

Reason: I agree with the IBEW/NECA's comment and CMP 9's recognition of a sharp edge on any metallic box is a safety issue and thus, I strongly recommend CMP 9 to remove the effective date. Let the manufacturers recognize the significance of both the safety issue and the code requirement and take appropriate actions. Any new code requirement always creates various degrees of significance to users, installers and manufacturers; addressing the degree of significance with an extended timeline on one requirement may not help the core issue of safety.

Additionally, removal of the date may also reduce the number of proposals in the 2011 code cycle appealing extension of the date from January 1, 2011 to January 1, 2014 or other future dates, citing this panel statement: "CMP 9 understands that these changes may compel significant changes in product standards and manufacturing procedures, and has delayed the effective date accordingly.

ARTICLE 320 — ARMORED CABLE: TYPE AC

7-1 Log #926 NEC-P07 **Final Action: Reject**
(320, 330, 332, 334, 340)

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-1
Recommendation: We feel that the panel should have rejected this proposal.
Substantiation: We are not confident that the results of this task group represent consensus and justification for the TCC to offer those findings as a TCC proposals for the 2008 NEC.

Panel Meeting Action: Reject
Panel Statement: The comment provides no technical justification for rejecting the proposal, only commentary on the participation in the development of the proposal.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-2 Log #1071 NEC-P07 **Final Action: Reject**
(320.12(1))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 7-3
Recommendation: Revise text to read as follows:
"...~~physical~~ mechanical damage".
Substantiation: The NEC Style Manual says in "3.2.5.5 Provisions on Protection Against Physical Damage: If protection against physical damage is to be one of the requirements, this can be standardized by the use of this terminology."

In this section, the NEC is not requiring the addition of mechanical protection from mechanical damage, but rather it is forbidding the use of AC cable where subject to such damage. This is not what 3.2.5.5 addresses, so it is not clear how the Panel Statement can claim that this use of the term complies with that section of the manual.

Rust is another form of physical damage, addressed explicitly in the other parts of 320.12. The CMP has clarified in its statement that 310.12(1), indeed concerns damage, not signal interference. Therefore, on the logical presumption that the rest of 320.12 is not tautological, 310.12(1) is concerned with other forms of physical damage than those caused by moisture. If 310.12(1) were a general expression of concern, it would be an unnecessary restatement of 110.3(A). Therefore, it is plausible to assume that it means to be conveying that AC cable is not considered capable of withstanding blows or abrasion-mechanical insult. This is particularly reasonable in light of the availability of such cables with reduced-strength armors.

Panel Meeting Action: Reject
Panel Statement: Physical damage is the appropriate terminology in accordance with the 2003 NEC Style Manual which states:

"3.2.5.4 Provisions on Protection Against Physical Damage. If protection against physical damage is to be one of the requirements, this can be standardized by the use of this terminology instead of using the phrase provided with mechanical protection to mean the same thing."

"Physical Damage" is a properly used generic term that directs installers and users of the code to protect wiring methods from the types of damage that could be present in a given environment.

"Mechanical Damage" is a specific type of "Physical Damage". Cables are required to be protected from all forms of damage that are likely to be present in a given area, unless approved for the purpose.

Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-3 Log #1075 NEC-P07 **Final Action: Reject**
(320.15)

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 7-5
Recommendation: Revise text to read as follows:
"...~~physical~~ damage...".
Substantiation: 3.2.5.5's permissive, not mandatory language suggests the use of the term "protection against physical damage" in place of "mechanical protection." Protection by locations is not quite identical to adding mechanical protection. Signal protection from EMI is not the same as protection from cable damage, I would think. More relevant, removing the adjective "physical" adds no confusion that I can envision as to what the installer is required to do or the inspector to enforce.
Panel Meeting Action: Reject
Panel Statement: The word "Physical", is appropriate since it specifically defines the type of protection being provided and complies with 3.2.5.5 of the NEC style manual. The code often times uses a language "all of its own" as its primary focus is on the protection of life and property. "Ampacity" is another word that is specific to the NEC, and like the phrase "physical damage", is very useful to code users.
Also see panel statement on Comment 7-2.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-4 Log #1669 NEC-P07 **Final Action: Reject**
(320.23)

Submitter: Phil Simmons, Olympia, WA
Comment on Proposal No: 7-8
Recommendation: Accept the Proposal.
Substantiation: As one who teaches the NEC, and has for many years, the wording of this section has long been criticized by students of the Code as being confusing or poorly worded. In other ways, the wording uses incorrect terminology and is out-of-date with today's construction methods.
The present title of 320.23 is "In Accessible Attics." We should note the framing members in attics are not often "floor joists" as is included in the title of 320.23(A) as well as in the text of that section. Most often, these are ceiling joists. The Merriam-Webster Online Dictionary defines the word "attic" as, "A room or a space immediately below the roof of a building." So, it seems the use of the words "floor joists" when describing the framing members in attics is incorrect. These framing members are most likely ceiling joists. In some cases, the framing member serves as the ceiling joist for the space below and the floor joist for the space above. This is the reason "framing members" is used in the Proposal. This term applies whether the framing members are ceiling joists for typical attics or combination ceiling joists/floor joists in the situation where the space is a partial attic when buildings have an attic space on one or more sides of an upper room which may have an attic above it.
It should also be noted that much of the construction uses manufactured trusses and beams in addition to stick-built buildings. It seems the term "framing member" can be used correctly for all these types of construction.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The existing wording is specific and adequate. Many attics are "floored" or are partially "floored" for storage purposes. The current text directs code users to the "specific location" that the text is referring to------ "The Floor Joist", which is indeed, "a framing member".
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-5 Log #342 NEC-P07 **Final Action: Reject**
(320.23(A))

Submitter: Bryan P. Holland, City of North Port
Comment on Proposal No: 7-7
Recommendation: I feel the proposal should be reconsidered.
Substantiation: The original proposal clearly indicated that the requirement would only apply to Type AC, MC, and NM cables and not all cables as indicated by the panel statement. As currently arranged in the NEC at this time, one must reference the article that applies to Type AC cable when installing Type MC or Type NM cable in attic spaces. It would add clarity to the code by moving this section to 300.4 with the stipulation that it only applies to Type NM, AC, and MC cables. The entire purpose for this section is for the protection of the cables.
Panel Meeting Action: Reject
Panel Statement: The text in 320.23 (a) is specific and addresses the unique installation requirements of type AC, MC, and NM cable when installed in accessible attics.
The rules, as they are currently written, are conveniently located within the very limited articles that they apply. There is no substantiation that implies that relocating the rules within the text of 300.4 will enhance code "usability". Article 300 normally contains requirements that apply in general. When a user selects a particular cable type, it is convenient to have all the rules specific to that cable type in the same Article.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 324 — FLAT CONDUCTOR CABLE: TYPE FCC

7-6 Log #927 NEC-P07 **Final Action: Accept**
(324)

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-13
Recommendation: We agree with the panel action on this proposal. See my Comment on Affirmative Vote on the Proposal.
Substantiation: The panel acted properly on this proposal. Article 324 is a unique wiring method, and should remain isolated from any other wiring methods.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-7 Log #601 NEC-P07 **Final Action: Accept**
(324.10(H))

Submitter: Henry A. Jenkins, Wake County, Inspections Development / Rep. N.C. Ellis Cannady Chapter of I.A.E.I
Comment on Proposal No: 7-17
Recommendation: We support the proposal.
Substantiation: None given.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-8 Log #1208 NEC-P07 **Final Action: Accept**
(324.10(H))

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 7-17
Recommendation: We support the panel's action in Accepting this Proposal as written.
Substantiation: None.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 328 — MEDIUM VOLTAGE CABLE: TYPE MV

7-9 Log #982 NEC-P07 **Final Action: Accept in Principle**
(328.10 and 328.12)

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 7-22
Recommendation: Revise as follows:
328.10 Uses Permitted
Type MV cable shall be permitted for use on power systems rated up to 35,000 volts nominal as follows:
(1) In wet or dry locations
(2) In raceways
(3) Direct buried in accordance with 300.50
(4) In messenger-supported wiring
(5) As exposed wiring in locations accessible to qualified persons only as permitted in 300.37
FPN: The ``Uses Permitted'' is not an all-inclusive list.
328.12 Uses Not Permitted
Unless identified for the use, Type MV cable shall not be used as follows:
(1) Where exposed to direct sunlight
(2) In cable trays, <u>unless permitted</u> in accordance with 392.3~~(B)(2)~~
(3) Direct buried, unless in accordance with 300.50
Substantiation: The resulting action of the Panel's action in the proposal was to not permit the use of MV cable at all in 328.10 and 328.12. By adding "unless permitted in accordance with 392.3", MV cable can now be used as stated in 392.3(B)(2).

Panel Meeting Action: Accept in Principle

Revise 328.10 of the current code as follows:

Renumber (3), (4), and (5) as (4), (5), and (6) respectively

Add "(3) In cable trays, where identified for the use, in accordance with Part II of Article 392

In (5), add the phrase "in accordance with Part II of Article 396" so it reads: "(5) In messenger-supported wiring in accordance with Part II of Article 396" In (6), delete the phrase "wiring in locations accessible to qualified persons only as" so it reads "(6) As exposed runs in accordance with 300.37"

Revise 328.12 of the current code as follows:

Delete (2) and (3) and revise to read:

"328.12 Uses Not Permitted. Type MV cable shall not be used where exposed to direct sunlight, unless identified for the use.

Panel Statement: Section 328.12(2) was relocated to 328.10(3) in accordance with Item 4 in 3.3.1 of the NEC Style Manual which encourages the use of positive language, whenever possible. The reference in (3) was changed from 392.3(B)(2) to Part II of Article 392 to correlate with the Action on Proposal 8-180 and there are other applicable sections in Part II, such as 392.13(F) and 392.15 that apply in addition to 392.10. The applicable reference was added in (5). 300.37 is applicable to all aboveground wiring methods, not just to locations accessible to qualified persons only.

Section 328.12 was revised since (2) was relocated to 328.10(3) and (3) was deleted. Since only (1) remained, the list was deleted and the text included in the first sentence of 328.12.

The Panel Action on Comment 7-12 modifies this Panel Action.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

7-10 Log #735 NEC-P07 **Final Action: Accept**
(328.11)

Submitter: Robert Kelleher, Paramount Electrical Services

Comment on Proposal No: 7-21

Recommendation: Continue to Reject .

Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP7 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

7-11 Log #849 NEC-P07 **Final Action: Accept**
(328.11)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.

Comment on Proposal No: 7-21

Recommendation: The panel is encouraged to continue to Reject Proposal 7-21.

Substantiation: The reasons to continue to Reject the Proposal are as follows:

1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.

2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.

3. These standards are also covered by a Fine Print Note in 110.12.

4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.

5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).

6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

7-12 Log #677 NEC-P07 **Final Action: Accept in Principle**
(328.12)

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 7-22

Recommendation: I agree with the Panel Action on the Proposal to Accept in Principle, however, the following additional text should be added for clarity.

Add an Exception following 328.10(5) before the FPN to read:

Exception to (5): Type MV cable that also complies with the requirements for Type MC cable and is identified as "MV or MC" shall be permitted to be installed as exposed runs of metal-clad cable in accordance with 300.37.

Add the following Exception following 328.12(2) to read:

Exception to (2): Type MV cable that also complies with the requirements for Type MC cable and is identified as "MV or MC" shall be permitted to be installed in cable trays in accordance with 392.3(A).

Substantiation: These two Exceptions do not introduce new material nor change any existing requirements; they merely clarify what is currently permitted in the Code.

330.112(B) permits Type MC Cable to contain insulated conductors rated over 600 volts in accordance with Table 310.61 through Table 310.64 [Tables 310.13(B) through 310.13(E) in the ROP preprint]:

Table 310.61 Conductor Application and Insulation

Table 310.62 Thickness of Insulation for 601- to 2000-Volt Nonshielded Types RHH and RHW.

Table 310.63 Thickness of Insulated Conductors Rated 2400 Volts and Jacket for Nonshielded Solid Dielectric Insulation.

Table 310.64 Thickness of Insulation for Shielded Solid Dielectric Insulated Conductors Rated 2001 to 35,000 Volts.

UL 1569

, Standard for Metal-Clad Cables, and UL 1072, Standard for Medium-Voltage Power Cables, both include a provision that "A multiple-conductor Type MV cable with a smooth (other than lead) or corrugated metal sheath or with interlocked metal armor may be marked for use also as Type MC cable." UL 1569 also permits the marking "for CT use" or "for use in cable trays" on those Type MC cables that do not have an overall jacket or, if jacketed, passes the vertical-tray flame test to qualify for tray installation.

Therefore, a medium voltage cable that complies with the requirements of both UL 1569 and UL 1072 and is marked "MV or MC" can be installed wherever either or both cable types are permitted in the NEC. Single or multiconductor cables that only comply with Type MV requirements and are only marked "Type MV" or "MV", with or without the 90C or 105C conductor temperature designation, are properly limited to industrial establishments only in accordance with 392.10(B).

392.10(A) states that: "The wiring methods in Table 392.10(A) shall be permitted to be installed in cable tray systems under the conditions described in their respective articles and sections." Therefore, the conditions under which Medium Voltage Type MC cables are permitted to be installed in cable tray should be specified in Part II of Article 328.

The substantiation for exposed runs of "MV or MC" cables in the first Exception is that 330.10(A)(4) permits Type MC cable to be installed "exposed or concealed".

The substantiation for the installation of "MV or MC" cables in cable tray in any location is that 330.10(A)(6) permits Type MC cable to be installed "in cable tray where identified for such use".

Panel Meeting Action: Accept in Principle

The Panel Accepts in Part the Exception to (5) in 328.10 to immediately follow (6), before the FPN to read:

"Exception: Type MV cable that has an overall metallic sheath or armor, also complies with the requirements for Type MC cable, and is identified as "MV or MC" shall be permitted to be installed as exposed runs of metal-clad cable in accordance with 300.37."

The Panel accepts in part the second Exception to immediately follow 328.10(3) to read:

"Exception: Type MV cable that has an overall metallic sheath or armor, also complies with the requirements for Type MC cable and is identified as "MV or MC" shall be permitted to be installed in cable trays in accordance with 392.10(A)."

Panel Statement: The Panel added the phrase "has an overall metallic sheath or armor" to specifically require an overall armor, compliance with all the requirements for Type MC cable and not just compliance with the mechanical requirements for MC cable.

Exception to (5) was changed to an Exception under (6) and Exception to (2) was changed to an Exception under (3) to correlate with the Panel Action on Comment 7-9.

The reference in the Exception to (3) was changed from 392.3(B)(2) to 392.10(A) to correlate with the Action on Proposal 8-180 and to provide the correct reference.

Location of the Exceptions immediately following the main rule to which they apply is in accordance with 2.6.1 of the NEC Style Manual.

This Panel Action modifies the Panel Action on Comment 7-9.

Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 330 — METAL-CLAD CABLE: TYPE MC

7-13 Log #928 NEC-P07 **Final Action: Reject**
(330.10(A)(7) (New))

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-25
Recommendation: The Panel should have accepted this proposal.
Substantiation: This is a safety issue that is directly related to proper grounding. The additional text would prevent ongoing infractions that continue to occur in the field.
Panel Meeting Action: Reject
Panel Statement: Sections 300.10 and 300.15 define the requirements for grounding the metallic armor or sheath.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:

LADART, S.: We disagree with the panel action. Proposal 7-25 addresses a grounding issue. The panel is correct in stating that Sections 300.10 and 300.15 define the requirements for grounding the metallic armor or sheath; however, infractions continue to frequently occur in the field. The acceptance of Proposal 7-25 would help eliminate the problem. The new provision (7), to 330.10(a) would give clear guidance to installers that: "when installing MC cable within a raceway the MC cable must be terminated in a fitting that provides grounding of the metal sheath." This is a safety issue.

The added prescriptive language could possibly prevent the wrongful practice of leaving the "free end" of MC cable "dangling" within an enclosure as it exits a raceway.

7-14 Log #1096 NEC-P07 **Final Action: Accept**
(330.10(B))

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 7-26
Recommendation: The Panel Action should continue to be Accept and correct the word "Part" to "Parts".
Substantiation: Grammatical correction to agree with the text in the 2005 Code and the Preprint of the 2008 Code.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-15 Log #2202 NEC-P07 **Final Action: Accept in Principle**
(330.12)

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 7-28
Recommendation: Revise text to read as follows:

330.12 Uses Not Permitted

1) Where subject to physical damage.

2) Under the following conditions unless the metallic sheath is suitable for the conditions or is protected by material suitable for the conditions:

a. For direct burial in the earth

b. For installation in concrete

FPN: MC cable that is identified for direct burial application is suitable for installation in concrete.

c. Where subject to cinder fills, strong chlorides, caustic alkalis, or vapors of chlorine or of hydrochloric acids.

Substantiation: The above revisions contain no technical changes. The reason for Proposal 7-28 was to clarify that MC is not permitted where subject to physical damage. The text in the 2005 NEC is confusing and is sometimes interpreted to mean that MC cable is allowed where subject to physical damage if the metallic sheath is suitable for the conditions. MC cable is not listed for use where subject to physical damage, regardless of the type of metallic sheath. While the submitter of this proposal attempted to clarify this, it could still be interpreted that MC cable may be used where subject to physical damage if the metallic sheath is suitable for the condition. The revision submitted in this comment makes it very clear that MC cable is not permitted where subject to physical damage.

The 1999 NEC was much clearer about the use of MC cable where exposed to physical damage. Section 334-3 Uses Permitted stated: "Unless specifically prohibited elsewhere in this Code and where not subject to physical damage, Type MC cables shall be permitted as follows."

When the cable articles were rewritten during the 2002 Code cycle, this requirement became much less clear and has caused confusion in the field.

Panel Meeting Action: Accept in Principle

Revise 330.12 to read as follows:

"330.12 Uses Not Permitted. Type MC cable shall not be used where:

(1) subject to physical damage

(2) exposed to any of the destructive corrosive conditions in (a) or (b), unless the metallic sheath or armor is resistant to the conditions or is protected by material resistant to the conditions:

(a) direct buried in the earth or embedded in concrete unless identified for direct burial

(b) exposed to cinder fills, strong chlorides, caustic alkalis, or vapors of chlorine or of hydrochloric acids"

Panel Statement: List identification and styles are in accordance with the NEC Style Manual. List item (2) was revised for consistency with the other list item. (a) and (b) were combined into one list item since the identification for direct burial also permits embedment in concrete and (c) was re-identified as (b). A FPN can only be informative, so it was combined into the rule and, since the Style Manual includes the word "suitable" as being a possibly unenforceable or vague term, it was changed to "resistant".
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-52 Log #946 NEC-P07 **Final Action: Reject**
(330.12)

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-28
Recommendation: The Panel should have rejected this proposal.
Substantiation: Type MC cable should not be installed where exposed to physical damage. Removing the text from the "uses not permitted" section (330.12 (1) is not consistent with other cabling articles.
Panel Meeting Action: Reject
Panel Statement: Proposal 7-28 did not propose the deletion of "subject to physical damage" only its relocation within the section. Also see the panel action and statement on Comment 7-15.

The panel notes that the recommendation was submitted as effecting 338.12 but actually applies to 330.12
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-16 Log #1980 NEC-P07 **Final Action: Reject**
(330.80(B)(1))

Submitter: Robert Konnik, Rockbestos-Surprenant
Comment on Proposal No: 7-36
Recommendation: Change section 330.80(B)(1) from Table 310.20 to 310.17 as shown below for high temperature MC cables.

(B) Single type MC Conductors Grouped Together. Where single Type MC conductors are grouped together in a triangular or square configuration and installed on a messenger or exposed with a maintained free air space of not less than 2.15 times one conductor diameter (2.15 X OD) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of the conductors shall not exceed the allowable ampacities in the following tables:

(1) Table 310.20 for conductors rated 0 to 2000 volts.

a. Exception: MC cables with silicone rubber insulation may use Table 310.17.

(2) Tables 310.67 and 310.68 for conductors rated over 2000 volts.

Substantiation: This would make 330.80(B)(1) the same as 332.80(B) for MI cables and MC cables with high temperature insulation. If the ampacity in Table 310.17 is acceptable for MI cable, it should be acceptable for MC cable. I do not believe it is germane that MI cable insulation may be able to withstand temperatures greater than 90oC, but since the panel believes this is a requirement, I have modified the proposal to be specific to MC cable with silicone rubber insulation since silicone rubber is rated for special applications at 200oC.
Panel Meeting Action: Reject
Panel Statement: Section 310.10 states "No conductor shall be used in such a manner that its operating temperature exceeds that designated for the type of insulated conductor involved." The explanatory FPN states "The temperature rating of a conductor [see Table 310.13(A) and Table 310.13(B)] is the maximum temperature, at any location along its length, that the conductor can withstand over a prolonged time period without serious degradation."

The standard rating for Type SA is 90ºC (194ºF) for dry and damp locations. The 200ºC (392ºF) rating is for special applications such as a high ambient temperature in the vicinity of a heat source, such as a blast furnace, and the ampacity correction factors in Tables 310.20 and 310.17 will correct the allowable ampacity to a lower value where the insulation will not be degraded under normal operating conditions.

When subjected to extremely high ambient temperatures for extended periods of time, the highly compressed refractory mineral insulation in Type MI cable will not suffer degradation.

Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 334 — NONMETALLIC-SHEATHED CABLE: TYPES NM, NMC, AND NMS

7-17 Log #41 NEC-P07 **Final Action: Accept**
(334.10)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 7-42a
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the Affirmative Comment relative to conformance to the NEC Style Manual, as expressed in the voting. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider. See the panel action on Comments 7-19 and 7-20.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-18 Log #936 NEC-P07 **Final Action: Accept**
(334.10)

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-42a
Recommendation: The panel should have rejected this proposal.
Substantiation: The code already clearly indicates that the installation is permissible.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-19 Log #1098 NEC-P07 **Final Action: Reject**
(334.10)

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 7-42a
Recommendation: The Panel Action should be to Accept in Principle and revise the section to read as follows:
Relocate (4) to immediately follow (3).
The FPNs should immediately follow (4) and be in the sequence shown and read as follows:
FPN No. 1 to (1), (2), (3), and (4): Types of building construction and occupancy classifications are defined in NFPA 220-1999, Standard on Types of Building Construction, or the applicable building code, or both. See Annex E for a summary of the Types of Construction [NFPA 220, Table 3.1].
~~FPN No. 2 to (1), (2), (3), and (4): See Annex E for a summary of the Types of Construction [NFPA 220, Table 3.1].~~
FPN No. 2 to (1), (2), (3), and 4: See 310.10 for temperature limitation of conductors.
FPN No. 3 to (2), (3), and 4: NM cable may be installed in any Type of construction in buildings if the building code permits the building to be Type III, IV, or V construction.
Substantiation: The revisions proposed do not change any existing requirements; they just further clarify the requirements and enhance useability. The placement of the FPNs provides logical placement of the FPNs and defines the specific list items to which each FPN applies.
FPN No. 2 revised for clarity to agree with the title in Annex E and combined with FPN No. 1 since both FPNs are related to the same information and reference the same NFPA standard.
FPN No. 3 was revised to eliminate the mandatory language to comply with 3.1.3 of the NEC Style Manual.
Panel Meeting Action: Reject
Panel Statement: The use of NM Cable in dwellings and structures that are permitted to be Type III, IV, or V construction but are constructed to Type I or II requirements is already permitted in 334.10 (2), (3), and (4).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-20 Log #1839 NEC-P07 **Final Action: Reject**
(334.10, FPN 2 (New))

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 7-42a
Recommendation: Add new FPN as follows:
FPN No. 2 to (2), (3) and (4): It is the intent of this section to allow NM Cable in any type of construction in buildings that the adopted building code permits to be of Type III, IV, or V construction.
Substantiation: Mr. Daly is correct in his assessment of the proposed language violating the Style Manual; however, his suggestion also does not comply.

Section 3.1.2 of the Style Manual states that the term "may" "shall only be used where it recognizes a discretionary judgment on the part of an authority having jurisdiction."
Panel Meeting Action: Reject
Panel Statement: The use of NM Cable in dwellings and structures that are permitted to be Type III, IV, or V construction but are constructed to Type I or II requirements is already permitted in 334.10 (2), (3), and (4).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-20a Log #1779 NEC-P07 **Final Action: Reject**
(334.10(3))

Submitter: Joseph A. Hertel, Safety and Buildings
Comment on Proposal No: 7-45
Recommendation: Support proposal 7-45 and revise 334.10(3) by deleting the second sentence.
Substantiation: The CMP has written a rule that is ignored. While this creates a violation of the NEC, there is certainly no increased hazard in wiring buildings as they have been done for the past 40 years. A garden shed behind a dwelling cannot be wired with NM cable without covering the wiring with a 15 minute finish rating. Is this the intent of the panel? The same applies to a detached garage as well as agricultural facilities since other nonmetallic cable articles refer to Article 334 for installation requirements. To create a list of exceptions is not in the interest of a usable code. The CMP has taken the basic rule and in the 2002 edition of the NEC added language that restricts the use of the wiring method for no apparent purpose other than restraint of trade. The basic requirement in the 1999 NEC restricted the wiring method to structures three floors or less above grade. I am not aware of any change in the composition of NM cable since 2002 that creates a hazard when the method is used in other than dwellings.
Panel Meeting Action: Reject
Panel Statement: Violations of the NEC requirements are not reason for changing requirements of the Code. The present text is inclusive of all "Other Structures". The substantiation addresses only unfinished garages and agriculture installations where Type UF cable is preferred. No substantiation has been submitted to address why the 15- minute finish rating for these and other commercial and non-residential installations should not be required. The panel advises the submitter that these installations might be more appropriately addressed under the Type UF Cable Article.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-21 Log #678 NEC-P07 **Final Action: Reject**
(334.10(3))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 7-45
Recommendation: The Proposal should be Accept in Principle with the addition of an exception immediately following 334.10(3) to read:

"Exception to (3): When Type UF cable is installed as nonmetallic-sheathed cable in animal housing facilities classified as storage occupancies, the cable shall not be required to be concealed within walls, floors, or ceilings that provide a thermal barrier of material that has at least a 15-minute finish rating."

Revise existing "FPN No. 1" to "FPN No. 1 to (2) and (3)" and "FPN No. 2" to "FPN No. 2 to (2) and (3)".

Add an additional Fine Print Note after FPN No. 2 to read:

"FPN No. 3 to Exception: Classification of animal housing facilities as storage occupancies is defined in NFPA 1-2006, Uniform Fire Code, NFPA 101-2006, Life Safety Code, and NFPA 5000-2006, Building Construction and Safety Code."
Substantiation: The Panel was not aware of this information during consideration of the Proposal at the ROP meeting.

The three NFPA Codes classify any type of animal housing facility as a storage occupancy, defined as an "occupancy used for the storage or sheltering of goods, merchandise, products, vehicles, or animals." A storage occupancy is typically characterized by the presence of few people, usually only owners and employees. If members of the public enter the building, the building can no longer be considered simply a storage occupancy. Additional information is contained in the NFPA Journal, November/December 2004 issue, page 22.

At its July 2004 meeting, the NFPA Standards Council approved an expansion of NFPA 150, Racetrack Stables, to include life and fire safety requirements for both humans and animals in all types of animal housing facilities and it changed the name of the committee to the Technical Committee on Animal Housing Facilities.

The submitter is correct that the use of gypsum wallboard or other thermal barriers is not appropriate in animal housing facilities. Also, 340.10(3) permits Type UF Cable to be used in wet locations.

The proposed Exception will provide appropriate and justified relief from concealing the cable in this very specific type of installation.

The revision to the numbering of FPN No. 2 and FPN No. 3 is in compliance with 2.6.1 of the NEC Style Manual.

The addition of FPN No. 3 provides the user with a source of additional NFPA information regarding the classification of animal housing facilities.

Panel Meeting Action: Reject

Panel Statement: When UF cable is installed as NM cable it must comply with the installation requirements of Article 334 in accordance with 340.10(4).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

7-22 Log #1782 NEC-P07 **Final Action: Reject**
(334.10(3))

Submitter: Joseph A. Hertel, Safety and Buildings
Comment on Proposal No: 7-42
Recommendation: Revise 334.10(3) to say:

(3) Other structures permitted to be of Types III, IV, and V construction except as prohibited in 334.12.

Substantiation: The 1999 NEC limited the use of NM cable to buildings or structures not exceeding three floors above grade without the additional protection of a 15 minute finish rating. The current language requires a 15 minute finish rating in all but dwelling occupancies while the building Type limits the height of buildings to 5 or 6 stories depending on fire protection. The Code Panel says there is no substantiation to address the removal of the 15 minute finish rating. Based on the previous editions of the NEC I cannot find any substantiation to keep the requirement. Can the CMP provide substantiation of what happened in the last two code cycles to make Nonmetallic-Sheathed cable hazardous?

Panel Meeting Action: Reject

Panel Statement: The current text was accepted by the Panel following an appeal that resulted in a decision by the NFPA Standards Council to accept Proposal 7-137 of the NEC 2001 Report on Proposals, which was subsequently upheld by the NFPA Board of Directors.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

7-23 Log #937 NEC-P07 **Final Action: Reject**
(334.10(5) (New))

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-47
Recommendation: The panel should have accepted this proposal.
Substantiation: This is a safety issue. Protecting wiring within residential air returns should be required, and appear as text within the confines of Article 334.

Panel Meeting Action: Reject

Panel Statement: The submitter has not provided any new technical basis or documentation to support the change.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

LADART, S.: We disagree with the panel action. This is a safety issue. Proposal 7-47 suggests that: Wiring placed within residential air returns be protected by a metal raceway in order to reduce the possible spread of fire.

Although there was no technical basis or documentation to support the change, many AHJ's do not allow "any" wiring method to penetrate the space; therefore, it seems logical that protecting the cable by placing it within a metal raceway is a minimum effort to prevent the "spread of fire".

7-24 Log #42 NEC-P07 **Final Action: Accept**
(334.12)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 7-50
Recommendation: The Technical Correlating Committee directs the panel to clarify the action on this proposal. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accept the TCC direction. The panel reaffirms the action taken on Proposal 7-50 to "Revise 334.12(B)(4) to read "In wet or damp locations."" No other action is intended.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

7-25 Log #334 NEC-P07 **Final Action: Reject**
(334.12)

Submitter: Ronald G. Nickson, National Multi Housing Council
Comment on Proposal No: 7-49
Recommendation: Delete text as follows:

334.12 Uses Not Permitted. Type, NM, NMC, and NMS cables shall not be used under the following conditions or in the following locations:

~~(1) For multifamily dwellings of other than Types III, IV, and V construction.~~

~~(2) For non-dwelling structures of other than Type III, IV, and V construction where the cables are not concealed within walls, floors and ceilings that provide a thermal barrier of materials that has at least a 15-minute finish rating as identified in listings of fire rated assemblies.~~

~~FPN No. 1: Building constructions are defined in NFPA 220-1999, Standard on Type of Building Construction, or the applicable building code, or both.~~

~~FPN No. 2: See Annex E for determination of building types (NFPA 220, Table 3.11).~~

~~(3)~~ (1) For cable tray installations unless the cable is identified for the use.

~~(4)~~ (2) For open run installations in dropped or suspended ceilings in other than one- and two-family and multifamily dwellings.

~~(5)~~ (3) For installation as service entrance-cable.

~~(6)~~ (4) For use in commercial garages having hazardous (classified) locations, except in accordance with 511.3(B).

~~(7)~~ (5) For use in theaters and similar locations, except where permitted in 518.4.

~~(8)~~ (6) For use in motion picture studios.

~~(9)~~ (7) For use in storage battery rooms.

~~(10)~~ (8) For use in hoistways, or on elevators or escalators.

~~(11)~~ (9) For installations embedded in poured cement, concrete, or aggregate.

~~(12)~~ (10) For use in hazardous (classified) locations, except where permitted in the following:

Substantiation: The proposed new wording adds additional restrictions on the use of NM cable well beyond what was acted on and approved by the decision of the NFPA Standards Council in accepting Proposal 7-137 of the NEC 2001 Report on Proposals, which was subsequently upheld by the NFPA Board of Directors. Specifically, the limitation that NM cable can only be used in Types III, IV, and V construction conflicts with the provisions of 334.10 which specifically allows NM cable in buildings "permitted to be" of Types III, IV, and V construction as clarified in the new FPN accepted per Log 7-42a.

In addition, the substantiation for the change only addressed the issues concerning us in normally dry locations and the expansion of the language for uses in damp locations.

The two FPNs are already included under 334.10 of the 2005 NEC.

Panel Meeting Action: Reject

Panel Statement: See panel action on Comment 7-18. The action on Proposal 7-49 included only Part B item (4).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

7-26 Log #938 NEC-P07 **Final Action: Reject**
(334.12 Exception (New))

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-51
Recommendation: The panel should have rejected this proposal.
Substantiation: This is a safety issue. Type NM cable should not be allowed to be routinely installed within a raceway system. The installation will contribute to short circuits, ground faults, and the overheating of conductors.

Panel Meeting Action: Reject

Panel Statement: The Exception limits installation of NM type cables into raceways that are authorized to be installed in Type I and II construction. The ampacity of NM type cables is specified in 334.80, is required to be corrected for ambient temperature and adjusted for more than 3 conductors in a raceway or cable. Chapter 9, Note to Tables (9) stipulates that the major diameter of elliptical cables shall be used to calculate the raceway fill.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

LADART, S.: We disagree with the panel action. Proposal 7-51 should be rejected.

Type NM cable is not designed to be routinely installed within a conventional raceway system. Raceway systems are allowed to contain as much as 360 degrees of total bend between pull points. Damage to the outer sheath of NM cable, (which is listed for use of up to 600 volts) could easily occur when installed within the confines of the raceway articles.

There are also reasonable concerns relating to the safe dissipation of heat. Conductors that are contained within a sheath, and then further confined within a raceway, and then possibly placed within thermal insulation creates a potential ignition source for a fire. The build up of heat will contribute to conductor insulation degradation that could ultimately lead to short circuits and ground faults: Clearly, something that the code requires that we avoid. This becomes a safety issue. Although the ampacity of NM cable is specified in 334.80, the acceptance of Proposal 7-51 establishes a new "condition of use" for NM cable with no technical substantiation for such an allowance.

7-27 Log #2203 NEC-P07 **Final Action: Reject**
(334.12 Exception)

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 7-51
Recommendation: Reject this Proposal.
Substantiation: During the Panel discussion in January, it was noted that this hybrid cable is not in production. When this comment was submitted during the 2005 NEC cycle, no data was presented to support the installation of this hybrid NM cable in a raceway system. We agree with the negative comments of Mr. Brown that Panel 6 would need to review such issues as heat dissipation, possible physical damage to the cable when pulled in a raceway, etc. Or a Fact-Finding Report should be submitted to assure that there are no negative consequences of installing the cable in a raceway. Types I and II buildings are generally hi-rise buildings where the safety of the wiring system is especially critical.
Panel Meeting Action: Reject
Panel Statement: The Exception limits installation of NM type cables into raceways that are authorized to be installed in Type I and II construction. The ampacity of NM type cables is specified in 334.80, is required to be corrected for ambient temperature and adjusted for more than 3 conductors in a raceway or cable. Chapter 9, Note to Tables (9) stipulates that the major diameter of elliptical cables shall be used to calculate the raceway fill.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-28 Log #988 NEC-P07 **Final Action: Reject**
(334.12(1))

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-57
Recommendation: The panel should have accepted this proposal.
Substantiation: Consistency should remain throughout the code. Other cabling articles list the requirements concerning physical damage in their respective articles. The same requirement should appear in Article 334.
Panel Meeting Action: Reject
Panel Statement: Section 300.4 addresses protection against physical damage for all wiring methods, and it is not necessary to repeat the requirements in 334.12. In addition the requirements of 334.15(B) address physical protection of the cable.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
SCHUMACHER, D.: This comment should have been accepted, Type NM cables are prone to be installed in all types of locations and conditions, and as they are the most commonly used, and the easiest to damage, they should be afforded more protection. 300.4 and 334.15(B) address how to protect cables in certain installation environments, but they do not forbid the installation of cables in all damaging locations.

7-29 Log #939 NEC-P07 **Final Action: Reject**
(334.12(A)(11) (New))

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-54
Recommendation: The panel should have accepted this proposal.
Substantiation: This is a safety issue. Every attempt should be made to stop the spread of fire. We recommend a Fine Print Note to accomplish this objective.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any new technical basis or documentation to support the change.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
LADART, S.: We disagree with the panel action. This is a safety issue. Proposal 7-47 suggests that: "Wiring placed within residential air returns be protected by a metal raceway in order to reduce the possible spread of fire".
Although there was no technical basis or documentation to support the change, many AHJ's do not allow "any" wiring method to penetrate the space; therefore, it seems logical that protecting the cable by placing it within a metal raceway is a minimum effort to prevent the "spread of fire".

7-30 Log #644 NEC-P07 **Final Action: Reject**
(334.15(C))

Submitter: Mark Shapiro, Farmington Hills, MI
Comment on Proposal No: 7-58
Recommendation: Reject the proposed new wording.
(C) In Unfinished Basements ~~and Crawl Spaces.~~ Where cable is run at angles with joists in unfinished basements ~~and crawl space.~~
Substantiation: Where is there a problem with securing NM Cable to the underside of crawl space joists? To drill holes in joists, so as to raise the cables, is to weaken the building's structure.
Are we requiring this just because it is not uniform with the requirements in basements? So what? There is a level of homeowner activity in a basement that justifies the requirement to protect the cables there. Very little goes on in a crawl space and anyone working there is going to be a lot more aware of the surroundings than someone moving things around in a basement.
In other words, the claim in the original substantiation that, "the same dangers exist in both basements and crawl spaces" is simply not true.
Finally, on a purely practical level (dare I mention that); aside from the unnecessary structural weakening that would result from this proposal, is there a problem that makes it worthwhile requiring people to expend the extra labor?
Panel Meeting Action: Reject
Panel Statement: NM cable needs to be protected from physical damage in crawl spaces just as it is in other locations.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-31 Log #943 NEC-P07 **Final Action: Reject**
(334.15)

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-58
Recommendation: The panel should have rejected this proposal.
Substantiation: This is a safety issue. This proposal will allow for unprotected wiring to be surface-installed directly to the lower edges of joists in (crawl spaces). Without a definition on what a crawl space is, this quickly becomes a hazardous situation. We feel as though there should be some well-defined height restrictions placed on the installation.
Panel Meeting Action: Reject
Panel Statement: NM cable needs to be protected from physical damage in crawl spaces just as it is in other locations.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
LADART, S.: We disagree with the panel action. Proposal 7-58 should have been rejected. The proposal will allow cables that are not smaller than No. 6 AWG or three No. 8 AWG conductors to become fastened directly to the lower edges of joists (in a crawl space). A "crawl space" is not defined in the NEC. Without placing "height restrictions" or defining a "crawl space", this added provision quickly becomes a safety issue. For example: A crawl space may exist beneath a building on a conventional foundation. An individual would have to navigate under surface mounted wiring, (possibly in a tight space), while attempting to move around under the building. The individual could snag the wiring and pull it away from its fastening. "Tight spaces" are already an impediment to performing work. Surface mounted cables should not be located in these types of spaces.
Without defining "crawl space", there are no guidelines or restrictions for allowing a lessening of the current rules. The panel action statement suggests that "adding crawl spaces" to the rules governing "unfinished basements" provides added protection for NM cable from physical damage because all of the rules pertaining to unfinished basements will now apply to crawl spaces as well. 300.4 requires NM cable, regardless of size to be protected from physical damage when installed through or parallel to framing members. We now have the acceptance of a proposal which is a lessening of current code requirements, with a panel action statement that suggests a strengthening of code requirements.

7-32 Log #355 NEC-P07 **Final Action: Accept**
(334.15(B))

Submitter: Code-Making Panel 8,
Comment on Proposal No: 7-62
Recommendation: CMP-8 supports the action on this proposal by CMP-7.
Substantiation: CMP-8 supports the action on this proposal and agrees with omitting the word "rigid" in two places.

This comment has been balloted through CMP-8 with the following ballot results:

12 Eligible to Vote
11 Affirmative
1 Negative

Mr. J. Dabe voted negatively stating: "CMP-8 recommends that CMP-7 reconsider this proposal and Accept it. The word "rigid" is correctly used here and is used in 300.5 also. CMP-8 has Accepted proposal to change nonmetallic to PVC."

Mr. R. Loyd voted affirmatively stating: "Proposal 7-62 was to Accept in Principle in Part. I agree with the CMP-7 action.

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-33 Log #602 NEC-P07 **Final Action: Accept**
(334.15(B))

Submitter: Henry A. Jenkins, Wake County, Inspections Development / Rep. N.C. Ellis Cannady Chapter of I.A.E.I
Comment on Proposal No: 7-61
Recommendation: We support the proposal.
Substantiation: None given.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-34 Log #1209 NEC-P07 **Final Action: Accept**
(334.15(B))

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 7-61
Recommendation: We support the Proposal as Accepted in Principle.
Substantiation: Adding the words "or grooves" to the words "in shallow chases" adds to the clarity of the original proposal. The new to read "in shallow chases or grooves."
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-35 Log #43 NEC-P07 **Final Action: Accept**
(334.15(C))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 7-63
Recommendation: The Technical Correlating Committee directs the panel to reconsider this proposal and correlate with action taken on Proposal 7-58. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC. The panel action on Proposal 7-58 modifies the panel action on Proposal 7-63.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-36 Log #408 NEC-P07 **Final Action: Hold**
(334.15(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-63
Recommendation: Revise panel third sentence:

NM cable installed on the wall of a ~~an unfinished~~ basement or garage shall be permitted...(remainder unchanged).

Substantiation: While this is apparently not prohibited by present code and has been a common practice, it is worthwhile as clarification. However, it should not be limited to unfinished basements. It is applicable to garage walls, finished walls etc., where NM cable is permitted.
Panel Meeting Action: Hold
Panel Statement: The panel holds Comment 7-36 for further study in accordance with 4.4.6.2.2(a) of NFPA Regulations Governing Committee Projects.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-37 Log #944 NEC-P07 **Final Action: Reject**
(334.15(C))

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-67
Recommendation: The panel should have rejected this proposal. The panel accepted it in principal in part.
Substantiation: The panel should not allow the lessening of a current code requirement on the installation of type NM cable in a crawl space. Our concern is that a crawl space is not defined. What's the difference between a crawl space and a similar area? How is the AHJ going to make his or her ruling?
Panel Meeting Action: Reject
Panel Statement: The term "crawl space" is accepted construction industry terminology while the term "similar area" is a possibly unenforceable and a vague term which 3.2.1 of the NEC Style Manual states should not be used in the NEC.

NM cable needs to be protected from physical damage in crawl spaces just as it is in other locations.

Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-38 Log #1076 NEC-P07 **Final Action: Reject**
(334.15(C))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 7-67
Recommendation: Revise text to read as follows:

(C) Unfinished Basements, and Crawl Spaces ~~and Similar Areas~~. Where cable is run at angles with joists in unfinished basements or areas of buildings that are too low to be legal for habitation nor suitable for storage...".

Substantiation: I agree with Mr. Brown that "crawlspaces" should be defined.
Panel Meeting Action: Reject
Panel Statement: The phrase "legal for habitation nor suitable for storage" is vague and unenforceable. This phrase leaves too much subject to interpretation and would not be permitted by 3.2.1 of the NEC Style Manual.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-39 Log #44 NEC-P07 **Final Action: Accept**
(334.80)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 7-72
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered based on the action taken on Proposal 1-19. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The Panel reconsidered its Action on Proposal 7-72 to Accept in Principle and the wording as modified in the Panel Action on Proposal 7-72 eliminates any conflict with the Action taken by Panel 1 on Proposal 1-19.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-40 Log #679 NEC-P07 **Final Action: Accept**
(334.80)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 7-72
Recommendation: The Panel should continue to Accept in Principle, however, the wording should be revised as follows:

Where more than two NM cables containing two or more current-carrying conductors ~~pass~~ are installed, without maintaining spacing between cables, through the same opening in wood framing that is to be fire- or draft-stopped using thermal insulation, caulk, or sealing foam, the allowable ampacity of each conductor shall be adjusted in accordance with Table 310.15(B)(2)(a) and the provisions of 310.15(A)(2), Exception, shall not apply.

Substantiation: The revised wording provides additional clarity regarding the specific installation conditions and consistency with the text used in the third paragraph.

The Panel Action eliminated the word "bundled" and, as indicated in the panel statement, the revised wording more accurately describes the installation so there is no conflict with Proposal 1-19. The definition proposed in Proposal 1-19 is not appropriate nor applicable to the installation conditions addressed in this section since there is no requirement that the cables be physically bound together.

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-41 Log #1255 NEC-P07 **Final Action: Accept**
(334.80)

Submitter: Travis Lindsey, Travis Lindsey Consulting Services / Rep. Copper Development Association
Comment on Proposal No: 7-70
Recommendation: I support the panel action to Accept in Part.
Substantiation: The submitter has correctly addressed an oversight that needs to be corrected.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-42 Log #1862 NEC-P07 **Final Action: Reject**
(334.80)

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 7-74
Recommendation: Reject this Proposal.
Substantiation: There is still no historical data of that shows any real life instances of this being a problem. The tests that are cited were most probably done with the cables subjected to currents at 100 percent of their rated values. The heating of the cable varies with the square of the current ratio. 90% current = 81% heating; 80% current = 54% heating; 70% current = 49% heating, and so forth. Considering the provisions of 210.19 and 210.20, it is very seldom that cables are every carrying their full ampacity for any substantial length of time. With that in mind, the 2002 NEC and previous editions had excellent track records, hence the lack of any real documented fire incidents. Until this proves to be more of a real world problem and not a hypothetical issue, the NEC should not require this drastic reduction in cable ampacities.
Panel Meeting Action: Reject
Panel Statement: The test data submitted with Proposal 7-74 supported the addition of this paragraph to 334.80 and recorded that the cables were never loaded more than 80% of their rated values and some cables failed when the load was as low as 60%.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-43 Log #1865 NEC-P07 **Final Action: Reject**
(334.80)

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 7-71
Recommendation: This Proposal should be Accepted.
Substantiation: There is still no historical data of that shows any real life instances of this being a problem. The tests that are cited were most probably done with the cables subjected to currents at 100 percent of their rated values. The heating of the cable varies with the square of the current ratio. 90% current = 81% heating; 80% current = 54% heating; 70% current = 49% heating, and so forth. Considering the provisions of 210.19 and 210.20, it is very seldom that cables are every carrying their full ampacity for any substantial length of time. With that in mind, the 2002 NEC and previous editions had excellent track records, hence the lack of any real documented fire incidents. Until this proves to be more of a real world problem and not a hypothetical issue, the NEC should not require this drastic reduction in cable ampacities.
Panel Meeting Action: Reject
Panel Statement: The test data submitted with Proposal 7-74 supported the addition of this additional paragraph to 334.80. Also see Panel Statement on Comment 7-42.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-44 Log #1919 NEC-P07 **Final Action: Reject**
(334.80)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 7-75
Recommendation: Accept the proposal.
Substantiation: The reference in the panel statement to Proposal 7-74 actually supports this proposal. It appears that Mr. Lindsay has come to appreciate the dramatic effect of thermal insulation on ampacity. However, the next logical step is to address insulation generally, not just in the case where cables are bundled, and not just where the cables are touching the insulation, but where they are surrounded by it. If two bundled cables touching insulation exceeded their temperature ratings (Proposal 7-74) at 0.8 times table ampacity (assume "eight" in 7-74 is actually "eighty"), then the 80% should have been applied to the 60°C rating, and then that diminished current level would have not produced excessive temperatures on the cable conductors.

This is what I have been trying to get across to CMP 7 for the last several code cycles. A rule that says (as at present) that the final calculated ampacity cannot be used to justify based on anything higher than the 60°C column number is irrelevant. The fact that you started in the 90°C column in the first place is dangerous. Cables run in thermal insulation need a radically different ampacity calculation protocol than those that run in free air. This proposal provides the place to start. It is consistent with the technical experience underling Proposal 7-74. Two cables run through a common set of holes through framing members are bundled for the purposes of 310.15(B)(2)(a), and, therefore, two two-wire cables are subject to the 80% factor. If the cables are within insulation, then start in the 60°C. If they are in free air, start in the 90°C column.

The action on Proposal 7-90 makes this issue even more pressing, because 334.80 will now apply to SE cables. If this section doesn't change, SER cables will be taken at the 60°C column values in all instances. This is appropriate for embedment in insulation, but far too low for most common applications for those cables. For example, traditional 4/0 A1 SER cable (180A nominal ampacity for terminations; 205A for derating start point; 150A for final ampacity) taken as the final allowable ampacity for a cable that is an industry workhorse for 200A feeders (200A being the next higher standard size above the 75°C column). NEC users will be very concerned to find out their 200A cable just lost 25% of its ampacity.

The 150A number is completely defensible for 4/0 A1 cabling in insulation. The 200A number is perfectly defensible for the same cable run across the open floor joists. This proposal fully addresses the issues.
Panel Meeting Action: Reject
Panel Statement: With the action taken on proposal 7-74, it is not necessary to begin derating the conductors at the 60 degree C ampacity. The thermal insulation issue has been addressed.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-45 Log #239 NEC-P07 **Final Action: Hold**
(334.104(C))

TCC Action: The Technical Correlating Committee directs that this comment and Proposal 7-78 be reported as "hold" as they introduce inconsistencies between the reference to Part II of Article 334 in 334.104(C) and the lack of a similar reference in 334.104(B).

The Technical Correlating Committee further directs that the existing Fine Print Note in 334.116(C) of the 2005 NEC be deleted to correlate with the panel actions on Proposals 16-51 and 16-60.

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 7-78
Recommendation: Continue to accept this proposal in principle in part by modifying the action as shown.

(C) Optical Fibers. Optical fibers shall be permitted in Type NMS ~~cable as permitted in 770.9(C) and 770.113~~.

Substantiation: Panel 16 action on proposal 16-36 eliminated section 770.9(C).

Panel 16 action on proposals 16-51 and 16-60 modified section 770.113. Section 770.13, currently and as modified by proposals 16-51 and 16-60, has no requirements dealing with composite optical fiber cable. Section 770.113 requires the use of listed optical fiber cables with an exception for a limited length of unlisted outside plant cable to enter the building.
Panel Meeting Action: Accept in Principle
The panel accepts the deletion of the phrase "as permitted in 770.9(C) and 770.113" and revises 334.104(C) to read "(C) Optical Fibers. Optical fibers shall be permitted in Type NMS cable provided the requirements of Part II of Article 334 apply to the installation."
Panel Statement: When optical fibers are included in NMS cable, the requirements of Part II of Article 334 and, specifically, 334.10 (Uses Permitted) and 334.12 (Uses Not Permitted) apply to the installation of the cable.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 336 — POWER AND CONTROL TRAY CABLE: TYPE TC

7-46 Log #1831 NEC-P07 **Final Action: Reject**
(336.10(7))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 7-81
Recommendation: The ACC agrees with Mr. Runyon's explanation of negative vote on proposal 7-81. In the panel substantiation, concern is raised about damage to the cable, "Expansion of the use of TC beyond those specific applications will expose the cable to damage that it is not designed to withstand." However, the first sentence of the proposal states, "where the cable is not subject to physical damage." The panel should accept the proposal to use Type TC cable under the conditions listed.
Substantiation: The panel action is inconsistent with that of Panel 3 on Proposal 3-205.

Panel Meeting Action: Reject
Panel Statement: TC cables are designed for installation in cable trays. They have nonmetallic outer jackets to facilitate installation without damage to the cabled conductors within. The cables are not designed for exposed installations. The differences in the physical properties nonmetallic and metallic outer coverings are very different. The tensile strength of steel and aluminum is typically 72,000 and 42,000 psi, respectively. The tensile strength of a nonmetallic covering is typically 2,000 psi. Simply meeting a crush and impact requirement does not encompass the abilities of a metallic outer covering on the cable.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
RUNYON, G.: The panel does not seem to be recognizing the proposed installations would be in areas "where the cable is not subject to physical damage." The "-ER" in TC-ER stands for exposed run, and is UL listed for such installations. The panel should have voted to accept this comment and its corresponding proposal to allow this wiring method.

7-47 Log #1875 NEC-P07 **Final Action: Reject**
(336.10(7))

Submitter: Donald A. Voltz, Mustang Engineering, Inc.
Comment on Proposal No: 7-80
Recommendation: Revise the new Exception 336.10(7) that was Accepted in Principal by the Panel as follows (underlined portion):
Exception: Where not subject to physical damage, Type TC-ER shall be permitted to transition between cable trays and between cable trays and utilization equipment or devices for a distance not to exceed 1.8 m (6 ft) without continuous support. **Where this distance exceeds 1.8 m (6 ft) continuous support shall be required**. **Where Type TC-ER cable that complies with the crush and impact requirements for Type MC-HL is used; the maximum distance without continuous support shall be increased to 15.2 m (50 ft) and the cable shall be supported in accordance with Article 330.** The cable shall be mechanically supported where exiting the cable tray to ensure that the minimum bending radius is not exceeded."
Substantiation: As written, the wording of the new Exception is confusing. Users may think that type TC-ER shall be permitted to be run only 6 ft period (i.e. between cable rays, between cable trays and utilization equipment or devices). The new second sentence clears up this confusion by requiring continual support where the cable runs beyond 6 ft.
The new third sentence would recognize an improved Type TC-ER that meets the more stringent crush and impact tests for Type MC-HL cable as outlined in UL 2225. As the Panel probably knows, the 1999 NEC allowed a standard Type TC-ER that met the crush and impact requirements of Type MC to be run 50ft outside of tray without the need for continuous support or mechanical protection as long as it was supported in accordance with Article 330. Over the last two Code cycles, the Panel has put unnecessary restrictions on it use. With the increased properties offered by this improved cable, the Panel should recognized it by allowing the original 50ft exception as was found in the 1999 Code. The Panel should take note that this cable can only be used in industrial establishments under the maintenance or supervision of qualified persons (i.e. a supervised installation). There are several cable manufacturers that offer this product.
Panel Meeting Action: Reject
Panel Statement: Type TC-ER that meets the crush and impact requirements of MC-HL are not equal to the true performance of the crush and impact of MC-HL. The 50-foot rule previously allowed was removed since it was considered unsafe. This is inconsistent with the requirement of securing and supporting in Article 336 which is 6 feet.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
RUNYON, G.: Mr. Voltz correctly points out that the panel has increased the restrictions on the use of this cable over the last 2 code cycles without technical documentation or documented incidents where the previously allowed installation practices caused a problem. I question the intent behind the panel's statement that TC-ER is not equal to the "true performance of the crush and impact of MC-HL." Does that mean that if manufacturers of MC-HL were only to meet and not exceed the requirements, that MC-HL also would be an unacceptable wiring method?

7-48 Log #1991 NEC-P07 **Final Action: Accept**
(336.104)

Submitter: Robert Konnik, Rockbestos-Surprenant
Comment on Proposal No: 7-83
Recommendation: Add allowance for nickel and nickel-coated copper conductors to 336.104 as shown below:
336.104 Conductors. The insulated conductors of Type TC cables shall be in sizes 18 AWG to 1000 kcmil copper, nickel, or nickel-coated copper, and sizes 12 AWG through 1000 kcmil aluminum or copper-clad aluminum. Insulated conductors of sizes 14 AWG and larger copper, nickel, or nickel-coated copper, and sizes 12 AWG through 1000 kcmil aluminum or copper-clad aluminum shall be one of the types listed in Table 310.13 or Table 310.62 that is suitable for branch circuit and feeder circuits or one that is identified for such use.
Substantiation: TC singles can be from Table 310.18 which could use nickel or nickel-coated coper. Some fire rated TC cables require nickel or nickel coated copper conductors. This harmonizes with the allowance of nickel and nickel-coated copper in 332.104 for MI cable. Note, many singles from Table 310.13 are high temperature rated, such as SA, FEP, FEPB, PFA, PFAH, TFE, Z and ZW. A variety of fixture wires singles are also rated for high temperatures and these may be used in Type TC cables. Additionally, PFAH and TFE can only use nickel coated conductors.
Panel Meeting Action: Accept
Panel Statement: The panel understands that the table references "Table 310.13 and Table 310.62" will be revised by the panel action on Comment 6-43.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:
DALY, J.: NEMA votes in agreement with the panel action to accept Comment 7-48 with the following comment:
Through the acceptance of this comment the panel has not taken into consideration the ampacities to be used when nickel and nickel-coated copper conductors are used. Since the resistivity of nickel is 4 times higher than that of copper, the ampacity for these conductors needs to be addressed.
Table 310.18 presently covers ampacities for nickel or nickel-coated conductors for two insulation types, PFAH and TFE. It is, therefore, expected that these would be the only types that can be used with nickel and nickel-coated conductors for sizes 14 AWG and above.
However, Table 310.18 only covers conductor sizes 14 AWG through 4/0 AWG. This table would need to be extended up to 1000 kcmil in order to agree with the panel action.

ARTICLE 338 — SERVICE-ENTRANCE CABLE: TYPES SE AND USE

7-49 Log #45 NEC-P07 **Final Action: Accept**
(338.10(B)(2))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 7-86
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action on Proposal 5-119. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction to reconsider and the panel accepts Proposal 7-86.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-50 Log #46 NEC-P07 **Final Action: Accept**
(338.10(B)(2))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 7-87
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action on Proposal 5-119. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider and reaffirms its rejection of Proposal 7-87. See the panel action and statement on Comment 7-49.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-51 Log #945 NEC-P07 **Final Action: Reject**
(338.10(B)(2))

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-87
Recommendation: The panel should have accepted this proposal.
Substantiation: This is a safety issue. It has been proven that in many situations, the neutral is contributing to shock hazards, and efforts should be made to eliminate the problem.

Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its rejection of Proposal 7-87. See the panel action and statement on Comment 7-49.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-53 Log #1767 NEC-P07 **Final Action: Reject**
(338.12(B)(1) Exception)

Submitter: Michael Cole, MRC Electric
Comment on Proposal No: 7-92
Recommendation: Add to proposed 338.12(B)(1):

Exception k: Service entrance cable shall be permitted to be exposed to corrosive fumes or vapors provided that 1 or more of these measures are used:

1. All of the conductors of the SE cable are insulated.

2. A cable with a bare conductor is sealed at both ends. The sealant shall be placed between the wire strands of the bare conductor regardless of whether the conductor is concentric stranded or compact stranded and the exposed bare conductor shall be insulated using rubber electrical tape or a heat shrink sleeve up to the point of connection.

3. The cable and connected enclosures are purged and pressurized with a noncorrosive atmosphere

. 4. The cable is sealed at one end and connected to a purged and pressurized enclosure at the other end.

5. SE cable that is constructed with strand blocking compound and filler compound that blocks transmission of unwanted liquids and gases.

Substantiation: a. Thanks to catalytic converters there is a way for a quite ordinary outdoor environment to be corrosive to copper wire. Therefore, SE cable could be accidentally banned for buildings that are within 1/2 of a mile of an Interstate highway or alongside a main street.

b. Alcan makes a 5-wire SER cable that can be used in a corrosive environment by either ignoring the bare wire or by insulating the bare wire at each end. Likewise, the Type MC cable that Alcan makes has a bare equipment grounding wire and this would need to be insulated in the field. Type UF cable also would need to have its equipment grounding conductor insulated in the field particularly if ammonia gas is present. Ammonia gas is murder on copper wire.

c. Theoretically, MC cable cannot be used with nonmetallic boxes. This is a possible interpretation of NEC 314.3 Exception No. 1 because of the difficulty of fastening MC cable to a nonmetallic box and providing a grounding means that works - larger nonmetallic boxes have thick walls that preclude the use of grounding bushings which means that an aluminum plate would need to be hacked in which would void the listing of the box.

d. Where ammonia gas is present a very good solution is to purge and pressurize electrical rooms, enclosures, cables and conduits.

One source of ammonia gas is the clay (aluminum oxide) powder that foundries use as molding material instead of sand which is very hard on machine tools. The combination of ammonia, oxygen, water, and fluxing chlorides dissolves or tarnishes all useful metals except indium and possibly also bismuth and very remotely copper free aluminum. However, aluminum alloys need a bit of magnesium for structural strength which means that corrosives will pockmark aluminum castings, boxes, and conduits. Steel beams have to be heavily painted in such an environment. The wastewater treatment building of one such facility where I worked had the ability to dissolve stainless steel and was 3 times as bad as how an oceangoing vessel needs to be rewired once every 10 years.

Presence of ammonia gas or chlorine gas is a very difficult corrosion problem and most devices that are listed as corrosion resistant are corrosion resistant in the presence of chlorides only. Presence of ammonia gas or chlorine gas with or without chlorides is beyond the listing and requires additional protection such as purging and pressurization. For some corrosive areas there is a lot in the way of electrical engineering that is more on the side of chemical engineering.

In some corrosive environments ALL wiring methods are unsatisfactory which means that the lest unsatisfactory method needs to be used or a throwaway wiring method needs to be used.

e. One way to avoid pockmarking of aluminum boxes, wireways, and cable trays is to paint the object with urethane varnish. Urethane varnish is transparent enough that corrosion will not be hidden. Urethane varnish is chemically related to crazy glue which makes it as impervious to gases and liquids as a protective coating can get. Similarly, luminaire threads can be treated with silicone lubricant to prevent glass to aluminum and aluminum to aluminum seizing.

However, this does not work for the interior of aluminum rigid conduit or liquidtight flexible metal conduit which would require urging and pressurization.

Electrically insulating varnish is also one of the classic methods of protecting busbars and so forth against corrosion and excessive moisture such as in tropical climates.

f. One way to protect wire terminations is to pot the termination with Type 1 Room Temperature Vulcanizing silicone sealant.

g. A foundry environment can use UF and SE cables as an exposed wiring method by pretending that the bottom flange of a steel beam is a mini cable tray. See 336.10(7) for this concept.

398.10 allows the use of open wiring on insulators which has to be one grade lower than UF, SE, and TC cables.

396.10 allows the use of exposed SE, UF, TC, MV, and individual conductors as messenger supported wiring in an industrial establishment.

UF, SE, and MV cables are allowed in cable tray without enclosing the cable tray in Type X drywall.

With all of these provisions for using Type UF and SE cables as exposed wiring in a factory, application of 334.10(3) is a bit illogical, electric, and down right silly.

h. One of the advantages of using UF cable for exposed wiring in a corrosive area is that 3 ft of slack can be folded up at each end so that even if Dryconn wire connectors or split bolts go bad the splice can be redone without disturbing other splices. Similar things can be done with SE and TC cables particularly since most TC cables are dual rated as Type UF. Cables type wiring methods in a factory are more repairable than raceway wiring methods which is an advantage in some instances.

i. According to some people in the oil industry whom I met online through www.eng-tips.com, PVC coated steel conduit corrodes in a brine processing facility and is absolutely useless.

j. At this foundry waste reprocessing and recycling facility where I worked PVC rigid conduit has a tendency to fall apart for several reasons:

1. Foundry dirt jams expansion couplings.
2. Conduit fasteners are so tight that an expansion coupling does not work.
3. Expansion couplings were omitted.
4. The combination of purple primer and all weather solvent cement was not used to produce superior joints.
5. The gray PVC cement that is alleged to be the best thing for PVC conduit breaks down after a few years allowing joints to break when exposed to cold outdoor temperatures or even worse the inside of a blast freezer.
6. Foundry dirt contaminates primer and solvent cement.
7. The stranded wire that is used for circuits up to 30 amperes in conduit is more susceptible to corrosion than the solid wire in UF cable as follows:

a. Building wire is not available in tin plated or nickel plated copper wire like with tray cable or control cable.

b. Stranded wire has more surface area for corrosive to attack than solid wire.

c. The silicon carbide paper elbow grease electrical grease is more likely to be used on solid wire.

d. Stranded wire can have problems with only 1/4 of the wire strands conducting such that a 20-ampere circuit has effectively 5 ampere wiring leading to a burn down. One PVC conduit in the truck unloading building of this foundry waste facility actually exploded even though the ammonia in the atmosphere was breathable and nonflammable.

e. Corrosive gases can flow in between the strands of stranded conductor hence the invention of Pirelli Strandseal conductor. Same effect can be done using purging and pressurization.

8. Ericson makes watertight/gastight female cord connectors that are UL listed for use with UF cable using an oval grommet. This is 1 wiring grade better than rubber cord. When made up with silicone lubricant such as Dow Corning number 111 a separable connection such as for a light fixture is absolutely watertight and gastight.

k. Flexible PVC conduit has to be supported just as often as UF cable and does not really provide any extra protection against mechanical damage.

l. Mice and rats can chew through steel and concrete which means that there is no such thing as rodent proof wiring. I have also vacuumed out enough street lighting handholes to know that saliva is semiconductirve enough that you cannot electrocute a mouse by sticking 480 volts into its mouth which means that they can chew right through live circuits.

m. At this foundry waste reprocessing facility where I worked there were 3 other buildings that were twice as bad as how an oceangoing vessel needs to be rewired once every 10 years if using conventional wiring methods. There are a lot of new products on the market such as nonmetallic channel strut and threaded rod that is intended to function under this kind of condition such that a complete rewire need only be done once every 15 years.

Let us who have extremely corrosive conditions figure out how to cope with the problem and to solve the safety and durability hazards and costs.

Panel Meeting Action: Reject
Panel Statement: The panel is not sure exactly where the submitter intends the exception to be located. The comment proposes adding an exception to 338.12(B)(1) on the use of Service Entrance (SE) cable, however, 338.12(B) addresses Underground Service Entrance Cable (USE). 338.12(A) addresses SE cable and 338.10(A)(1) already refers to 230.50(A) for protection where subject to physical damage.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 340 — UNDERGROUND FEEDER AND BRANCH-CIRCUITCABLE: TYPE UF

7-54 Log #512 NEC-P07 **Final Action: Accept in Principle**
(340.12(2)(7))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 7-96
Recommendation: Accept in Part (7):
In hazardous (classified) locations except as otherwise permitted in this Code.
Substantiation: See proposal numbers 8-113, 8-143, 8-160, 8-29, 8-101, and others where similar wording was accepted.
Panel Meeting Action: Accept in Principle
The panel accepts the addition of the additional phrase, adds the word "any", and makes location singular, and adds a comma after location, so the list item 340.12(7) reads: "(7) In any hazardous (classified) location, except as otherwise permitted in this Code"
Panel Statement: The panel understands that the Section reference is to 340.12(7). 340.12(7) already contains the first phrase "In hazardous (classified) locations, and "any" is consistent with the text accepted by Panel 8 in the proposals listed in the substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 342 — INTERMEDIATE METAL CONDUIT: TYPE IMC

8-3 Log #850 NEC-P08 **Final Action: Accept**
(342)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 8-3
Recommendation: The panel is encouraged to continue to Reject Proposal 8-3.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-4 Log #733 NEC-P08 **Final Action: Accept**
(342.13)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 8-7
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 8 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-5 Log #734 NEC-P08 **Final Action: Accept**
(342.13)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 8-3
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 8 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
It is interesting to note that the American Iron and Steel Institute publicly endorses NECA publications as a "tool to assist untrained electricians to make safer and better installations." However, 90.1(C) states that the NEC is not intended "as a design specification or an instruction manual for untrained persons." The TCC should step in to remove all Fine Print Notes of this type.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-6 Log #851 NEC-P08 **Final Action: Accept**
(342.13)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 8-7
Recommendation: The panel is encouraged to continue to Reject Proposal 8-7.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-7 Log #781 NEC-P08 **Final Action: Accept**
(342.30(C))

Submitter: David G. Humphrey,
Comment on Proposal No: 8-9
Recommendation: Revise text to read as follows:
Where oversized, concentric or eccentric knockouts are not encountered, Type IMC shall be permitted to be unsupported where the raceway is not more than ~~900 mm (3 ft)~~ 450 mm (18 in.) and remains in unbroken lengths (without coupling). Such raceways shall terminate in an outlet box, device box, cabinet, or other termination at each end of the raceway.
Substantiation: The existing text does not address issues that could have a direct negative impact on the durability of the installation. The affects of weight and vibration of the raceway, especially with larger raceway sizes, may cause loosening at the raceway termination points. This loosening would certainly impose an impediment to the raceways ability to safely carry the maximum fault current likely to be imposed on the raceway. Reducing the length to 450 mm (18 in.) would half the weight of the raceway in the current text, and still provide ample room to install normal supporting and securing hardware for longer lengths. Prohibiting unsupported raceways where oversized, concentric, or eccentric knockouts are encountered would serve to maintain the integrity of the equipment grounding function of the raceway.
In summation, the proposed revised text would meet the submitter's intent and address system durability issues.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
GRIFFITH, M.: Panel action on this Comment should have been to "Reject" rather than to "Accept" for the following reasons:
1. The new language suggesting an 18 in. limit completely changes the intent of the original proposal which was to clarify a widespread practice in industry that is already implied to be acceptable by existing code language and for which there is no evidence to change.
2. The spacing of 18 in. is new material that has not had public review and is not substantiated.
3. The limitation to installations "where oversized...knockouts are not encountered" has not been substantiated. In addition, concerns about knockouts can be addressed by any of several installation methods representing good workmanship that result in adequate support.
Panel action on the original Proposal 8-9 should continue to apply.

8-8 Log #983 NEC-P08 **Final Action: Accept**
(342.30(C))

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 8-9
Recommendation: Add an introduction to the new (C) provided in the proposal to read as follows:
342.30 Securing and Supporting
IMC shall be installed as a complete system in accordance with 300.18 and shall be securely fastened in place and supported in accordance with 342.30(A) and (B) or permitted to be unsupported in accordance with 342.30(C).
(C) Unsupported raceways. Type IMC shall be permitted to be unsupported where the raceway is not more than 900 mm (3 ft) in length and remains in unbroken lengths (without coupling). Such raceway shall terminate in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway.
Substantiation: The added text helps provide an introduction to the new (C) for unsupported IMC.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-9 Log #1077 NEC-P08 **Final Action: Accept in Principle**
(342.30(C))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 8-9
Recommendation: Accept (C) but change the last sentence to "Such raceway shall terminate in ~~an outlet box, junction box, device box, cabinet, or other termination~~ a threaded opening or a single knockout at each end."
Substantiation: This modification addresses Mr. Humphrey's concern about concentric and eccentric knockouts, etc. It also eliminates the use of a laundry list ending in "or other termination," which seems a plus.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 8-7. The panel believes that the action on Comment 8-7 meets the intent of the submitter.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
GRIFFITH, M.: Panel action should have been to "Reject" this Comment. There is no substantiation for the limit(s) imposed by the submitter's suggested revision. See also my Explanation of Negative Vote on Comment 8-7.

8-10 Log #1393 NEC-P08 **Final Action: Accept in Principle in Part**
(342.30(C))

Submitter: James M. Imlah, City of Hillsboro
Comment on Proposal No: 8-9
Recommendation: Revise text to read as follows:
(c) Unsupported raceways: Type IMC shall be permitted to be unsupported where the raceways is not more than 600 mm (2 ft) ~~900 mm (3 ft)~~ in length and remains in unbroken lengths (without coupling). Such raceway shall terminate, where oversized, eccentric or concentric knockout are not encountered in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway.
Substantiation: This allowance should only be allowed for 24" nipples or less in length. Many times IMC nipples, as described in Table 9 Note 4, are installed for the intent of allowing additional conductor conduit fill. By following the 24" length of this note for nipples provides consistency for short sections of raceway being installed and meet submitters intent. Additionally, support shall be installed if oversized, eccentric, or concentric knockouts are encountered to maintain assured grounding and bonding continuity due to vibration or loose oversized knockouts.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: The panel action on Comment 8-7 satisfies the eccentric or concentric issue of the submitter; however, the panel rejects the recommendation to increase the unsupported length to 2 feet.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
GRIFFITH, M.: Panel action should have been to "Reject" this Comment. The revision suggested by the submitter is new material and is not substantiated. See also my Explanation of Negative Vote on Comment 8-7.

8-11 Log #1920 NEC-P08 **Final Action: Reject**
(342.30(C) (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-9
Recommendation: Reject the proposal.
Substantiation: The concept of a special support rule for short lengths of raceway run between enclosures of various sorts is without technical substantiation, and at variance from routine trade practice. No such requirement has ever been in the NEC. Raceways generally require support within 3 ft of terminations, and when the entire length is just that long, then no additional support is ever required. In effect, the locknuts and bushings or connectors and locknuts at each end are supports. This is not a new concept for the NEC: CMP 7 just added the wording "(wiring method) fittings shall be permitted as a means of cable support" in a number of cable articles. In addition, this section allows up to 5 ft of raceway to be unsupported, except at the outer end. In the case of IMC and RMC, that 5-ft length can be broken and contain any number of short segments coupled together. This proposal is without precedent, and addresses a nonexistent problem.
Panel Meeting Action: Reject
Panel Statement: Section 342.30(A) specifically states, "Each IMC shall be securely fastened within 900 mm (3 ft) of each outlet box, junction box, device box, cabinet, conduit body, or other conduit termination." There is no special support rule, just the already existing securely fastened rule. See also panel action on Comment 8-7.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
GRIFFITH, M.: Panel action should have been "Accept in Principle" for this Comment. The submitter's substantiation is correct except for his (likely unintended) reference to "support" instead of "secured in place" as identified in the Panel statement. See also my Explanation of Negative Vote on Comment 8-7.

ARTICLE 344 — RIGID METAL CONDUIT: TYPE RMC

8-12 Log #852 NEC-P08 **Final Action: Accept**
(344)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 8-11
Recommendation: The panel is encouraged to continue to Reject Proposal 8-11.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

(Note: The sequence no. 8-13 was not used.)

8-14 Log #984 NEC-P08 **Final Action: Accept in Principle in Part**
(344.10(A), (B), and (C))

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 8-15
Recommendation: Revise as follows:
344.10 Uses Permitted
(A) Atmospheric Conditions and Occupancies.
(1) Galvanized Steel and Stainless Steel RMC. Galvanized steel and stainless steel RMC shall be permitted under all atmospheric conditions and occupancies.
(2) Red brass RMC. Red brass RMC shall be permitted to be installed for direct burial and swimming pool applications.
(3) Aluminum RMC. Aluminum RMC shall be permitted to be installed where judged suitable for the environment. Rigid aluminum conduit encased in concrete or in direct contact with the earth shall be provided with approved supplementary corrosion protection.
(4) Ferrous Raceways and Fittings. Ferrous raceways and fittings protected from corrosion solely by enamel shall be permitted only indoors and in occupancies not subject to severe corrosive influences.
(B) ~~Corrosion~~ Corrosive Environments.
(1) Galvanized Steel, Stainless Steel and Red Brass RMC, Elbows, Couplings, and Fittings. Galvanized steel, stainless steel and red brass RMC, elbows, couplings, and fittings shall be permitted to be installed in concrete, in direct contact with the earth, or in areas subject to severe corrosive influences where protected by corrosion protection and judged suitable for the condition.
(2) Supplementary Protection of Aluminum RMC. Aluminum RMC shall be provided with approved supplementary corrosion protection where encased in concrete or in direct contact with the earth.
FPN: The galvanizing on steel (ferrous) RMC provides corrosion protection. The AHJ may require supplementary corrosion protection for severely corrosive environments. Where aluminum (non-ferrous) RMC is encased in concrete or direct-buried, approved supplementary corrosion protection ~~is~~ may be required. This protection can be provided in a variety of ways including factory PVC-coating, tape-wrapping, or painting with a zinc-rich paint.
(C) Cinder Fill. Galvanized steel, stainless steel and red brass RMC shall be permitted to be installed in or under cinder fill where subject to permanent moisture where protected on all sides by a layer of noncinder concrete not less than 50 mm (2 in.) thick; where the conduit is not less than 450 mm (18 in.) under the fill; or where protected by corrosion protection and judged suitable for the condition.
Substantiation: Titles were added to the sub-sections to comply with the NEC Style Manual. The text was changed in the FPN from mandatory text to non-mandatory text in compliance with the NEC Style Manual.

Panel Meeting Action: Accept in Principle in Part
Accept the title changes as recommended, reject the revision proposed to the FPN, and in addition, delete the FPN in its entirety.
Panel Statement: The FPN creates a conflict with the requirement.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-15 Log #730 NEC-P08 **Final Action: Accept**
(344.13)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 8-19
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 8 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-16 Log #731 NEC-P08 **Final Action: Accept**
(344.13)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 8-18
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 8 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-17 Log #732 NEC-P08 **Final Action: Accept**
(344.13)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 8-11
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 8 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development.. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
It is interesting to note that the American Iron and Steel Institute publicly endorses NECA publications as a "tool to assist untrained electricians to make safer and better installations." However, 90.1(C) states that the NEC is not intended "as a design specification or an instruction manual for untrained persons." The TCC should step in to remove all Fine Print Notes of this type.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-18 Log #853 NEC-P08 **Final Action: Accept**
(344.13 (New))

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 8-18
Recommendation: The panel is encouraged to continue to Reject Proposal 8-18.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-19 Log #854 NEC-P08 **Final Action: Accept**
(344.13)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 8-19
Recommendation: The panel is encouraged to continue to Reject Proposal 8-19.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-20 Log #782 NEC-P08 **Final Action: Accept**
(344.30(C))

Submitter: David G. Humphrey, Midlothian, VA
Comment on Proposal No: 8-23
Recommendation: Revise text to read as follows:
Where oversized, concentric or eccentric knockouts are not encountered, Type RMC shall be permitted to be unsupported where the raceway is not more than ~~900 mm (3 ft)~~ 450 mm (18 in.) and remains in unbroken lengths (without coupling). Such raceways shall terminate in an outlet box, device box, cabinet, or other termination at each end of the raceway.
Substantiation: The existing text does not address issues that could have a direct negative impact on the durability of the installation. The affects of weight and vibration of the raceway, especially with larger raceway sizes, may cause loosening at the raceway termination points. This loosening would certainly impose an impediment to the raceways ability to safely carry the maximum fault current likely to be imposed on the raceway. Reducing the length to 450 mm (18 in.) would half the weight of the raceway in the current text, and still provide ample room to install normal supporting and securing hardware for longer lengths. Prohibiting unsupported raceways where oversized, concentric, or eccentric knockouts are encountered would serve to maintain the integrity of the equipment grounding function of the raceway.
In summation, the proposed revised text would meet the submitter's intent and address system durability issues.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
GRIFFITH, M.: Panel action on this Comment should have been to "Reject" rather than to "Accept" for the following reasons:
1. The new language suggesting an 18 in. limit completely changes the intent of the original proposal which was to clarify a widespread practice in industry that is already implied to be acceptable by existing code language and for which there is no evidence to change.
2. The spacing of 18 in. is new material that has not had public review and is not substantiated.
3. The limitation to installations "where oversized...knockouts are not encountered" has not been substantiated. In addition, concerns about knockouts can be addressed by any of several installation methods representing good workmanship that result in adequate support.
Panel action on the original Proposal 8-23 should continue to apply.

8-21 Log #966 NEC-P08 **Final Action: Accept**
(344.30(C))

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 8-23
Recommendation: Add an introduction to the new (C) provided in the proposal to read as follows:
344.30 Securing and Supporting
RMC shall be installed as a complete system in accordance with 300.18 and shall be securely fastened in place and supported in accordance with 344.30(A) and (B) or permitted to be unsupported in accordance with 344.30(C).
(C) Unsupported raceways. Type RMC shall be permitted to be unsupported where the raceway is not more than 900 mm (3 ft) in length and remains in unbroken lengths (without coupling). Such raceway shall terminate in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway.
Substantiation: This added new subsection (C) needs an introduction in the main text to comply with the NEC Style Manual.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-22 Log #1078 NEC-P08 **Final Action: Accept in Principle (344.30(C))**

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 8-23
Recommendation: Accept (C) but change the last sentence to "Such raceway shall terminate in ~~an outlet box, junction box, device box, cabinet, or other termination~~ a threaded opening or a single knockout at each end."
Substantiation: This modification addresses Mr. Humphrey's concern about concentric and eccentric knockouts, etc. It also eliminates the use of a laundry list ending in "or other termination," which seems a plus.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 8-20. The panel believes that the action on Comment 8-20 meets the intent of the submitter.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
GRIFFITH, M.: Panel action should have been to "Reject" this Comment. There is no substantiation for the limit(s) imposed by the submitter's suggested revision. See also my Explanation of Negative Vote on Comment 8-20.

8-23 Log #1395 NEC-P08 **Final Action: Accept in Principle in Part (344.30(C))**

Submitter: James M. Imlah, City of Hillsboro
Comment on Proposal No: 8-23
Recommendation: Revise text to read as follows:
(c) Unsupported raceways: Type RMC shall be permitted to be unsupported where the raceways is not more than 600 mm (2 ft) ~~900 mm (3 ft)~~ in length and remains in unbroken lengths (without coupling). Such raceway shall terminate, where oversized, eccentric or concentric knockout are not encountered in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway.
Substantiation: This allowance should only be allowed for 24" nipples or less in length. Many times RMC nipples, as described in Table 9 Note 4, are installed for the intent of allowing additional conductor conduit fill. By following the 24" length of this note for nipples provides consistency for short sections of raceway being installed and meet submitters intent. Additionally, support shall be installed if oversized, eccentric, or concentric knockouts are encountered to maintain assured grounding and bonding continuity due to vibration or loose oversized knockouts.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: The panel action on Comment 8-20 satisfies the eccentric or concentric issue of the submitter; however, the panel rejects the recommendation to increase the unsupported length to two feet.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
GRIFFITH, M.: Panel action should have been to "Reject" this Comment. The revision suggested by the submitter is new material and is not substantiated. See also my Explanation of Negative Vote on Comment 8-20.

8-24 Log #1922 NEC-P08 **Final Action: Reject**
(344.30(C) (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-23
Recommendation: Reject the proposal.
Substantiation: The concept of a special support rule for short lengths of raceway run between enclosures of various sorts is without technical substantiation, and at variance from routine trade practice. No such requirement has ever been in the NEC. Raceways generally require support within 3 ft of terminations, and when the entire length is just that long, then no additional support is ever required. In effect, the locknuts and bushings or connectors and locknuts at each end are supports. This is not a new concept for the NEC: CMP 7 just added the wording "(wiring method) fittings shall be permitted as a means of cable support" in a number of cable articles. In addition, this section allows up to 5 ft of raceway to be unsupported, except at the outer end. In the case of IMC and RMC, that 5-ft length can be broken and contain any number of short segments coupled together. This proposal is without precedent, and addresses a nonexistent problem.
Panel Meeting Action: Reject
Panel Statement: Section 344.30(A) specifically states, "Each RMC shall be securely fastened within 900 mm (3 ft) of each outlet box, junction box, device box, cabinet, conduit body, or other conduit termination." There is no special support rule, just the already existing securely fastened rule. See also panel action on Comment 8-20.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
GRIFFITH, M.: Panel action should have been "Accept in Principle" for this Comment. The submitter's substantiation is correct except for his (likely unintended) reference to "support" instead of "secured in place" as identified in the panel statement. See also my Explanation of Negative Vote on Comment 8-20.

ARTICLE 348 — FLEXIBLE METAL CONDUIT: TYPE FMC

8-25 Log #2041 NEC-P08 **Final Action: Accept in Principle (348.30)**

Submitter: James M. Imlah, City of Hillsboro
Comment on Proposal No: 8-35
Recommendation: Revise as follows:
FMC shall be securely fastened in place and supported in accordance with 348.30(A) and (B).
(A) Securely Fastened. FMC shall be securely fastened in place by an approved means within 300 mm (12 in.) of each box, cabinet, conduit body, or other conduit termination and shall be supported and secured at intervals not to exceed 1.4 m (4 ft).
Exception No. 1: Where FMC is fished.
Exception No. 2: At terminals where installed for flexibility is required, lengths shall not exceed the following:
Substantiation: There are installations of metallic flex being installed under exception 2 with the allowance for increased distance for supports. Permanently attached electrical equipment and appliances are being connected under the guise of "where flexibility is required." "Is required" is not enforceable term. Additionally, there have been instances that engineers, architects, and installers are determining what type of flexibility is required and specify the allowance for expanded support allowances,. Why should the "exception" allowing for flexibility when equipment is permanently attached to structure and there is no need for flexibility? The intent of this section is for equipment that requires flexibility such as motors with belt tension adjustments, or equipment that has constant movement in normal operations. See attached picture as an example.
Panel Meeting Action: Accept in Principle
Revise 348.30(A), Exception 2, to read as follows:
"Exception No. 2: Where flexibility is necessary after installation, lengths shall not exceed the following: (remainder of existing text remains unchanged)."

In addition, in (A), the comment incorrectly states the English measurement as 4 feet; it should be 4 l/2 feet.

Panel Statement: The revised panel wording clarifies the intent of the submitter.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-26 Log #2035 NEC-P08 **Final Action: Reject**
(348.30(A) Exception No. 4)

Submitter: Donald Cook, Shelby County Building Inspections
Comment on Proposal No: 8-39
Recommendation: Accept proposal as submitted.
Substantiation: While I understand and agree with the panel statement that a raceway that closely follows the surface upon which it is installed is less likely to become damaged by penetration of screws, nails, etc., I fail to understand how that statement is different in an accessible or non-accessible ceiling. As an installer and an AHJ, I have worked above accessible and non-accessible ceilings and found both to sometimes have building surfaces where raceways could be secured and found both to sometimes be suspended and not have building surfaces where raceways could be secured. Available building surfaces is not directly related to the accessibility of the ceiling.
Panel Meeting Action: Reject
Panel Statement: Accessible ceilings are drop ceilings with removal panels and are not likely to have screws or nails driven through them and penetrating the FMC. Also 300.11(A) states that cables and raceways shall not be supported by the ceiling grids.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-27 Log #1079 NEC-P08 **Final Action: Accept**
(348.60)

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 8-41
Recommendation: I support the panel in accepting the new text as written.
Substantiation: I am concerned about the "accept in principle" comments. If there are field reports of inspectors rejecting jobs where flexibility is required not due to continuous movement but due to vibration or occasional movement or adjustment, then the wording ought to be modified. As it stands, "flexibility after installation" is a useful clarification, and encompasses all these.
Panel Meeting Action: Accept
Panel Statement: Panel 8 agrees that the panel action on Proposal 8-41 should have been "Accept in Principle". The panel statement would remain the same.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-28 Log #2042 NEC-P08 **Final Action: Reject**
(348.60)

Submitter: James M. Imlah, City of Hillsboro
Comment on Proposal No: 8-40
Recommendation: Revise as follows:
348.60 Grounding and Bonding.
Where used to connect equipment where installed for flexibility ~~is required,~~ an equipment grounding conductor shall be installed.
~~Where~~ FMC not installed for flexibility ~~is not required~~, ~~FMC~~ shall be permitted to be used as an equipment grounding conductor when installed in accordance with 250.118(5).
Where ~~required~~ or installed for flexibility, equipment grounding conductors shall be installed in accordance with 250.134(B).
Where required or installed for flexibility, equipment bonding jumpers shall be installed in accordance with 250.102.
Substantiation: Required is applied to this section as a mandatory requirement. Additionally, as with earlier substantiation, "where required" is not enforceable. The sentence states that an "Equipment grounding conductor shall be installed" so the requirement for conductor installation should be when a wiring method is installed as needed for specific connection conditions. There are wiring methods that can be installed that provides flexibility, but determining where flexibility is required is subjective between inspectors, installers, engineers creating confusion. As stated by CMP-7 (7-32), even M/C cable is a general wiring method and is not limited to installations for flexibility. Normally, inspectors find these types of corrections after the fact which creates hardship and loss of production time to end users if the FMC installation is not "for flexibility."
Panel Meeting Action: Reject
Panel Statement: The new text in the 2008 draft for 348.60 based on ROP 8-40 and 8-41 makes it clear when an equipment grounding conductor is or is not required.
348.60 Grounding and Bonding. Where used to connect equipment where flexibility is required after installation, an equipment grounding conductor shall be installed.
[ROP 8–40]
Where flexibility is not required after installation, FMC shall be permitted to be used as an equipment grounding conductor when installed in accordance with 250.118(5).
[ROP 8–41]
Where required or installed, equipment grounding conductors shall be installed in accordance with 250.134(B). Where required or installed, equipment bonding jumpers shall be installed in accordance with 250.102.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 350 — LIQUIDTIGHT FLEXIBLE METAL CONDUIT: TYPE LFMC

8-29 Log #2044 NEC-P08 **Final Action: Accept in Principle**
(350.30)

Submitter: James M. Imlah, City of Hillsboro
Comment on Proposal No: 8-47
Recommendation: Revise as follows:
A) Securely Fastened. LFMC shall be securely fastened in place by an approved means within 300 mm (12 in.) of each box, cabinet, conduit body, or other conduit termination and shall be supported and secured at intervals not to exceed 1.4 m (4 ft).
Exception No. 1: Where LFMC is fished.
Exception No. 2: ~~Lengths not exceeding 900 mm (3 ft) at~~ At terminals where installed for flexibility is ~~necessary. required~~, lengths shall not exceed the following:
Substantiation: The committee approved the change for exception 2 to replace "necessary" with "required" as part of 8-44. By removing "required" and replacing with "installed for" flexibility provides a clear intended purpose for the less restrictive support. There is still confusion between installers, engineers and inspectors of "required" flexibility. Who makes the decision of "required" flexibility. There are instances where LFMC is attached to electrical equipment and appliances that are physically attached to structure and the raceway flexibility is installed as a convenience, not a necessity for protection from repetitive vibration or motion. Where "required" makes enforcement extremely difficult due to the different interpretations between inspectors, installers and engineers. Inspectors determine "required" differently causing inconsistency between inspectors and AHJ's.
Note: Supporting material is available for review at NFPA headquarters.
Panel Meeting Action: Accept in Principle
Revise 350.30(A), Exception 2, to read as follows:
"Exception No. 2: Where flexibility is necessary after installation, lengths shall not exceed the following: (remainder of existing text remains unchanged)."
In addition, in (A), the comment incorrectly states the English measurement as 4 feet; it should be 4 l/2 feet.
Panel Statement: The revised panel wording clarifies the intent of the submitter.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-30 Log #1080 NEC-P08 **Final Action: Accept**
(350.60)

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 8-50
Recommendation: I support the panel in accepting the new text as written.
Substantiation: I am concerned about the "accept in principle" comments. If there are field reports of inspectors rejecting jobs where flexibility is required not due to continuous movement but due to vibration or occasional movement or adjustment, then the wording ought to be modified. As it stands, "flexibility after installation" is a useful clarification, and encompasses all these.
Panel Meeting Action: Accept
Panel Statement: Panel 8 agrees that the panel action on Proposal 8-50 should have been "Accept in Principle". The panel statement would remain the same.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-31 Log #2043 NEC-P08 **Final Action: Reject**
(350.60)

Submitter: James M. Imlah, City of Hillsboro
Comment on Proposal No: 8-51
Recommendation: Revise as follows:
350.60 Grounding and Bonding.
Where used to connect equipment ~~where~~ installed for flexibility ~~is required~~, an equipment grounding conductor shall be installed.
~~Where~~ LFMC not installed for flexibility ~~is not required~~, ~~LFMC~~ shall be permitted to be used as an equipment grounding conductor when installed in accordance with 250.118(6).
Where ~~required~~ or installed for flexibility, equipment grounding conductors shall be installed in accordance with 250.134(B).
Where ~~required or~~ installed for flexibility, equipment bonding jumpers shall be installed in accordance with 250.102.
FPN: See 501.30(B), 502.30(B), and 503.30(B) for types of equipment grounding conductors.
Substantiation: The submitted original proposal comments were crossed from another article. The substantiation is the same for the removal of "required" and replacing with the words "for flexibility." The language uses "require" and "shall" within the same description that is a mandatory requirement. Where "required" is applied becomes un-enforceable as to what an each inspector, installer, or contractor believes what their interpretation of "required." Where "installed for flexibility" would provide consistency of intent for installing LFMC raceway to electrical equipment or appliances where vibration or continuous movement occurs.
Panel Meeting Action: Reject
Panel Statement: The new text in the 2008 draft for 350.60 based on ROP 8-49 and 8-50 makes it clear where an equipment grounding conductor is or is not required.
350.60 Grounding and Bonding. Where used to connect equipment where flexibility is required after installation, an equipment grounding conductor shall be installed.
[ROP 8–49]
Where flexibility is not required after installation, LFMC shall be permitted to be used as an equipment grounding conductor when installed in accordance with 250.118(6).
[ROP 8–50]

Where required or installed, equipment grounding conductors shall be installed in accordance with 250.134(B). Where required or installed, equipment bonding jumpers shall be installed in accordance with 250.102.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 352 RIGID — NONMETALLIC CONDUIT: TYPE RNC

8-32 Log #1378 NEC-P08 **Final Action: Accept**
(352)

Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 8-53
Recommendation: This Proposal should be Accepted as revised by CMP-8.
Substantiation: The submitter of Proposal 8-53 agrees with the panel statement that the panel's action on this proposal meets the original intent.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-45a Log #CC801 NEC-P08 **Final Action: Accept**
(352.10(G))

Submitter: Code-Making Panel 8,
Comment on Proposal No: 8-68
Recommendation: 1. Revise 352.10(G) to read as follows:

352.10(G) Underground Installations. For underground installations, homogenous and non-homogenous PVC shall be permitted for direct burial and underground encased in concrete, see 300.5 and 300.50.

2. Revise the proposed text in 352.100 to read as follows:

352.100 Construction. PVC conduit shall be made of rigid (nonplasticized) polyvinyl chloride (PVC) The material shall be homogeneous without the use of foaming agents, except as permitted in 352.10(G), for direct burial and underground encased in concrete. PVC conduit and fittings shall be composed of suitable nonmetallic material that is resistant to moisture and chemical atmospheres. For use above ground, it shall also be flame retardant, resistant to impact and crushing, resistant to distortions from heat under conditions likely to be encountered in service and resistant to low temperature and sunlight effects. For use underground, the material shall be acceptably resistant to moisture and corrosive agents and shall be of sufficient strength to withstand abuse, such as by impact and crushing, in handling and during installation. Where intended for direct burial, without encasement in concrete, the material shall also be capable of withstanding continued loading that is likely to be encountered after installation.
Substantiation: The panel believes that additional testing is needed to satisfy the panel's concerns that the non-homogeneous product is equal to the products currently covered in Article 352 and is suitable for the uses permitted throughout the NEC. Supporting data showed that testing was not completed. This action will permit the use of non-homogenous PVC to be used in direct burial and underground encased in concrete. This comment is based on the supporting documentation provided to the panel in Comment 8-42 and at the panel ROC meeting.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

DWIGHT, J.: The action taken should have been to reject Proposal 8-68.

I understand the Panel's concerns that the "non-homogenous" product may not be equal to the Type RNC products covered in Article 352 and may not be suitable for all uses for Type RNC products permitted throughout the NEC. The ROC panel statement indicates that additional testing could satisfy this concern.

My primary objection is to the inclusion of language such as "homogeneous without the use of foaming agents" in the construction specification of this installation code article. The basis for my objection is that the NEC's purpose is to cover electrical installations in order to safeguard persons and property and that it is not intended to extend to individual product examination, specification or testing for safety. It is my belief that the language "homogenous without the use of foaming agents" is a product description. furthermore, UL has developed an appropriate product standard, ANSI/UL 651, Standard for Schedule 40 and 80 Rigid PVC Conduit and Fittings, which has been used safely for many years. This product standard clearly defines the materials of construction and performance requirements.

Additionally, the panel should strive for clarity and insist that terms such as "homogeneous" or "non-homogeneous" denote specific and clearly understood characteristics. These terms are not currently defined either in the code or in any accepted technical literature. Excluding a product in the construction specification section by singling out a characteristic specific to the product, such as "without the use of foaming agents" sets a precedent. After all, most products can be distinguished by specific characteristics which have no bearing on the performance of the product. The panel should insist on objective, technically sound basis for differentiation.

The manufacturer of the cellular-core PVC conduit system had originally listed and labeled their product according to the product standard for Schedule 40 and 80 Rigid PVC Conduit and Fittings, ANSI/UL 651. The UL accepted testing indicated that the "non-homogenous" PVC conduit met all the performance requirements of "homogenous" PVC conduit, with the possible exception of sunlight resistance. The code panel has neither test data nor technical substantiation to indicate sufficient performance different to warrant excluding the cellular-core PVC conduit from PVC Construction specification in Article 352.

The proposed revision will add very detailed and confusing material requirements within the NEC, with the practical result of effective suppression of suitable alternative technologies - and repetitive future work in Panel 8 to address product level details better addressed in the applicable product standard forum.

KENDALL, D.: The panel comment 8-45a (CC801) should never have been created nor accepted. Instead, Comment 8-45 should have been accepted. By approving Comment 8-45a, the panel set a precedent to allow new products, or other wiring methods to be accepted for applications without NRTL testing. Comment 8-42 utilized a substantiation based completely on non-NRTL testing.
Comment on Affirmative:

GRIFFITH, M.: See my Affirmative with Comment on Panel Action on Comment 8-42.

8-33 Log #1677 NEC-P08 **Final Action: Reject**
(352.12 Exception (New))

Submitter: Joseph S. Zimnoch, The Okonite Company
Comment on Proposal No: 8-58
Recommendation: Accept the original Proposal.
Substantiation: A temperature drop exists from the conductor to the outer insulation or jacket surface of any wire or cable. For medium voltage cables, when the conductor is operating at 105°C, the outer jacket surface operates at 90°C or less due to the greater insulation thickness and other components like the inner and outer semiconducting screens plus the shield or neutral wires. The worst case scenario for medium voltage cables is 5 kV cables with a thin (90 mil wall).

I have submitted calculation results for 5 kV cables (with 90 mils of insulation) in ductbank configurations from Figure 310.60 for both Detail 2 and Detail 3 (3 x 2). The calculations were made using USAmps Ampacity program that uses the Nehr-McGrath method. The column titled "Tdw" is the temperature of the inner duct wall. In all calculations, this temperature is below 90oC. Additionally since the introduction of the 105oC rated MV cables into the code, many 105oC rated cables have been installed in 90oC NM ducts without incident. Also submitted are copies of the ductbank dimensions and a legend to read the USAmps output data.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: As stated in the panel statement for Proposal 8-58, 352.12(E) Exception permits 105 degree C medium voltage cables to be used with rigid nonmetallic conduit, Type PVC, when the cable is operated at a temperature lower than the conduit's listed temperature rating.

The panel does not wish to establish a precedent of revising the exception for a single condition based solely on computer calculations instead of actual test data.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-34 Log #2504 NEC-P08 **Final Action: Accept**
(352.12(A))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 8-59
Recommendation: Based on the actions taken on Proposal 14-33a, the American Chemistry Council supports CMP-8 actions on Proposals 8-59 and 8-60. CMP-14 supports text in Articles 352 for Rigid Nonmetallic Polyvinyl Chloride Conduit and Article 355 for Reinforced Thermosetting Resign Conduit that recognizes the wiring methods permitted in Chapter 5. Also as appropriate in the Article 500 series, revise the term PVC Conduit to Rigid Nonmetallic Polyvinyl Chloride Conduit: Type PVC RNC, as for example in 501.10(B)(1)(7).
Substantiation: None given.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the first sentence of the comment and recognizes that the remainder of the comment more properly belongs in the substantiation for the comment, not as part of the recommendation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-35 Log #302 NEC-P08 **Final Action: Accept**
(352.12(A)(1))

Submitter: Code-Making Panel 14,
Comment on Proposal No: 8-60
Recommendation: Based on the actions taken on Proposal 14-33a, CMP-14 supports CMP-8's actions on Proposals 8-59 and 8-60. CMP-14 supports text in Articles 352 for Rigid Polyvinyl chloride Conduit and proposed Article 355 for Reinforced Thermosetting Resin Conduit that recognizes the wiring methods permitted in Chapter 5.
Substantiation: This comment supports correlation of the requirements in Chapters 3 and 5.

This comment was balloted through CMP-14 with the following ballot results:

14 Eligible to Vote
14 Affirmative

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-36 Log #729 NEC-P08 **Final Action: Accept**
(352.13)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 8-64
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 8 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-37 Log #855 NEC-P08 **Final Action: Accept**
(352.13)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 8-64
Recommendation: The panel is encouraged to continue to Reject Proposal 8-64.
Substantiation: The reasons to continue to Reject the Proposal are as follows:

1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-38 Log #785 NEC-P08 **Final Action: Accept**
(352.30(C))

Submitter: David G. Humphrey, Midlothian, VA
Comment on Proposal No: 8-65
Recommendation: Revise text to read as follows:

Where oversized, concentric or eccentric knockouts are not encountered, Type RNC shall be permitted to be unsupported where the raceway is not more than ~~900 mm (3 ft)~~ 450 mm (18 in.) and remains in unbroken lengths (without coupling). Such raceways shall terminate in an outlet box, device box, cabinet, or other termination at each end of the raceway.

Substantiation: The existing text does not address issues that could have a direct negative impact on the durability of the installation. The affects of weight and vibration of the raceway, especially with larger raceway sizes, may cause loosening at the raceway termination points. Movement as described could additionally result in a weakening of the joined rings of concentric and eccentric knockouts and where on the raceway fitting in contact with the enclosure to which it is connected. Reducing the length to 450 mm (18 in.) would half the weight of the raceway in the current text, and still provide ample room to install normal supporting and securing hardware for longer lengths. Prohibiting unsupported raceways where oversized, concentric, or eccentric knockouts are encountered would serve to maintain the integrity of the equipment installation.

In summation, the proposed revised text would meet the submitter's intent and address system durability issues.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

GRIFFITH, M.: Panel action on this Comment should have been to "Reject" rather than to "Accept" for the following reasons:
1. The new language suggesting an 18 in. limit completely changes the intent of the original proposal which was to clarify a widespread practice in industry that is already implied to be acceptable by existing code language and for which there is no evidence to change.
2. The spacing of 18 in. is new material that has not had public review and is not substantiated.
3. The limitation to installations "where oversized...knockouts are not encountered" has not been substantiated. In addition, concerns about knockouts can be addressed by any of several installation methods representing good workmanship that result in adequate support.
Panel action on the original Proposal 8-65 should continue to apply.

8-39 Log #967 NEC-P08 **Final Action: Accept in Principle**
(352.30(C))

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 8-65
Recommendation: Add an introduction to the new (C) provided in the proposal to read as follows:
352.30 Securing and Supporting
RNC shall be installed as a complete system as provided in 300.18 and shall be fastened so that movement from thermal expansion or contraction is permitted. RNC shall be securely fastened and supported in accordance with 352.30(A) and (B) or permitted to be unsupported in accordance with 344.30(C).

[(A) and (B) are unchanged in this comment and the proposal.]

(C) Unsupported raceways. Type PVC conduit RNC shall be permitted to be unsupported where the raceway is not more than 900 mm (3 ft) in length and remains in unbroken lengths (without coupling). Such raceway shall terminate in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway.
Substantiation: This added new subsection (C) needs an introduction in the main text to comply with the NEC Style Manual. .....
Panel Meeting Action: Accept in Principle
Change the NEC reference from 344.30(C) to 352.30(C).
Panel Statement: Editorial correction of cross-reference.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-40 Log #1397 NEC-P08 **Final Action: Accept in Principle in Part (352.30(C))**

Submitter: James M. Imlah, City of Hillsboro
Comment on Proposal No: 8-65
Recommendation: Revise text to read as follows:

(c) Unsupported raceways: Type RNC shall be permitted to be unsupported where the raceways is not more than 600 mm (2 ft) ~~900 mm (3 ft)~~ in length and remains in unbroken lengths (without coupling). Such raceway shall terminate, where oversized, eccentric or concentric knockout are not encountered in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway.

Substantiation: This allowance should only be allowed for 24" nipples or less in length. Many times RNC nipples, as described in Table 9 Note 4, are installed for the intent of allowing additional conductor conduit fill. By following the 24" length of this note for nipples provides consistency for short sections of raceway being installed and meet submitters intent. Additionally, support shall be installed if oversized, eccentric, or concentric knockouts are encountered due to vibration or loose oversized knockouts causing possible additional strain on energized conductors.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: The panel action on Comment 8-38 satisfies the eccentric or concentric issue of the submitter; however, the panel rejects the recommendation to increase the unsupported length to 2 feet.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

GRIFFITH, M.: Panel action should have been to "Reject" this Comment. There is no substantiation for the limit(s) imposed by the submitter's suggested revision. See also my Explanation of Negative Vote on Comment 8-38.

8-41 Log #1923 NEC-P08 **Final Action: Reject**
(352.30(C) (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-65
Recommendation: Reject the proposal.
Substantiation: The concept of a special support rule for short lengths of raceway run between enclosures of various sorts is without technical substantiation, and at variance from routine trade practice. No such requirement has ever been in the NEC. Raceways generally require support within 3 ft of terminations, and when the entire length is just that long, then no additional support is ever required. In effect, the locknuts and bushings or connectors and locknuts at each end are supports. This is not a new concept for the NEC: CMP 7 just added the wording "(wiring method) fittings shall be permitted as a means of cable support" in a number of cable articles. If this and its companion proposals remain accepted, the various tubular rigid raceways will be expected to grow clamps where they will look rather strange, such as in the middle of a 90° sweep if it has a coupling and a 3-in. extension to make a required distance. This proposal is without precedent, and addresses a nonexistent problem.
Panel Meeting Action: Reject
Panel Statement: Section 352.30(A) specifically states, "Each Type PVC shall be securely fastened within 900 mm (3 ft) of each outlet box, junction box, device box, cabinet, conduit body, or other conduit termination." There is no special support rule, just the already existing securely fastened rule. See also panel action on Comment 8-38.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

GRIFFITH, M.: Panel action should have been "Accept in Principle" for this Comment. The submitter's substantiation is correct except for his (likely unintended) reference to "support" instead of "secured in place" as identified in the panel statement. See also my Explanation of Negative Vote on Comment 8-38.

8-42 Log #445 NEC-P08 **Final Action: Reject**
(352.100)

Submitter: Steven Tollefson, Cantex Inc.
Comment on Proposal No: 8-68
Recommendation: CANTEX requests that Code-Making Panel 8 Reject the proposed revision as initially Accepted in Principle in Part by deleting the additional two sentences placed at the beginning of the section. The section should remain as originally phrased prior to the proposed revision, as follows:

352.100 Construction. ~~RNC shall be made of rigid (nonplasticized) polyvinyl chloride (PVC) or reinforced thermosetting resin (RTRC). The material shall be homogenous without the use of foaming agents.~~ RNC and fittings shall be composed of suitable nonmetallic material that is resistant to moisture and chemical atmospheres. For use above ground, it shall also be flame retardant, resistant to impact and crushing, resistant to distortions from heat under conditions likely to be encountered in service and resistant to low temperature and sunlight effects. For use underground, the material shall be acceptably resistant to moisture and corrosive agents and shall be of sufficient strength to withstand abuse, such as by impact and crushing, in handling and during installation. Where intended for direct burial, without encasement in concrete, the material shall also be capable of withstanding continued loading that is likely to be encountered after installation.

Alternatively, the panel should refrain from taking any action with regard to the proposal until after Underwriters Laboratories Inc. ("UL") has completed its testing of CANTEX's Schedule 40 Forte-Duct® product line.
Substantiation: The proposed revision fundamentally alters the existing standard by requiring that PVC conduit "material shall be homogenous without the use of foaming agents." By specifically excluding the use of "foaming agents" in RNC, the proposed revision under consideration by the Panel would effectively suppress alternative cellular-core technology that has proven to be a safe and efficient alternative to solid-core RNC.

As a manufacturer of its own line of highly successful cellular-core RNC products marketed under the trade name Fote-Duct®, CANTEX is a market leader in cellular-core technology. As demonstrated by the success of CANTEX's own products, cellular-core RNC is more economical, lighter in weight and equally as safe as solid-core RNC made of PVC and reinforced thermosetting resin ("RTRC").

Based upon its expertise in cellular-core technology, as well as independent testing conducted by Underwriters Laboratories Inc. ("UL") and other testing organizations, CANTEX respectfully submits that the proposed revision to NEC 352.100 is scientifically unfounded and otherwise unjustified as a matter of public policy. CANTEX has carefully reviewed the proposed revision, its supporting text, and the twelve (12) specified technical concerns about cellular-core RNC that accompany the proposed revision. As detailed in the supporting material submitted along with this comment, the twelve (12) points raised in support of the proposed revision are largely inaccurate, incomplete or otherwise scientifically unsubstantiated.

In short, Code-Making Panel 8 should Reject Mr. Kendall's proposed revision to 352.100. In the absence of any legitimate scientific justification, the proposed revision is blatantly anticompetitive. If adopted, the proposed revision would place CANTEX and other manufacturers of cellular-core RNC at a competitive disadvantage to the makers of traditional solid-core PVC products. As a result, the proposed revision would stifle the continued development of emerging cellular-core technology to the detriment of the market and the credibility of NFPA.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 8-45a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

GRIFFITH, M.: The submitter is encouraged and reminded to consider using the TIA process should further test results become available to support a broader application of the cellular-core product than allowed by 352.100 as stipulated in Panel Comment 8-45a.

8-43 Log #1394 NEC-P08 **Final Action: Reject**
(352.100)

Submitter: David R Carpenter, Florence, AL
Comment on Proposal No: 8-68
Recommendation: This proposal and change of construction requirements should not be accepted in the code. It should be removed from the proposal.

Revise 352.100 to read as follows:

352.100 Construction. ~~RNC shall be made of rigid (nonplasticized) polyvinyl chloride (PVC) or reinforced thermosetting resin (RTRC). The material shall be homogenous without the use of foaming agents.~~
Substantiation: The proposed language "homogenous without the use of foaming agents" is anticompetitive. This language removes cellular-core RNC from acceptance in the Code. Cellular-core has a 10+ year history of use with no reports of shock or safety hazards. The submitter's proposal has no technical data to prove any hazard can or will exist with cellular-core RNC.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 8-45a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-44 Log #1396 NEC-P08 **Final Action: Reject**
(352.100)

Submitter: David R Carpenter, Florence, AL
Comment on Proposal No: 8-68
Recommendation: This proposal and change of construction requirements should not be accepted in the code. It should be removed from the proposal.

Revise 352.100 to read as follows:

352.100 Construction. ~~RNC shall be made of rigid (nonplasticized) polyvinyl chloride (PVC) or reinforced thermosetting resin (RTRC). The material shall be homogenous without the use of foaming agents.~~
Substantiation: This additional wording clearly prohibits the use of cellular-core type conduit without any scientific data to provide it is a safety hazard. Cellular-core conduit has not been a hazard to the electrical industry, even with

foaming agents. The foam in this conduit is a closed cell technology design. It is not open cell such as foam in a cooler or cushion. The proposal would have a significant impact on competition without data to prove the product is a safety hazard. No safety hazard has been established and it has already passed all but one UL 651 standard test. The product has already passed the first phase of the remaining test and final results on that test are expected in the near future. Cellular-core conduit has already been accepted in specifications of utilities for the past ten years without a shock or fire hazard being reported. As an inspector and engineer, I am concerned any time I see the code being used as a competition tool without adequate substantiation. Product with the best quality and safe application should stand on its own merit. I respectfully ask this Panel to consider removing the change and additional language of this proposal based on the grounds of no scientific data to substantiate the proposal and its good safety record.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 8-45a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-45 Log #2157 NEC-P08 **Final Action: Reject**
(352.100)

Submitter: David H. Kendall, Carlon
Comment on Proposal No: 8-68
Recommendation: This Proposal should continue to be Accepted in Principle in Part.
Substantiation: It is not Panel 8's position that this product is inherently unsuitable for Listing. Rather, as stated in the substantiation that accompanied Proposal 8-68, this product "is obviously different from any other conduit previously listed under UL 651" and that while it "may have its place as a Listable conduit, it should not be considered equivalent to currently Listed PVC conduits."

All types of conduit, either currently or previously covered under Article 352, Rigid Nonmetallic Conduit (PVC, HDPE, and RTRC) were introduced to the NEC through the use of data developed by an independent third-party, NRTL test facility. However, this was not the course of action chosen for the cellular-core PVC product.

It is Panel 8's decision whether or not new conduit types are acceptable for use in electrical installations, and listing agencies and manufacturers should not attempt to circumvent that responsibility. If it is determined that this product is safe, it should be accepted by the NEC and it should be done so on the basis of a thorough analysis of the product and its features and the application of an appropriate set of product safety requirements. Additionally, based upon the precedent that has been set for HDPE in the 2005 NEC, which appears likely to be followed for RTRC in the 2008 NEC, this product should be covered by a separate article.

The process followed by the manufacturer and the listing agency represents an effort on their part to write Code without Panel 8's input. This would permit the use of a product of undetermined suitability while providing a manufacturer with an unfair and unwarranted advantage over the manufacturers that do follow the correct procedures.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 8-45a.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
KENDALL, D.: Comment 8-45 should have been accepted. See my explanation of negative vote on
Comment 8-45a.

ARTICLE 353 — HIGH DENSITY POLYETHYLENE CONDUIT: TYPE HDPE CONDUIT

8-46 Log #728 NEC-P08 **Final Action: Accept**
(353.13)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 8-71
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 8 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.

Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-47 Log #856 NEC-P08 **Final Action: Accept**
(353.13)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 8-71
Recommendation: The panel is encouraged to continue to Reject Proposal 8-71.
Substantiation: The reasons to continue to Reject the Proposal are as follows:

1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-47a Log #1379 NEC-P08 **Final Action: Accept in Principle**
(355 (New))

Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 8-78
Recommendation: This Proposal should be Accepted as revised by the panel.
Substantiation: The submitter of Proposal 8-78 agrees with the panel statement that the panel's action on this proposal meets the original intent.
Panel Meeting Action: Accept in Principle
See panel action and substantiation on Comment 8-49b.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Poholski, S.

8-48 Log #1380 NEC-P08 **Final Action: Reject**
(355.10)

Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 8-79
Recommendation: This Proposal should be revised and accepted as follows:

355.10 Uses Permitted. The use of RTRC shall be permitted in accordance with 352.10(A) through ~~(H)~~ (J).

(A) Concealed. RTRC shall be permitted in walls, floors, and ceilings.

(B) Corrosive Influences. RTRC shall be permitted in locations subject to severe corrosive influences as covered in 300.6 and where subject to chemicals for which the materials are specifically approved.

(C) Cinders. RTRC shall be permitted in cinder fill.

(D) Wet Locations. RTRC shall be permitted in portions of dairies, laundries, canneries, or other wet locations and in locations where walls are frequently washed, the entire conduit system including boxes and fittings used therewith shall be installed and equipped so as to prevent water from entering the conduit. All supports, bolts, straps, screws, and so forth, shall be corrosion-resistant materials or be protected against corrosion by approved corrosion-resistant materials.

(E) Dry and Damp Locations. RTRC shall be permitted for use in dry and damp locations not prohibited by 355.12.

(F) Exposed. RTRC shall be permitted for exposed work where not subject to physical damage if identified for such use.

(G) Underground Installations. For underground installations, see 300.5 and 300.50.

FPN: Refer to Article 352 for Rigid Polyvinyl Chloride Conduit: Type PVC and Article 353 for High Density Polyethylene Conduit: Type HDPE.

(H) Support of Conduit Bodies. RTRC shall be permitted to support nonmetallic conduit bodies not larger than the largest trade size of an entering raceway. These conduit bodies shall not support luminaires (Fixtures) or other equipment and shall not contain devices other than splicing devices as permitted by 110.14(B) and 314.16(C)(2).

(I) Ducts, Plenums and Other Air-Handling Spaces. Phenolic RTRC shall be permitted for use in ducts, plenums, and other air-handling spaces as covered in 300.22 if listed as having adequate fire-resistant and low smoke-producing characteristics.

(J) Riser. Phenolic RTRC shall be permitted for use in riser applications if listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

Substantiation: This proposal was presented as a companion proposal to 3-92 (NEC 300.22). It was rejected due to insufficient technical substantiation. However, technical substantiation has now been developed to demonstrate the ability of these products to be safely used in these applications and is being presented to CMP-3 in support of revised proposal 3-92, CMP-8 in support of revised proposals 8-79 and 8-80, and CMP-15 in support of revised proposal 15-112.

CMP-8 was, of course, correct in its statement that "individual raceway articles do not need to duplicate acceptable systems" provided that they have been included in 300.22. However, the proposed revision to include phenolic RTRC in 300.22 represents such a significant departure from the types of raceway that have been previously accepted in these applications, that it is believed to warrant a corresponding reference in 355.10 of the NEC as well.

The position of Underwriters Laboratories in relation to flame spread and smoke developed values for materials used in plenums was put forth in UL's Mr. Randy Laymon's letter dated December 15, 2004.

As a result of my initial proposal, and this UL position paper, FRE Composites (2005) Inc. undertook testing with Underwriters Laboratories of phenolic RTRC products to both UL 2024 plenum and riser tests, and the ASTM E84 flame spread and smoke developed tests. As can be seen from the UL test data and reports, phenolic RTRC products, in a variety of trade sizes, were able to complete each of these testing programs with flame and smoke ratings significantly below the criteria established for products to be used in both plenum and riser applications.

The performance of these products, as demonstrated, is summarized as follows:

Test	Maximum Permitted Value	Maximum Test Value
Plenum (UL 2024) Flame	5.0 ft	2.0 ft
Plenum (UL 2024) Smoke Peak	0.50	0.10
Plenum (UL 2024) Smoke Avg.	0.15	0.02
Riser (UL 2024) Flame	12.0 ft	4.0 ft
Riser (UL 2024) Temperature	850.0˚F	371˚F
ASTM E84 Flame Spread Index (FSI)	25	5
ASTM E84 Smoke Developed Index (SDI)	50	0

Therefore, in consideration of the data generated by an independent, NRTL accredited test laboratory, and in conjunction with UL's stated position on this issue, these conduit products have conclusively demonstrated their ability to perform acceptably in both plenum and riser applications and I recommend their inclusion in NEC 355.10 in accordance with the revised proposal. It should be noted that this proposal has been slightly modified from its original version in order to delete the FPN indicating suggested acceptance criteria for these products. The development of appropriate flame and smoke criteria, along with the product's listing requirements is best left to the determination of the listing organization. However, regardless of which of the established flame and smoke criteria the listing organization chooses, phenolic RTRC has demonstrated its ability to perform safely.

Additionally, a reference to "phenolic" RTRC conduit has been added in order to limit this proposal to only that conduit type which was evaluated as part of the technical substantiation provided with this comment.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: Individual raceway articles do not need to duplicate acceptable systems. Only Code- Making Panel 3 can determine which wiring methods are acceptable for use in ducts, plenums, and other air-handling spaces [300.22(A) through (D)]. It would be inappropriate for Panel 8 to indicate redundant information pertaining to 300.22, since this might confuse the user. Even if Panel 3 accepts this as an acceptable use, the references in 355.10 and 355.12 are unnecessary.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Abstain: 1

Explanation of Abstention:

HUMPHREY, D.: The vote by this party was to abstain. As per the request of the Technical Correlating Committee at the meeting on proposals, and because of the ongoing revision of NFPA 90A, the opportunity to resolve technical issues relating to RTRC in plenums for the 2008 NEC and revision of NFPA 90A could not be completed.

8-49 Log #1381 NEC-P08 **Final Action: Reject**
(355.12)

Submitter: William Wagner, Certification Solutions

Comment on Proposal No: 8-80

Recommendation: This Proposal should be revised and accepted as follows:

355.12 Uses Not Permitted. RTRC shall not be used under the following conditions.

(A) Hazardous (Classified) Locations.

(1) In hazardous (classified) locations, except as permitted in 503.10(A), 504.20, 514.8 Exception No. 2, and 515.8

(2) In Class I, Division 2 locations, except as permitted in 501.10(B)(3)

(B) Support of Luminaires (Fixtures). For the support of Luminaires (fixtures) or other equipment not described in 355.10(H).

(C) Physical Damage. Where subject to physical damage unless identified for such use.

(D) Ambient Temperatures. Where subject to ambient temperatures in excess of 110°C (230°F) unless listed otherwise.

(E) Insulation Temperature Limitations. For conductors or cables operating at a temperature higher than the RTRC listed operating temperature rating.

Exception: Conductors or cables rated at a temperature higher than the RTRC listed temperature rating shall be permitted to be installed in RTRC, provided they are not operated at a temperature higher than the RTRC listed temperature rating.

(F) Theaters and Similar Locations. In theaters and similar locations, except as provided in 518.4 and 520.5.

(G) Ducts, Plenums and Other Air-Handling Spaces. RTRC shall not be used in ducts, plenums, and other air-handling spaces as covered in 300.22, unless constructed of phenolic and listed as having adequate fire-resistant and low smoke-producing characteristics.

(H) Riser. RTRC shall not be used in riser applications unless constructed of phenolic and listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.

Substantiation: This proposal was presented as a companion proposal to 3-92 (NEC 300.22). It was rejected due to insufficient technical substantiation. However, technical substantiation has now been developed to demonstrate the ability of these products to be safely used in these applications and is being presented to CMP-3 in support of revised proposal 3-92, CMP-8 in support of revised proposals 8-79 and 8-80, and CMP-15 in support of revised proposal 15-112.

CMP-8 was, of course, correct in its statement that "individual raceway articles do not need to duplicate acceptable systems" provided that they have been included in 300.22. However, the proposed revision to include phenolic RTRC in 300.22 represents such a significant departure from the types of raceway that have been previously accepted in these applications, that it is believed to warrant a corresponding reference in 355.12 of the NEC as well.

The position of Underwriters Laboratories in relation to flame spread and smoke developed values for materials used in plenums was put forth in UL's Mr. Randy Laymon's letter dated December 15, 2004.

As a result of my initial proposal, and this UL position paper, FRE Composites (2005) Inc. undertook testing with Underwriters Laboratories of phenolic RTRC products to both UL 2024 plenum and riser tests, and the ASTM E84 flame spread and smoke developed tests. As can be seen from the UL test data and reports, phenolic RTRC products, in a variety of trade sizes, were able to complete each of these testing programs with flame and smoke ratings significantly below the criteria established for products to be used in both plenum and riser applications.

The performance of these products, as demonstrated, is summarized as follows:

Test	Maximum Permitted Value	Maximum Test Value
Plenum (UL 2024) Flame	5.0 ft	2.0 ft
Plenum (UL 2024) Smoke Peak	0.50	0.10
Plenum (UL 2024) Smoke Avg.	0.15	0.02
Riser (UL 2024) Flame	12.0 ft	4.0 ft
Riser (UL 2024) Temperature	850.0˚F	371˚F
ASTM E84 Flame Spread Index (FSI)	25	5
ASTM E84 Smoke Developed Index (SDI)	50	0

Therefore, in consideration of the data generated by an independent, NRTL accredited test laboratory, and in conjunction with UL's stated position on this issue, these conduit products have conclusively demonstrated their ability to perform acceptably in both plenum and riser applications and I recommend their inclusion in NEC 355.12 in accordance with the revised proposal. It should be noted that this proposal has been slightly modified from its original version in order to delete the FPN indicating suggested acceptance criteria for these products. The development of appropriate flame and smoke criteria, along with the product's listing requirements is best left to the determination of the listing organization. However, regardless of which of the established flame and smoke criteria the listing organization chooses, phenolic RTRC has demonstrated its ability to perform safely.

Additionally, a reference to "phenolic" RTRC conduit has been added in order to limit this proposal to only that conduit type which was evaluated as part of the technical substantiation provided with this comment.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: See panel statement on 8-48.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Abstain: 1

Explanation of Abstention:

HUMPHREY, D.: See my explanation of abstaining vote on Comment 8-49.

8-49b Log #CC800 NEC-P08 **Final Action: Accept**
(355.30)

Submitter: Code-Making Panel 8,

Comment on Proposal No: 8-78

Recommendation: Revise text of 355.30 to read as follows:

355.30 Securing and Supporting

RTRC shall be installed as a complete system in accordance with 300.18 and shall be securely fastened in place and supported in accordance with 355.30(A) and (B) or permitted to be unsupported in accordance with 355.30(C).

(A) Securely Fastened. RTRC shall be securely fastened within 900 mm (3 ft) of each outlet box, junction box, device box, conduit body, or other conduit termination. Conduit listed for securing at other than 900 mm (3 ft) shall be permitted to be installed in accordance with the listing.

(B) Supports. RTRC shall be supported as required in Table 355.30. Conduit listed for support at spacing other than as shown in Table 355.30 shall be permitted to be installed in accordance with the listing. Horizontal runs of RTRC supported by openings through framing members at intervals not exceeding those in Table 355.30 and securely fastened within 900 mm (3 ft) of termination points shall be permitted.

(C) Unsupported Raceways. Where oversized, concentric or eccentric knockouts are not encountered, Type RTRC shall be permitted to be unsupported where the raceway is not more than 450 mm (18 in.) and remains in unbroken lengths (without coupling). Such raceways shall terminate in an outlet box, device box, cabinet, or other termination at each end of the raceway.

Substantiation: This comment correlates with the panel actions on Comments 8-7, 8-8, 8-20, 8-21, 8-38, 8-39, 8-57, and 8-58 for Type RTRC.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

GRIFFITH, M.: The panel text for 355.30(C) should be revised to read as follows:

(C) Unsupported raceways. ~~Where oversized, concentric or eccentric knockouts are not encountered,~~ Type RTRC shall be permitted to be unsupported where the raceway is not more than ~~450 mm (18 in.)~~ 900 mm (3 ft.) and remains in unbroken lengths (without coupling). Such raceways...at each end of the raceway.

Panel accepted the text in this comment in order to correlate with similar text in accepted comments for the other raceway articles. The text regarding knockouts and the 18 in. length limit should not apply as explained in my Explanation of Negative Votes on Comments 8-7, 8-20, 8-38, and 8-57.

ARTICLE 356 — LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT: TYPE LFNC

8-50 Log #727 NEC-P08 **Final Action: Accept**
(356.13)

Submitter: Robert Kelleher, Paramount Electrical Services

Comment on Proposal No: 8-85

Recommendation: Continue to Reject .

Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 8 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

8-51 Log #857 NEC-P08 **Final Action: Accept**
(356.13 (New))

Submitter: John P. Masarick, Independent Electrical Contractors Inc.

Comment on Proposal No: 8-85

Recommendation: The panel is encouraged to continue to Reject Proposal 8-85.

Substantiation: The reasons to continue to Reject the Proposal are as follows:

1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

ARTICLE 358 — ELECTRICAL METALLIC TUBING: TYPE EMT

8-52 Log #2204 NEC-P08 **Final Action: Reject**
(358.10, FPN)

Submitter: William A. Wolfe, Steel Tube Institute of North America

Comment on Proposal No: 8-94

Recommendation: Revise the text as follows and accept this comment;

FPN: The galvanizing on steel (ferrous) EMT provides supplementary corrosion protection. When steel EMT is in direct contact with the earth or is installed in concrete, supplementary corrosion protection may be required. When aluminum (non-ferrous) EMT is in direct contact with the earth or is installed in concrete, supplementary corrosion protection is required.

Substantiation: Proposal 8-94 was a companion proposal to proposal 8-15 on Rigid Metal Conduit. The Panel accepted proposal 8-15 which added a Fine Print Note to differentiate between the corrosion protection required for steel rigid conduit versus aluminum rigid conduit. There has been confusion in the field as to when supplementary corrosion protection is required for these two different metals.

The Panel did **not** accept the addition of the FPN in this proposal. Article 358 covers aluminum and steel electrical metallic tubing. The Panel stated that there was mandatory language in the FPN and that there was a reference to 300.6. The revised text addresses those issues by removing the mandatory language and the reference to 300.6. With these changes, the Panel should be able to accept this proposal and make their action on this proposal consistent with their action on Proposal 8-15. The FPN provides useful guidance and reflects the listing requirements in the UL Electrical Construction Equipment Directory.

Panel Meeting Action: Reject

Panel Statement: The panel still maintains that the reference to 300.6 in the FPN gives the installer the proper reference to determine corrosion protection requirements.

It is not acceptable per the NEC Style Manual for fine print notes (FPNs) to state "Mandatory Text". The last sentence in the proposed text indicates that supplementary corrosion protection "is required."

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

8-53 Log #1784 NEC-P08 **Final Action: Reject**
(358.10(B))

Submitter: Joseph A. Hertel, Safety and Buildings
Comment on Proposal No: 8-95
Recommendation: Revise 358.10(B) to say:
(B) Electrical metallic tubing shall not be used in direct contact with earth, in concrete slabs or floors poured on earth, or in exterior concrete walls below grade.
Substantiation: The CMP rejected the proposal and should reconsider in the comments. The panel indicates that EMT is suitable where corrosion protection is provided in accordance with 358.10(B). 358.10(B) says "where protected by corrosion protection and judged suitable for the condition." What is a suitable corrosion protection that will allow EMT to survive below grade or embedded in concrete on grade? Is the galvanized coating from the manufacturer the corrosion protection envisioned by the CMP or is it something they should specify?
Panel Meeting Action: Reject
Panel Statement: The authority having jurisdiction will determine the suitability of a corrosion protection method.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-54 Log #725 NEC-P08 **Final Action: Accept**
(358.13)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 8-102
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 8 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-55 Log #726 NEC-P08 **Final Action: Accept**
(358.13)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 8-90
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 8 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
It is interesting to note that the American Iron and Steel Institute publicly endorses NECA publications as a "tool to assist untrained electricians to make safer and better installations." However, 90.1(C) states that the NEC is not intended "as a design specification or an instruction manual for untrained persons." The TCC should step in to remove all Fine Print Notes of this type.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-56 Log #858 NEC-P08 **Final Action: Accept**
(358.13)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 8-102
Recommendation: The panel is encouraged to continue to Reject Proposal 8-102.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-57 Log #784 NEC-P08 **Final Action: Accept**
(358.30(C))

Submitter: David G. Humphrey, Midlothian, VA
Comment on Proposal No: 8-104
Recommendation: Revise text to read as follows:
Where oversized, concentric or eccentric knockouts are not encountered, Type EMT shall be permitted to be unsupported where the raceway is not more than ~~900 mm (3 ft)~~ 450 mm (18 in.) and remains in unbroken lengths (without coupling). Such raceways shall terminate in an outlet box, device box, cabinet, or other termination at each end of the raceway.
Substantiation: The existing text does not address issues that could have a direct negative impact on the durability of the installation. The affects of weight and vibration of the raceway, especially with larger raceway sizes, may cause loosening at the raceway termination points. This loosening would certainly impose an impediment to the raceways ability to safely carry the maximum fault current likely to be imposed on the raceway. Reducing the length to 450 mm (18 in.) would half the weight of the raceway in the current text, and still provide ample room to install normal supporting and securing hardware for longer lengths. Prohibiting unsupported raceways where oversized, concentric, or eccentric knockouts are encountered would serve to maintain the integrity of the equipment grounding function of the raceway.
In summation, the proposed revised text would meet the submitter's intent and address system durability issues.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
GRIFFITH, M.: Panel action on this Comment should have been to "Reject" rather than to "Accept" for the following reasons:
1. The new language suggesting an 18 in. limit completely changes the intent of the original proposal which was to clarify a widespread practice in industry that is already implied to be acceptable by existing code language and for which there is no evidence to change.

2. The spacing of 18 in. is new material that has not had public review and is not substantiated.
3. The limitation to installations "where oversized...knockouts are not encountered" has not been substantiated. In addition, concerns about knockouts can be addressed by any of several installation methods representing good workmanship that result in adequate support.
Panel action on the original Proposal 8-104 should continue to apply.

8-58 Log #968 NEC-P08 **Final Action: Accept**
(358.30(C))

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 8-104
Recommendation: Revise as follows:
358.30 Securing and Supporting
EMT shall be installed as a complete system in accordance with 300.18 and shall be securely fastened in place and supported in accordance with 358.30(A) and (B) or permitted to be unsupported in accordance with 358.30(C).
(C) Unsupported raceways. Type EMT shall be permitted to be unsupported where the raceway is not more than 900 mm (3 ft) in length and remains in unbroken lengths (without coupling). Such raceway shall terminate in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway.
Substantiation: This added new subsection (C) needs an introduction in the main text to comply with the NEC Style Manual.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-59 Log #1398 NEC-P08 **Final Action: Accept in Principle in Part**
(358.30(C))

Submitter: James M. Imlah, City of Hillsboro
Comment on Proposal No: 8-104
Recommendation: Revise text to read as follows:
(c) Unsupported raceways: Type EMT shall be permitted to be unsupported where the raceways is not more than 600 mm (2 ft) ~~900 mm (3 ft)~~ in length and remains in unbroken lengths (without coupling). Such raceway shall terminate, where oversized, eccentric or concentric knockout are not encountered in an outlet box, junction box, device box, cabinet, or other termination at each end of the raceway.
Substantiation: This allowance should only be allowed for 24" nipples or less in length. Many times EMT nipples, as described in Table 9 Note 4, are installed for the intent of allowing additional conductor conduit fill. By following the 24" length of this note for nipples provides consistency for short sections of raceway being installed and meet submitters intent. Additionally, support shall be installed if oversized, eccentric, or concentric knockouts are encountered to maintain assured grounding and bonding continuity due to vibration or loose oversized knockouts.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: The panel action on Comment 8-57 satisfies the eccentric or concentric issue of the submitter; however, the panel rejects the recommendation to increase the unsupported length to 2 feet.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
GRIFFITH, M.: Panel action should have been to "Reject" this comment. There is no substantiation for the limit(s) imposed by the submitter's suggested revision. See also my Explanation of Negative Vote on Comment 8-57.

8-60 Log #1925 NEC-P08 **Final Action: Reject**
(358.30(C) (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Pro
posal No: 8-104
Recommendation: Reject the proposal.
Substantiation: The concept of a special support rule for short lengths of raceway run between enclosures of various sorts is without technical substantiation, and at variance from routine trade practice. No such requirement has ever been in the NEC. Raceways generally require support within 3 ft of terminations, and when the entire length is just that long, then no additional support is ever required. In effect, the locknuts and bushings or connectors and locknuts at each end are supports. This is not a new concept for the NEC: CMP 7 just added the wording "{wiring method} fittings shall be permitted as a means of cable support" in a number of cable articles. If this and its companion proposals remain accepted, the various tubular rigid raceways will be expected to grow clamps where they will look rather strange, such as in the middle of a 90° sweep if it has a coupling and a 3-in. extension to make a required distance. This proposal is without precedent, and addresses a nonexistent problem.
Panel Meeting Action: Reject
Panel Statement:
Section358.30(A) specifically states, "Each Type EMT shall be securely fastened within 900 mm (3 ft) of each outlet box, junction box, device box, cabinet, conduit body, or other conduit termination." There is no special support rule, just the already existing securely fastened rule. See also the panel action on Comment 8-57.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
GRIFFITH, M.: Panel action should have been "Accept in Principle" for this comment. The submitter's substantiation is correct except for his (likely unintended) reference to "support" instead of "secured in place" as identified in the Panel statement. See also my Explanation of Negative Vote on Comment 8-57.

ARTICLE 362 — ELECTRICAL NONMETALLIC TUBING: TYPE EMT

8-61 Log #724 NEC-P08 **Final Action: Accept**
(362.13)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 8-114
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 8 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-62 Log #859 NEC-P08 **Final Action: Accept**
(362.13 (New))

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 8-114
Recommendation: The panel is encouraged to continue to Reject Proposal 8-114.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-63 Log #2353 NEC-P08 **Final Action: Accept**
(368.6)

Submitter: Alan Manche, Square D Company
Comment on Proposal No: 8-129
Recommendation: Continue to Reject the Proposal.
Substantiation: There has been no substantiation presented that a safety issue exists that would warrant a listing requirement on busway.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
DABE, J.: The original submitter of ROP 8-129 is correct in stating that the AHJ does not have the means to determine the safety of the design and manufacture of busways. The panel should reconsider the fact that many panels including this one have required listing for far less hazaradous and complex items.
WALBRECHT, G.: The submitter's substantiation in Proposal 8-129 is correct. The authority having jurisdiction will not have the means available to determine the safety of the design, manufacture, and installation of a busway. Busways and their associated fittings, as with any wiring method, should be evaluated and listed by a nationally recognized third party certification organization. Field fabrication and modification of factory-produced components can also be hazardous and should be properly examined and evaluated by a nationally recognized testing organization.

8-64 Log #1926 NEC-P08 **Final Action: Reject**
(368.10)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-131
Recommendation: Accept the proposal.
Substantiation: The panel statement did not rebut the assertion in the substantiation that the use of "exposed" and "concealed" in the NEC text did not accord with the Article 100 definitions. This should be corrected. In addition, it is not true that the view terminology is not used in the NEC. It is used in 610.31(4) because on large cranes an insight disconnect rule is impracticable due to the 50-ft parameter in the "insight" definition. To get around this, CMP 12 uses the "in view" construction. Another comparable construction occurs in 450.13(A), where "in the open" is used because the key issue is being capable of observation as opposed to being within view and capable of being reached quickly. Defined terms in the NEC should be used accordingly.
Panel Meeting Action: Reject
Panel Statement: The terms "Exposed" and "Concealed" are commonly used and understood throughout the National Electrical Code. "In View" and "Out of View" may have been more appropriate for other sections of the National Electrical Code, but in this case Panel 8 believes that those terms would only deviate from the commonly used terms without the appropriate substantiation to make the revision.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
WALBRECHT, G.: UL agrees with the panel that "in view" and "out of view" should not be adopted for this section. However, we agree with the submitter that the terms "exposed" and "concealed" are being used improperly in this section and instead suggest replacing "Exposed" with "Where Visible" and "Concealed" with "Behind Access Panels" as the subsection titles for 368.10(A) and (B) respectively. This more closely describes that text of the requirements.

8-65 Log #723 NEC-P08 **Final Action: Accept**
(368.13)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 8-135
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 8 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-66 Log #860 NEC-P08 **Final Action: Accept**
(368.13 (New))

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 8-135
Recommendation: The panel is encouraged to continue to Reject Proposal 8-135.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the comment to continue to reject the proposal and reiterates its substantiation for that rejection as stated in the ROP: "As 90.1(C) states: This Code is not intended as a design specification or instruction manual for untrained persons." The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-67 Log #1382 NEC-P08 **Final Action: Accept**
(368.56(A))

Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 8-136
Recommendation: This Proposal should be Accepted as revised:
368.56(A) General. Branches from busways shall be permitted to use any of the following wiring methods:
(1) Type AC armored cable
(2) Type MC metal-clad cable
(3) Type MI mineral-insulated, metal-sheathed cable
(4) Type IMC intermediate metal conduit
(5) Type RMC rigid metal conduit
(6) Type FMC flexible metal conduit
(7) Type LFMC liquidtight flexible metal conduit
(8) Type PVC ~~RNC~~ rigid ~~nonmetallic~~ polyvinyl chloride conduit
(9) Type RTRC reinforced thermosetting resin conduit
~~(9)~~ (10) Type LFNC liquidtight flexible nonmetallic conduit
~~(10)~~ (11) Type EMT electrical metallic tubing
~~(11)~~ (12) Type ENT electrical nonmetallic tubing
~~(12)~~ (13) Busways
~~(13)~~ (14) Strut-type channel raceway
~~(14)~~ (15) Surface metal raceways~~s~~
~~(15)~~ (16) Surface nonmetallic raceways~~s~~
Where a separate equipment grounding conductor is used, connection of the equipment grounding conductor to the busway shall comply with 250.8 and 250.12.
Substantiation: While it is true that Proposals 8-53 and 8-78 refer to RNC in the definition of PVC conduit and RTRC, this proposed revision is still necessary. With the acceptance of 8-53 and 8-78, Type RNC will cease to exist, replaced by Type PVC and Type RTRC. Accordingly, the use of the designation "Type" RNC would be incorrect. Therefore, it is necessary to revise 368.56(A) as shown above both for correctness of terminology and consistency with the references to other conduit types.

This proposal has been revised to remove the reference to HDPE, as the submitter agrees with the panel statement that HDPE is not permitted to be used as a branch from a busway.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 374 — CELLULAR METAL FLOOR RACEWAY

8-68 Log #1752 NEC-P08 **Final Action: Hold**
(374.17)

Submitter: John Michlovic, H.H. Robertson Floor Systems
Comment on Proposal No: 8-148
Recommendation: Revise text to read as follows:
Ampacity of conductors. The ampacity adjustment factors in ~~310.15(B)(2)~~ Table 374.17 shall apply to conductors installed in cellular metal floor raceways.
Substantiation: ROP 8-148 (Log #1057) seeks an exception to 374.17 so as to eliminate the perceived need to use "loop wiring" and "violate 374.7" in relation to multiple outlets on the same circuit. In lieu of adopting an isolated exception to address the proponent's particular concern, this Comment suggests that NFPA amend 374.17 more comprehensively to establish an ampacity reduction table specifically applicable to cellular metal floor raceways.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Hold
Panel Statement: The comment introduces a concept that has not had public review in accordance with 4.4.6.2.2 of the Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 376 — METAL WIREWAYS

8-69 Log #49 NEC-P08 **Final Action: Accept**
(376.6)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 8-151
Recommendation: It was the action of the Technical Correlating Committee that the panel reconsider the proposal as it is unclear what "one of a kind" means and that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 8-71.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-70 Log #696 NEC-P08 **Final Action: Reject**
(376.6)

TCC Action: The Technical Correlating Committee understands that the panel agrees with the substantiation provided by the submitter of Comment 8-71 and their action to Accept.
Submitter: Jamie McNamara, Hastings, MN
Comment on Proposal No: 8-151
Recommendation: The panel should continue to accept this proposal in principle and have the exception read:
"Exception: Custom made, and field-fabricated wireways and fittings shall not be required to be listed."
Substantiation: The TCC concerns of the term "one of a kind" being unclear is warranted and the term has been removed from the proposed exception.
The close vote and the comments of the panel members make it clear that this is a very important and divided issue and there is merit in all the comments expressed. Installers and inspectors do not have the ability in the field to determine the suitability of a raceway (metal wireways) as to its condition of use. Metal wireways and associated fittings should be listed to provide for a minimum standard of safety that all standard metal wireways and associated fittings should meet.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 8-71.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
DABE, J.: The panel should have accepted this comment. Custom made or Field Fabricated wireways may be used under the exception, however, a listed product used whenever possible for standardized construction is the preferred method.
WALBRECHT, G.: The authority having jurisdiction will not have the means available to determine the safety of the design, manufacture, and installation of a metal wireway. Wireways and their associated fittings, as with any wiring method, should be evaluated and listed by a nationally recognized third party certification organization. Field fabrication and modification of factory-produced components can also be hazardous and should be properly examined and evaluated by a nationally recognized testing organization.

8-71 Log #1832 NEC-P08 **Final Action: Accept**
(376.6)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 8-151
Recommendation: Reject this Proposal.
Substantiation: In the Explanation of Negative all of the commenters state the same concern. Metal Wireways are more often field fabricated than purchased components made into an assembly. There are not enough options made by the manufacturers to fit the needs of the field. Customizing of listed metal wireway components would void the listing. This is an impractical requirement. No technical substantiation has been provided that there is a problem with the current installations. If custom made or field fabricated metal wireways are acceptable, per the Exception, then why require any of them be listed.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
DABE, J.: The panel should have rejected this comment and accepted comment 8-70, which would have allowed "Custom made or Field Fabricated wireways" when needed.
WALBRECHT, G.: See my explanation of negative and substantiation on Comment 8-70.

8-72 Log #906 NEC-P08 **Final Action: Hold**
(376.10)

Submitter: Nicholas P. Ludlam, FM Approvals
Comment on Proposal No: 8-157a
Recommendation: Revise as follows:
376.10 Uses Permitted. The use of metal wireways shall be permitted in the following:
(1) For exposed work.
(2) In concealed spaces as permitted in 376.10(4).
(3) In hazardous (classified) locations as permitted by 501.10(B) for Class I, Division 2 locations; 502.10(B) for Class II, Division 2 locations ~~and~~ 504.20, 505.15(A) and 506.15(A) for intrinsically safe wiring; 505.15(C) for Class I Zone 2 locations; and 506.15(C) for Zone 22. Where installed in wet locations, wireways shall be listed for the purpose.
(4) As extensions to pass transversely through walls if the length passing through the wall is unbroken. Access to the conductors shall be maintained on both sides of the wall.
Substantiation: Articles 505 and 506 include additional hazardous classified locations which are not addressed by this wiring technique.
Panel Meeting Action: Hold
Panel Statement: The comment introduces a concept that has not had public review in accordance with 4.4.6.2.2 of the Regulations Governing Committee Projects. The recommendation is for a revision to 376.10, yet Proposal 8-157a is on 376.100.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-73 Log #969 NEC-P08 **Final Action: Accept**
(376.80)

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 8-157
Recommendation: Revise as follows:
376.22 Number of Conductors and Ampacity. The number of conductors and their ampacity shall comply with (A) and (B).
(A) Cross-Sectional Areas of Wireway. The sum of the cross-sectional areas of all contained conductors at any cross section of a wireway shall not exceed 20 percent of the interior cross-sectional area of the wireway.
(B) Adjustment Factors. The adjustment factors in 310.15(B)(2)(a) shall be applied only where the number of current-carrying conductors, including neutral conductors classified as current-carrying under the provisions of 310.15(B)(4), exceeds 30. Conductors for signaling circuits or controller conductors between a motor and its starter and used only for starting duty shall not be considered as current-carrying conductors.
Substantiation: Added titles to the subsections to comply with the NEC Style Manual.

Panel Meeting Action: Accept
Panel Statement: Panel 8 recognizes that the submitter meant to indicate 376.22 instead of 376.80. Panel 8 accepts the proposed titles to 376.22(A) and (B).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-74 Log #50 NEC-P08 **Final Action: Accept**
(376.100 (new))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 8-157a
Recommendation: The Technical Correlating Committee directs that the panel add Titles to (A) and (B). This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: Panel 8 recognizes that the TCC meant to indicate Proposal 8-157, not 8-157a, since titles are incorporated in 376.100. Panel 8 accepted Comment 8-73 to add titles to 376.22(A) and (B).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 382 — NONMETALLIC EXTENSIONS

7-55 Log #947 NEC-P07 **Final Action: Reject**
(382)

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-98
Recommendation: The panel should have rejected this proposal.
Substantiation: This is a safety issue. This wiring method is subject to physical damage under any and all sets of circumstances. We feel as though it could contribute to unnecessary shock hazards, as well as fire-damage.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 7-56.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:

ADAMS, M.: This wiring method is subject to physical damage.

FAHRENTHOLD, C.: Proposal 7-98 has written concealable nonmetallic extension into Article 382. These concealable nonmetallic extensions can be installed on walls and ceilings without mechanical protection. This is contrary to 300.4 which states that: "where subject to physical damage, conductors shall be protected." Nowhere in 300.4 does it provide for an exception if the wiring has a "level of shock protection equivalent to a GFCI."

Proposal 7-98 has put in the requirement that the concealed nonmetallic extension have a level of shock protection equivalent to a GFCI. This will protect the person who drives a nail through the wiring of the nonmetallic extension, but there is no provision for repairing the wiring. The only solution is to install more wiring over the existing wiring or remove the old wiring and install new. This can be an expensive undertaking for the person that did not know that the wiring was concealed behind the paint, texture, etc. when they drove the nail into the wall.

The concealable nonmetallic extensions should not be added to the code unless there are provisions for the wiring to be protected from physical damage.

LADART, S.: We disagree with the panel action. This is a safety issue. Proposal 7-98 introduces a new wiring method: "Concealable nonmetallic extensions". Although we encourage and promote the development of innovative wiring methods, the "concealable flat wire nonmetallic extension method" is unacceptable. Proposal 7-98 suggests revising the text of Article 382, which governs nonmetallic extensions to include a new method of extending a branch circuit, (the concealable nonmetallic extension method).

The opening sentence of the NEC, (90.1), clearly states that the intended purpose of the NEC is the practical safeguarding of persons and property from hazards arising from the use of electricity.

AC flatwire is a fragile wiring method, with thin flat conductors, separated by thin layers of insulating material. The wiring method is designed to be surface mounted on a dwelling or office wall using adhesives, and then painted for "CONCEALMENT". The system is designed to utilize an inherent safety system that is built within.

Good judgment has prevailed. Everyone with whom we have discussed this wiring method has quickly asked: Since I cannot see the "concealed wiring", how can I avoid penetrating it with a nail, screw, or some other foreign object? The answer is quite clear. You cannot protect this wiring method from physical damage. The proposal suggest that there is no need to protect the wiring method from physical damage. We disagree for a number of reasons. AC Flatwire is nonrepairable, and it must be stripped from the wall in the inevitable event of failure. We feel that; in all likelihood of failure, this will become an economical disadvantage to the consumer. Our foremost concern is product safety. The panel accepted this proposal on a "fact finding study", and not on the merits of "product approval" by a testing lab. The substantiation for this proposal suggests that no protection from physical damage is necessary because the circuit for the nonmetallic extension is designed with "inherent" protection to protect against shock hazards.

Would you or your loved ones feel safe while driving a nail into an energized 120 volt circuit under any set of circumstances that could possible exist? Circuits containing "inherent" safety devices are vital in preventing shock hazards associated with approved wiring methods. We fee, however, that the "inherent" design of an electrical circuit is placed within the circuit to augment the safety of an acceptable wiring method, and not for the purpose of attempting to" make safe" the design of an unsafe circuit.

Make no mistake about it. We have been opposed to this wiring method for extending a branch circuit from the very beginning. The safety of an electrical circuit is a product of design and conditions of use. This product cannot be designed for its intended application, and meet the safety standards as set forth in 90.1.

In the name of safety, we have an obligation to recommend the rejection of this proposal.

7-56 Log #2231 NEC-P07 **Final Action: Accept**
(382.6)

Submitter: Richard Temblador, Southwire Company
Comment on Proposal No: 7-98
Recommendation: Revise text to read as follows:

382.6 Listing Requirements. Concealable nonmetallic extensions and associated fittings and devices shall be listed. The starting/source tap device for the extension shall contain and provide the following protection for all load-side extensions and devices:

(1) Supplementary over-current protection
(2) Level of protection equivalent to a Class A GFCI
(3) Level of protection equivalent to a portable GFCI
(4) Line and load-side miswire protection
(5) Provide protection from the effects of arc faults

Substantiation: The revised wording provides additional protection against possible arcing and miswired circuits. The UL Fact Finding Study supporting these additions is available at NFPA headquarters. The study showed that all shock and fire hazards were mitigated with the exception of arcing. The proposed revision requires arc fault protection to be added to the listing requirements. Line and Load-Side Miswire Protection addition improves the overall performance of all the integral safety functionality by insuring the system will not energize if either the line or load-side of the CNE is miswired.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept
Panel Statement: The Panel accepts the Fact Finding Report and resulting requirements to add arc fault and miswire protection.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:

LADART, S.: We disagree with the panel action. Supplementary overcurrent protection and active safety devices are always a welcomed addition to augment the safety of an acceptable wiring method, and not to attempt to "make safe" an unacceptable wiring method. Concealable nonmetallic extensions are an unacceptable wiring method, and the employment of active safety devices to protect the dangerous circuit is as ridiculous as the placement of "seat belts" on motorcycles. Proposal 7-98 should be rejected.

7-57 Log #1081 NEC-P07 **Final Action: Accept in Principle**
(382.6(4))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 7-98
Recommendation: Add new text as follows:

382.6(4) Level of protection equivalent to that of a combination-type AFCI.

Substantiation: I share the grave concerns expressed by those who disagree with acceptance of this wiring method. I have observed for decades the frequency with which end-users damage even wiring methods that are quite visible, such as surface-run cable or surface raceway. It is rare that I can identify a location with confidence as one that is unlikely to subject a surface wiring method to mechanical damage. Mr. Stewart's point about its concealment is very troubling, too. While this method should enjoy protection equivalent to that of LDCI cords, AFCIs strength is that they protect against cables that are damaged in just such ways as this seems likely to experience.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 7-56.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:

LADART, S.: We disagree with the panel action. Supplementary overcurrent protection and active safety devices are always a welcomed addition to augment the safety of an acceptable wiring method, and not to attempt

to "make safe" an unacceptable wiring method. Concealable nonmetallic extensions are an unacceptable wiring method, and the employment of active safety devices to protect the dangerous circuit is as ridiculous as the placement of "seat belts" on motorcycles.

Comment on Affirmative:

STEWART, H.: The additional proposed protection mitigates the requirement of physical protection of concealable non-metallic extensions.

7-57a Log #CC700 NEC-P07 **Final Action: Accept**
(382.12(5))

Submitter: Code-Making Panel 7,
Comment on Proposal No: 7-99
Recommendation: Reject Proposal 7-99 and do not add new 382.12(5).
Substantiation: The listing for the products addresses the permitted use of the product under the provisions of Article 382. Acceptance of the recommendation of Proposal 7-99 would have precluded the intended use of nonmetallic extensions.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-58 Log #925 NEC-P07 **Final Action: Reject**
(382.12(5) (New))

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-99
Recommendation: We agree with the panel action to accept this proposal. See my Affirmative Comment on Vote on this Proposal.
Substantiation: Non metallic extensions should never be installed where subject to physical damage.
Panel Meeting Action: Reject
Panel Statement: The listing for the products addresses the proper use of the product under the provisions of this Article.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:

ADAMS, M.: This wiring method is subject to physical damage. No electrical installation should be installed where physical damage is so easily anticipated.

FAHRENTHOLD, C.: Proposal 7-99 to add the requirement that the concealable nonmetallic extensions should not be permitted to be installed "where subject to physical damage" is consistent with the code. This requirement correlates with 300.4 which states that: "where subject to physical damage, conductors shall be protected." No where in 300.4 does it provide for an exception if the wiring has a "level of shock protection equivalent to a GFCI" which is the only requirement for the concealable nonmetallic extension that is part of Proposal 7-98.

The concealable nonmetallic extension should have as a requirement that they be protected from physical damage.

LADART, S.: We disagree with the panel action. The panel action on Proposal 7-99 at the proposal stage added a new 382.12(5) that provided: Nonmetallic extensions cannot be located where subject to physical damage. Comment 7-58 is an affirmative comment for the panel action taken at the proposal stage.

Comment 7-58 was initially accepted at the comment stage, and later revisited and rejected because it was obvious that some of the panel members wanted the new "concealable Flatwire method" of extending a branch circuit to be exempt from having to be protected from physical damage.

Comment on Affirmative:

DALY, J.: See my explanation of affirmative vote on Comment 7-59.

7-59 Log #1413 NEC-P07 **Final Action: Reject**
(382.12(5) (New))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 7-99
Recommendation: NEMA agrees with the panel action.
Substantiation: NEMA submits this comment to correct incorrect statements by the submitter and by Mr. Brown who submitted an affirmative comment. Statements were made that EMT (Electrical Metallic Tubing) is not permitted where subject to physical damage. Article 358 covers EMT and allows the use of EMT where not subject to severe physical damage. Since code users read the ROP for educational purposes in addition to keeping current on actions on code proposals, it is important to correct misstatements when they occur.
Panel Meeting Action: Reject
Panel Statement: The listing for the products addresses the proper use of the product under the provisions of this Article.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:

ADAMS, M.: This wiring method is subject to physical damage. No electrical installation should be installed where physical damage is so easily anticipated.

LADART, S.: We disagree with the panel action. The panel action on Proposal 7-99 at the proposal stage added a new 382.12(5) that provided: Nonmetallic extensions cannot be located where subject to physical damage. Comment 7-59 is an affirmative comment for the panel action taken at the proposal stage. The panel rejected it at the comment stage.

Comment on Affirmative:

DALY, J.: NEMA votes in agreement with the panel action to reject Comments 7-58 and 7-59 and understands that the panel actions to reject these two comments and accept Comment 7-57a will result in the rejection of Proposal 7-99 and the text will remain as shown in the 2005 Code.

While NEMA agrees with the panel action to reject Comment 7-59 and Proposal 7-99, NEMA agrees with the substantiation in comment 7-59 that wanted to clarify the submitter's substantiation and the affirmative comment. Comment 7-59 was submitted to correct incorrect statements by the submitter and by Mr. Brown who submitted an affirmative comment. Statements were made that EMT (Electrical Metallic Tubing) is not permitted where subject to physical damage. Article 358 covers EMT and allows the use of EMT where not subject to severe physical damage. Since code users read the ROP and the ROC for educational purposes in addition to keeping current on actions on code proposals,it is important to correct misstatements when they occur.

7-60 Log #923 NEC-P07 **Final Action: Reject**
(383 (New))

Submitter: Samuel R. LaDart, City of Memphis / Rep. IBEW Local 474
Comment on Proposal No: 7-101
Recommendation: We disagree with the panel action to accept this proposal.
Substantiation: This is a safety issue. The proposed wiring method is too fragile to be exposed to physical damage, and should not be allowed in the code.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 7-56.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:

ADAMS, M.: This wiring method is subject to physical damage. No electrical installation should be installed where physical damage is so easily anticipated.

LADART, S.: We disagree with the panel action. Proposal 7-101 provides for a new article that covers the use, installation, and construction specifications for Concealable Nonmetallic Extensions.

Although we encourage and promote the development of new wiring methods, the Concealable Nonmetallic Extension method is unacceptable.

AC Flatwire is a fragile wiring method, with thin flat conductors, separated by thin layers of insulating material. The wiring method is designed to be surface mounted on a dwelling or office wall using adhesives, and then painted for "concelment". The system is designed to utilize an inherent safety system that is built within.

Good judgment has prevailed. Everyone with whom we have discussed this wiring method has quickly asked: Since I cannot see the "concealed wiring", how can I avoid penetrating it with a nail, screw, or some other foreign object? The answer is quite clear. You cannot protect this wiring method from physical damage. The proposal suggest that there is no need to protect the wiring method from physical damage. We disagree for a number of reasons. AC Flatwire is nonrepairable, and it must be stripped from the wall in the inevitable event of failure. We feel that; in all likelihood of failure, this will become an economical disadvantage to the consumer. Our foremost concern is product safety. The panel accepted this proposal on a "fact finding study", and not on the merits of "product approval" by a testing lab. The substantiation for this proposal suggests that no protection from physical damage is necessary because the circuit for the nonmetallic extension is designed with "inherent" protection to protect against shock hazards.

Would you or your loved ones feel safe while driving a nail into an energized 120 volt circuit under any set of circumstances that could possible exist?

Circuits containing "inherent" safety devices are vital in preventing shock hazards associated with approved wiring methods. We feel, however, that the "inherent" design of an electrical circuit is placed within the circuit to augment the safety of an acceptable wiring method, and not for the purpose of attemting to "make safe" the design of an unsafe circuit.

Make no mistake about it. We have been opposed to this wiring method for extending a branch circuit from the very beginning. The safety of an electrical circuit is a product of design and conditions of use. This product cannot be designed for its intended application, and meet the safety standards as set forth in 90.1.

In the name of safety, we have an obligation to recommend the rejection of this proposal.

ARTICLE 384 — STRUT-TYPE CHANNEL RACEWAY

8-75 Log #344 NEC-P08 **Final Action: Accept**
(384.22)

Submitter: Brian Dolan, IBEW/NECA Technical Institute
Comment on Proposal No: 8-170
Recommendation: Revise text to read:
Shall not exceed the percentage fill using Table 384.22 and applicable ~~Outside Diameter (OD) Dimensions~~ Cross-Sectional Area of specific types and sizes of wire given in the tables in Chapter 9.
Substantiation: The above change would facilitate greater efficiency in the application of the code section, and reduce confusion. Greater efficiency because the user is not asked to calculate the area of a conductor from its diameter, when the area is shown in the adjacent column. Less confusion because the user is not left to wonder if they are misinterpreting the code section, thinking there must be a reason why they are told to use the conductor diameter as a starting point, instead of the conductor cross-sectional area. This change would also eliminate the need for the user to recall and apply the formula for the area of a circle.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 388 — SURFACE NONMETALLIC RACEWAYS

8-76 Log #1928 NEC-P08 **Final Action: Accept**
(388.56)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 8-176
Recommendation: Accept the proposal in principle. Instead of deleting the word “removable”, replace it with “capable of being opened in place” placed immediately after the word “cover”. Instead of deleting the third sentence of the rule, retain it, but change “removable” to “capable of being opened in place” with those new words following the word “covers”.
Substantiation: Deleting the cover rules may end up distorting the meaning of this section. This comment addresses the submitter’s concern that a hinged cover of some sort that could not be removed might not qualify. The new wording in this comment provides access where it is required, while sidestepping the cover access provisions. It is unclear whether the provision as it emerged from the proposal period would have assured access and boxes where expected.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 392 — CABLE TRAYS

8-77 Log #1473 NEC-P08 **Final Action: Hold**
(392)

Submitter: Richard E. Loyd, Sun Lakes, AZ, James Imlah
Comment on Proposal No: 8-180
Recommendation: Revise Article 392 as follows:

ARTICLE 392 Cable Trays ~~-~~ Systems

I. General

392.1 Scope. This article covers cable tray systems, including ladder, ventilated trough, ventilated channel, solid bottom, and other similar structures.

FPN: For further information on cable trays, see ANSI/NEMA–VE 1-1998,Metal Cable Tray Systems; NEMA–VE 2-1996, Metal Cable Tray Installation Guidelines; and NEMA–FG-1998, Nonmetallic Cable Tray Systems.

392.2 Definition.
Cable Tray System. A unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways.
FPN. Cable trays are not raceways they are mechanical support systems. See definition of raceway in Article 100.

ll. Installation

392.~~3~~ 10 Uses Permitted.
Complete System. Cable trays shall be installed as a complete system. ~~Cable trays and their associated fittings shall be identified for the intended use.~~
(A) Cable tray shall be permitted to be used as a support system for service conductors, feeders, branch circuits, communications circuits, control circuits, and signaling circuits.

(B) Cable tray installations shall not be limited to industrial establishments.

(C) Where exposed to direct rays of the sun, insulated conductors and jacketed cables shall be identified as being sunlight resistant.

(D) Cable tray systems shall be permitted to have mechanically discontinuous segments between cable tray runs or between cable tray runs and equipment. The system shall provide for the support of the cables in accordance with their corresponding articles.

(E Where cable trays support individual conductors and where the conductors pass from one cable tray to another, or from a cable tray to raceway(s) or from a cable tray to equipment where the conductors are terminated, the distance between cable trays or between the cable tray and the raceway(s) or the equipment shall not exceed 1.8 m (6 ft). The conductors shall be secured to the cable tray(s) at the transition, and they shall be protected, by guarding or by location, from physical damage.

(F) In all ~~L~~ locations ~~(A) Wiring Methods. T~~he wiring methods in Table 392.~~3~~10~~(A)~~ (F) shall be permitted to be installed in cable tray systems under the conditions described in their respective articles and sections.

Table 392.~~3~~10~~(A)(6)~~ (F) Wiring Methods

Wiring Method	Article Section
Armored cable	320
Communication raceways	800
Electrical metallic tubing	358
Electrical nonmetallic tubing	362
Fire alarm cables	760
Flexible metal conduit	348
Flexible metallic tubing	360
Instrumentation tray cable	727
Intermediate metal conduit	342
Liquidtight flexible metal conduit	350
Liquidtight flexible nonmetallic conduit	356
Metal-clad cable	330
Mineral-insulated, metal-sheathed cable	332
Multiconductor service-entrance cable	338
Multiconductor underground feeder and branch-circuit cable	340
Multipurpose and communications cables	800
Nonmetallic-sheathed cable	334
Power and control tray cable	336
Power-limited tray cable	725.61(C) and 725.82(E)
Optical fiber cables	770
Optical fiber raceways	770
Rigid metal conduit	344
Rigid nonmetallic conduit	352

Other factory-assembled, multiconductor control, signal, or power cables that are specifically approved for installation in cable trays.

~~B)~~ (G) In Industrial Establishments Only. The wiring methods in Table 392.~~3~~(A) 10 (F) shall be permitted to be used in any industrial establishment under the conditions described in their respective articles. In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified persons service the installed cable tray system any of the cables in 392.~~3~~ 10(G) (1) ~~(B)(1)~~ and (G) (4) ~~(B)(2)~~ shall be permitted to be installed in ladder, ventilated trough, solid bottom, or ventilated channel cable trays.

~~(1) Single Conductors. Single-conductor cables shall be permitted to be installed in accordance with (B)(1)(a) through (B)(1)(c).~~
~~(a)~~ (1) Single-conductor cable shall be 1/0 AWG or larger and shall be of a type listed and marked on the surface for use in cable trays. Where 1/0 AWG through 4/0 AWG single-conductor cables are installed in ladder cable tray, the maximum allowable rung spacing for the ladder cable tray shall be 225 mm (9 in.).

~~(b)~~ (2) Welding cables shall comply with the provisions of Article 630, Part IV.

~~(c)~~ (3) Single conductors used as equipment grounding conductors shall be insulated, covered, or bare, and they shall be 4 AWG or larger.

~~(2)~~ ~~(d)~~ (4) Medium Voltage. Single- and multiconductor medium voltage cables shall be Type MV cable. Single conductors shall be installed in accordance with 392.~~3~~(B)(1)10~~(5)(a).~~(G)(1)

~~(C)~~ (H) Equipment Grounding Conductors. Metallic cable trays shall be permitted to be used as equipment grounding conductors where continuous maintenance and supervision ensure that qualified persons service the installed cable tray system and the cable tray complies with provisions of 392.~~7~~ 60.

~~(D)~~ (I) Hazardous (Classified) Locations. Cable trays in hazardous (classified) locations shall contain only the cable types permitted in 501.10, 502.10, 503.10, 504.20, and 505.15.

~~(E)~~ (J) Nonmetallic Cable Tray. In addition to the uses permitted elsewhere in 392.~~3~~ (10), nonmetallic cable tray shall be permitted in corrosive areas and in areas requiring voltage isolation.

~~392.6 (E)~~ (K) Multiconductor Cables Rated 600 Volts or Less. Multiconductor cables rated 600 volts or less shall be permitted to be installed in the same cable tray.

~~392.6(F)~~ (L)Cables Rated Over 600 Volts. Cables rated over 600 volts and those rated 600 volts or less installed in the same cable tray shall comply with either of the following:

(1 The cables rated over 600 volts are Type MC.

(2) The cables rated over 600 volts are separated from the cables rated 600 volts or less by a solid fixed barrier of a material compatible with the cable tray.

~~392.6(G)~~ (M)Through Partitions and Walls. Cable trays shall be permitted to extend transversely through partitions and walls or vertically through platforms and floors in wet or dry locations where the installations, complete with installed cables, are made in accordance with the requirements of 300.21.

~~392.6(H)~~ (N) Exposed and Accessible. Cable trays shall be exposed and accessible except as permitted by 392.~~6(G)~~ 10(~~13~~) (M).

~~392.6(I)~~ (O) Adequate Access. Sufficient space shall be provided and maintained about cable trays to permit adequate access for installing and maintaining the cables.

392.~~←~~12 Uses Not Permitted.

Cable tray systems shall not be used in hoistways or where subject to severe physical damage. Cable tray systems shall not be used in ducts, plenums, and other air-handling spaces, except as permitted in 300.22, to support wiring methods recognized for use in such spaces.

~~392.6(B)~~ 392.22 Conductors and Multiconductor Cables Completed Before Installation. Each run of cable tray shall be completed before the installation of cables.

~~392.8(D)~~ (A) Connected in Parallel.

(1) Where single conductor cables comprising each phase, neutral; or grounded conductor of an alternating-current circuit are connected in parallel as permitted in 310.4, the conductors shall be installed in groups consisting of not more than one conductor per phase, neutral, or grounded conductor to prevent current imbalance in the paralleled conductors due to inductive reactance.

(2) Single conductors shall be securely bound in circuit groups to prevent excessive movement due to fault-current magnetic forces unless single conductors are cabled together, such as triplexed assemblies.

~~392.8(E)~~ (B) Single Conductors. Where any of the single conductors installed in ladder or ventilated trough cable trays are 1/0 through 4/0 AWG, all single conductors shall be installed in a single layer. Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

~~392.9~~ (C) Number of Multiconductor Cables, Rated 2000 Volts or Less, in Cable Trays.

The number of multiconductor cables, rated 2000 volts or less, permitted in a single cable tray shall not exceed the requirements of this section. The conductor sizes herein apply to both aluminum and copper conductors.

(~~A~~) (1) Any Mixture of Cables. Where ladder or ventilated trough cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, and signal cables, the maximum number of cables shall conform to the following:

~~(1)~~ (a) Where all of the cables are 4/0 AWG or larger, the sum of the diameters of all cables shall not exceed the cable tray width, and the cables shall be installed in a single layer.

~~(2)~~ (b) Where all of the cables are smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables shall not exceed the maximum allowable cable fill area in Column 1 of Table 392.~~9~~ 22 (C) for the appropriate cable tray width.

~~(3)~~ (c) Where 4/0 AWG or larger cables are installed in the same cable tray with cables smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables smaller than 4/0 AWG shall not exceed the maximum allowable fill area resulting from the calculation in Column 2 of Table 392.9 22 (C) for the appropriate cable tray width. The 4/0 AWG and larger cables shall be installed in a single layer, and no other cables shall be placed on them.

Table 392.22(C) Allowable Cable Fill Area for Multiconductor Cables in Ladder, Ventilated Trough, or Solid Bottom Cable Trays for Cables Rated 2000 Volts or Less

Maximum Allowable Fill Area for Multiconductor Cables									
		Ladder or Ventilated Trough Cable Trays, 392.22~~9(A~~(C) (1)				Solid Bottom Cable Trays, 392.22~~9(C~~)22(C) (3)			
Inside Width of Cable Tray		Column 1 Applicable for 392.~~9(A~~22(C) (1)~~(2)~~ (b) Only		Column 2[a] Applicable for 392.~~9(A~~22 (C) (1) ~~(3)~~ (c) Only		Column 3 Applicable for 392.~~9(C)(2)~~ 22 (C) (2) (b)Only		Column 4a Applicable for 392.~~9 (C)(3)~~ 22 (c) Only	
mm	in.	mm2	in.2	mm2	in.2	mm2	in.2	mm2	in.2
150	6.0	4,500	7.0	4,500 – (30 Sd)[b]	7– (1.2 Sd)[b]	3,500	5.5	3,500–(25 Sd[b])	5.5–Sd[b]
225	9.0	6,800	10.5	6,800 – (30 Sd)	10.5– (1.2 Sd)	5,100	8.0	5,100–(25 Sd)	8.0–Sd
300	12.0	9,000	14.0	9,000 – (30 Sd)	14– (1.2 Sd)	7,100	11.0	7,100–(25 Sd)	11.0–Sd
450	18.0	13,500	21.0	13,500 – (30 Sd)	21– (1.2 Sd)	10,600	16.5	10,600–(25 Sd)	16.5–Sd
600	24.0	18,000	28.0	18,000 – (30 Sd)	28– (1.2 Sd)	14,200	22.0	14,200–(25 Sd)	22.0–Sd
750	30.0	22,500	35.0	22,500 – (30 Sd)	35– (1.2 Sd)	17,700	27.5	17,700–(25 Sd)	27.5–Sd
900	36.0	27,000	42.0	27,000 – (30 Sd)	42– (1.2 Sd)	21,300	33.0	21,300–(25 Sd)	33.0–Sd

[a] The maximum allowable fill areas in Columns 2 and 4 shall be calculated. For example, the maximum allowable fill in mm2 for a 150-mm wide cable tray in Column 2 shall be 4500 minus (30 multiplied by Sd) [the maximum allowable fill, in square inches, for a 6-in. wide cable tray in Column 2 shall be 7 minus (1.2 multiplied by Sd)].

[b]The term Sd in Columns 2 and 4 is equal to the sum of the diameters, in mm, of all cables 107.2 mm (in inches, of all 4/0 AWG) and larger multiconductor cables in the same cable tray with smaller cables.

(B) (2) Multiconductor Control and/or Signal Cables Only.

(a) Where a ladder or ventilated trough cable tray having a usable inside depth of 150 mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 50 percent of the interior cross-sectional area of the cable tray.

(b) A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).

(C) (3) Solid Bottom Cable Trays Containing Any Mixture. Where solid bottom cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, and signal cables, the maximum number of cables shall conform to the following:

(1) (a) where all of the cables are 4/0 AWG or larger, the sum of the diameters of all cables shall not exceed 90 percent of the cable tray width, and the cables shall be installed in a single layer.

(2) (b) Where all of the cables are smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables shall not exceed the maximum allowable cable fill area in Column 3 of Table 392.9 22 (C)for the appropriate cable tray width.

(3) (c) Where 4/0 AWG or larger cables are installed in the same cable tray with cables smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables smaller than 4/0 AWG shall not exceed the maximum allowable fill area resulting from the computation in Column 4 of Table 392.9 22 (C) for the appropriate cable tray width. The 4/0 AWG and larger cables shall be installed in a single layer, and no other cables shall be placed on them.

(D) (4) Solid Bottom Cable Tray — Multiconductor Control and/or Signal Cables Only.

(a) Where a solid bottom cable tray having a usable inside depth of 150 mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 40 percent of the interior cross-sectional area of the cable tray.

(b) A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).

(E) (5) Ventilated Channel Cable Trays. Where ventilated channel cable trays contain multiconductor cables of any type, the following shall apply:

(1) (a) Where only one multiconductor cable is installed, the cross-sectional area shall not exceed the value specified in Column 1 of Table 392.9(E).22 (C) (5)

(2) (b) Where more than one multiconductor cable is installed, the sum of the cross-sectional area of all cables shall not exceed the value specified in Column 2 of Table 392.9(E).22 (C) (5)

Table 392.9(E) 392.22(C)(5) Allowable Cable Fill Area for Multiconductor Cables in Ventilated Channel Cable Trays for Cables Rated 2000 Volts or Less

Inside Width of Cable Tray		Maximum Allowable Fill Area for Multiconductor Cables			
		Column 1 One Cable		Column 2 More Than One Cable	
mm	in.	mm2	in.2	mm2	in.2
75	3	1500	2.3	850	1.3
100	4	2900	4.5	1600	2.5
150	6	4500	7.0	2450	3.8

(F) (6) Solid Channel Cable Trays. Where solid channel cable trays contain multiconductor cables of any type, the following shall apply:

(1) (a) Where only one multiconductor cable is installed, the cross-sectional area of the cable shall not exceed the value specified in Column 1 of Table 392.9(F) 22 (C) (6).

(2) (b) Where more than one multiconductor cable is installed, the sum of the cross-sectional area of all cable shall not exceed the value specified in Column 2 of Table 392.9(F) 22 (C) (6).

Table 392.9(F)392.22(C)(6) Allowable Cable Fill Area for Multiconductor Cables in Solid Channel Cable Trays for Cables Rated 2000 Volts or Less

Inside Width of Cable Tray		Column 1 One Cable		Column 2 More Than One Cable	
mm	in.	mm2	in.2	mm2	in.2
50	2	850	1.3	500	0.8
75	3	1300	2.0	700	1.1
100	4	2400	3.7	1400	2.1
150	6	3600	5.5	2100	3.2

392.10 392.22 (D) Number of Single-Conductor Cables, Rated 2000 Volts or Less, in Cable Trays.

The number of single-conductor cables, rated 2000 volts or less, permitted in a single cable tray section shall not exceed the requirements of this section. The single conductors, or conductor assemblies, shall be evenly distributed across the cable tray. The conductor sizes herein apply to both aluminum and copper conductors.

(A) (1) Ladder or Ventilated Trough Cable Trays. Where ladder or ventilated trough cable trays contain single-conductor cables, the maximum number of single conductors shall conform to the following:

(1) (a) Where all of the cables are 1000 kcmil or larger, the sum of the diameters of all single conductor cables shall not exceed cable tray width, and the cables shall be installed in a single layer. Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

(2) (b) Where all of the cables are from 250 kcmil up to 1000 kcmil, the sum of the cross-sectional areas of all single-conductor cables shall not exceed the maximum allowable cable fill area in Column 1 of Table 392.10(A) 22(D) for the appropriate cable tray width.

(3) (c) Where 1000 kcmil or larger single-conductor cables are installed in the same cable tray with single-conductor cables smaller than 1000 kcmil, the sum of the cross-sectional areas of all cables smaller than 1000 kcmil shall not exceed the maximum allowable fill area resulting from the computation in Column 2 of Table 392.10(A) 392.22(D) for the appropriate cable tray width.

(4) d Where any of the single conductor cables are 1/0 through 4/0 AWG, the sum of the diameters of all single conductor cables shall not exceed the cable tray width.

(B) (2) Ventilated Channel Cable Trays. Where 50 mm (2 in.), 75 mm (3 in.), 100 mm (4 in.), or 150 mm (6 in.) wide ventilated channel cable trays contain single-conductor cables, the sum of the diameters of all single conductors shall not exceed the inside width of the channel.

392.12 (E) Number of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays.

The number of cables rated 2001 volts or over permitted in a single cable tray shall not exceed the requirements of this section.

(1) The sum of the diameters of single-conductor and multiconductor cables shall not exceed the cable tray width, and the cables shall be installed in a single layer.

(2) Where single conductor cables are triplexed, quadruplexed, or bound together in circuit groups, the sum of the diameters of the single conductors shall not exceed the cable tray width, and these groups shall be installed in single layer arrangement.

Table 392.10(A) 392.22 (D) Allowable Cable Fill Area for Single-Conductor Cables in Ladder or Ventilated Trough Cable Trays for Cables Rated 2000 Volts or Less

Inside Width of Cable Tray		Maximum Allowable Fill Area for Single-Conductor Cables in Ladder or Ventilated Trough Cable Trays			
		Column 1 Applicable for 392.10(A)(2) 22 (D) (1) (b) Only		Column 2a Applicable for 392.10(A)(3) 392.22 (D) (1) (c) Only	
mm	in.	mm2	in.2	mm2	in.2
150	6	4,200	6.5	4,200 – (28 Sd)[b]	6.5 – (1.1 Sd)[b]
225	9	6,100	9.5	6,100 – (28 Sd)	9.5 – (1.1 Sd)
300	12	8,400	13.0	8,400 – (28 Sd)	13.0 – (1.1 Sd)
450	18	12,600	19.5	12,600 – (28 Sd)	19.5 – (1.1 Sd)
600	24	16,800	26.0	16,800 – (28 Sd)	26.0 – (1.1 Sd)
750	30	21,000	32.5	21,000 – (28 Sd)	32.5 – (1.1 Sd)
900	36	25,200	39.0	25,200 – (28 Sd)	39.0 – (1.1 Sd)

[a]The maximum allowable fill areas in Column 2 shall be calculated. For example, the maximum allowable fill, in mm2, for a 150 mm wide cable tray in Column 2 shall be 4200 minus (28 multiplied by Sd) [the maximum allowable fill, in square inches, for a 6-in. wide cable tray in Column 2 shall be 6.5 minus (1.1 multiplied by Sd)].

[b]The term Sd in Column 2 is equal to the sum of the diameters, in mm, of all cables 507 mm2 (in inches, of all 1000 kcmil) and larger single-conductor cables in the same ladder or ventilated trough cable tray with small cables.

~~392.6(A)~~ 392.24 Field Bends or Modifications ~~How Made.~~ Field bends or modifications shall be so made that the electrical continuity of the cable tray system and support for the cables is maintained.

~~392.5(B)~~ 392.28 Smooth Edges. Cable trays shall not have sharp edges, burrs, or projections that could damage the insulation or jackets of the wiring.

~~392.6(C)~~ 392.30 Supports.
A. Cable Supports
(1)Supports shall be provided to prevent stress on cables where they enter raceways or other enclosures from cable tray systems.
~~392.8 (B)~~(2) (B) ~~Fastened Securely.~~ In other than horizontal runs, the cables shall be fastened securely to transverse members of the cable trays.
~~(A)~~ (B) Cable trays shall be supported at intervals in accordance with the installation instructions.
~~(B)~~ (C) ~~392.6(J)~~ Raceways, Cables, Boxes, and Conduit Bodies Supported from Cable Tray Systems.
(1) In industrial facilities where conditions of maintenance and supervision ensure that only qualified persons service the installation and where the cable tray systems are designed and installed to support the load, such systems shall be permitted to support raceways and cables, and boxes and conduit bodies covered in 314.1.
~~(a)~~ (2) For raceways terminating at the tray, a listed cable tray clamp or adapter shall be used to securely fasten the raceway to the cable tray system. Additional supporting and securing of the raceway shall be in accordance with the requirements of the appropriate raceway article.
~~(b)~~ (3) For raceways or cables running parallel to and attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of the appropriate raceway or cable article.
~~(c)~~ (4) For boxes and conduit bodies attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of 314.23.

~~392.5 (E) & 392.3~~ 392.40 ~~(D) Boxes and~~ Fittings and Covers.

~~392.5(E)~~ 392.40(A) Fittings.
(1) Cable trays shall include fittings or other suitable means for changes in direction and elevation of runs.
~~392.3~~ (2) Cable trays and associated fittings shall be identified for the intended use.

~~392.6(D)~~(B) Covers. In portions of runs where additional protection is required, covers or enclosures providing the required protection shall be of a material that is compatible with the cable tray.

~~392.8(C)~~ 392.46 Bushed Conduit and Tubing. A box shall not be required where cables or conductors are installed in bushed conduit and tubing used for support or for protection against physical damage.

~~392.8(A)~~ 392.56 Cable Splices. Cable splices made and insulated by approved methods shall be permitted to be located within a cable tray, provided they are accessible and do not project above the side rails.

392.60 Grounding and Bonding.

~~392.7~~ 392.60 (A) Grounding
(A) Metallic Cable Trays. Metallic cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with 250.96.
(~~B~~ 1) Steel or Aluminum Cable Tray Systems. Steel or aluminum cable tray systems shall be permitted to be used as equipment grounding conductors, provided that all the following requirements are met:
~~(1)~~ a The cable tray sections and fittings shall be identified for grounding purposs.
~~(2)~~ b The minimum cross-sectional area of cable trays shall conform to the requirements in Table 392.~~7(B).~~60 (A)
~~(3)~~ c All cable tray sections and fittings shall be legibly and durably marked to show the cross-sectional area of metal in channel cable trays, or cable trays of one-piece construction, and the total cross-sectional area of both side rails for ladder or trough cable trays.
~~(4)~~ d Cable tray sections, fittings, and connected raceways shall be bonded in accordance with 250.96, using bolted mechanical connectors or bonding jumpers sized and installed in accordance with 250.102.

~~Table 392.7(B)~~ Table 392.60(A) Metal Area Requirements for Cable Trays Used as Equipment Grounding Conductor

Minimum Cross-Sectional Area of Metal[a]

Maximum Fuse Ampere Rating, Circuit Breaker Ampere Trip Setting, or Circuit Breaker Protective Relay Ampere Trip Setting for Ground-Fault Protection of Any Cable Circuit in the Cable Tray System	**Minimum Cross-Sectional Area of Metal[a]**			
	Steel Cable Trays		**Aluminum Cable Trays**	
	mm2	**in.2**	**mm2**	**in.2**
60	129	0.20	129	0.20
100	258	0.40	129	0.20
200	451.5	0.70	129	0.20
400	645	1.00	258	0.40
600	967.5	1.50[b]	258	0.40
1000	—	—	387	0.60
1200	—	—	645	1.00
1600	—	—	967.5	1.50
2000	—	—	1290	2.00[b]

[a]Total cross-sectional area of both side rails for ladder or trough cable trays; or the minimum cross-sectional area of metal in channel cable trays or cable trays of one-piece construction.
[b]Steel cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 600 amperes. Aluminum cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 2000 amperes.

~~292.6(A)~~ 392.60(B) Bonding. A bonding jumper sized in accordance with 250.102 shall connect the two sections of cable tray, or the cable tray and the raceway or equipment. Bonding shall be in accordance with 250.96.

~~392.11~~ 392. 80 Ampacity of Cables, Rated 2000 Volts or Less, in Cable Trays.
(A) Multiconductor Cables. The allowable ampacity of multiconductor cables, nominally rated 2000 volts or less, installed according to the requirements of 392.9 shall be as given in Table 310.16 and Table 310.18, subject to the provisions of (1), (2), (3), and 310.15(A)(2).
(1) The derating factors of 310.15(B)(2)(a) shall apply only to multiconductor cables with more than three current-carrying conductors. Derating shall be limited to the number of current-carrying conductors in the cable and not to the number of conductors in the cable tray.
(2) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not over 95 percent of the allowable ampacities of Table 310.16 and Table 310.18 shall be permitted for multiconductor cables.
(3) Where multiconductor cables are installed in a single layer in uncovered trays, with a maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ambient temperature-corrected ampacities of multiconductor cables, with not more than three insulated conductors rated 0 through 2000 volts in free air, in accordance with 310.15(C).
FPN: See Table B.310.3.
(B) Single-Conductor Cables. The allowable ampacity of single-conductor cables shall be as permitted by 310.15(A)(2). The derating factors of 310.15(B)(2)(a) shall not apply to the ampacity of cables in cable trays. The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), nominally rated 2000 volts or less, shall comply with the following:
(1) Where installed according to the requirements of 392.10, the ampacities for 600 kcmil and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 600 kcmil and larger cables shall not exceed 70 percent of the allowable ampacities in Table 310.17 and Table 310.19.
(2) Where installed according to the requirements of 392.10, the ampacities for 1/0 AWG through 500 kcmil single-conductor cables in uncovered cable trays shall not exceed 65 percent of the allowable ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG through 500 kcmil cables shall not exceed 60 percent of the allowable ampacities in Table 310.17 and Table 310.19.
(3) Where single conductors are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between

individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.17 and Table 310.19.

Exception to (B)(3): For solid bottom cable trays the ampacity of single conductor cables shall be determined by 310.15(C).

(4) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free airspace of not less than 2.15 times one conductor diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities of two or three single insulated conductors rated 0 through 2000 volts supported on a messenger in accordance with 310.15(B).

FPN: See Table 310.20.

~~392.13~~ ~~392.64~~(C) Ampacity of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays.

The ampacity of cables rated 2001 volts, nominal, or over, installed according to ~~392.12~~ 392.22(E) shall not exceed the requirements of this section.

(A) Multiconductor Cables (2001 Volts or Over). The allowable ampacity of multiconductor cables shall be as given in Table 310.75 and Table 310.76, subject to the following provisions:

(1) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not more than 95 percent of the allowable ampacities of Table 310.75 and Table 310.76 shall be permitted for multiconductor cables.

(2) Where multiconductor cables are installed in a single layer in uncovered cable trays, with maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ampacities of Table 310.71 and Table 310.72.

(B) Single-Conductor Cables (2001 Volts or Over). The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), shall comply with the following:

(1) The ampacities for 1/0 AWG and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.69 and Table 310.70. Where the cable trays are covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG and larger single-conductor cables shall not exceed 70 percent of the allowable ampacities in Table 310.69 and Table 310.70.

(2) Where single-conductor cables are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.69 and Table 310.70.

(3) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free air space of not less than 2.15 times the diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in

III Construction Specifications

~~392.5 Construction Specifications~~.

~~392.5~~ 392.100 Construction

(A) Strength and Rigidity. Cable trays shall have suitable strength and rigidity to provide adequate support for all contained wiring.

~~392.5 (D)~~ (B) Side Rails. Cable trays shall have side rails or equivalent structural members.

~~392.5(C)~~ 392.110 Corrosion Protection. Cable tray systems shall be corrosion resistant. If made of ferrous material, the system shall be protected from corrosion as required by 300.6.

~~392.5(F)~~ 392.116 Nonmetallic Cable Tray. Nonmetallic cable trays shall be made of flame-retardant material.

Revised Article 392 would show as follows:

ARTICLE 392 Cable Tray Systems

I. General

392.1 Scope. This article covers cable tray systems, including ladder, ventilated trough, ventilated channel, solid bottom, and other similar structures.

FPN: For further information on cable trays, see ANSI/NEMA–VE 1-1998,Metal Cable Tray Systems; NEMA–VE 2-1996, Metal Cable Tray Installation Guidelines; and NEMA–FG-1998, Nonmetallic Cable Tray Systems.

392.2 Definition.

Cable Tray System. A unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways.

FPN. Cable trays are not raceways they are mechanical support systems. See definition of raceway in Article 100.

ll. Installation

392.10 Uses Permitted.

Complete System. Cable trays shall be installed as a complete system.

(A) Cable tray shall be permitted to be used as a support system for service conductors, feeders, branch circuits, communications circuits, control circuits, and signaling circuits.

(B) Cable tray installations shall not be limited to industrial establishments.

(C) Where exposed to direct rays of the sun, insulated conductors and jacketed cables shall be identified as being sunlight resistant.

(D) Cable tray systems shall be permitted to have mechanically discontinuous segments between cable tray runs or between cable tray runs and equipment. The system shall provide for the support of the cables in accordance with their corresponding articles.

(E) Where cable trays support individual conductors and where the conductors pass from one cable tray to another, or from a cable tray to raceway(s) or from a cable tray to equipment where the conductors are terminated, the distance between cable trays or between the cable tray and the raceway(s) or the equipment shall not exceed 1.8 m (6 ft). The conductors shall be secured to the cable tray(s) at the transition, and they shall be protected, by guarding or by location, from physical damage.

(F) In all locations the wiring methods in Table 392.10 (F) shall be permitted to be installed in cable tray systems under the conditions described in their respective articles and sections.

Table 392.10-(F) Wiring Methods

Wiring Method	Article Section
Armored cable	320
Communication raceways	800
Electrical metallic tubing	358
Electrical nonmetallic tubing	362
Fire alarm cables	760
Flexible metal conduit	348
Flexible metallic tubing	360
Instrumentation tray cable	727
Intermediate metal conduit	342
Liquidtight flexible metal conduit	350
Liquidtight flexible nonmetallic conduit	356
Metal-clad cable	330
Mineral-insulated, metal-sheathed cable	332
Multiconductor service-entrance cable	338
Multiconductor underground feeder and branch-circuit cable	340
Multipurpose and communications cables	800
Nonmetallic-sheathed cable	334
Power and control tray cable	336
Power-limited tray cable	725.61(C) and 725.82(E)
Optical fiber cables	770
Optical fiber raceways	770
Rigid metal conduit	344
Rigid nonmetallic conduit	352

Other factory-assembled, multiconductor control, signal, or power cables that are specifically approved for installation in cable trays.

(G) In Industrial Establishments Only. The wiring methods in Table 392.10 (F) shall be permitted to be used in any industrial establishment under the conditions described in their respective articles. In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified persons service the installed cable tray system any of the cables in 392.10(G) (1) and (G) (4) shall be permitted to be installed in ladder, ventilated trough, solid bottom, or ventilated channel cable trays.

(1) Single-conductor cable shall be 1/0 AWG or larger and shall be of a type listed and marked on the surface for use in cable trays. Where 1/0 AWG through 4/0 AWG single-conductor cables are installed in ladder cable tray, the maximum allowable rung spacing for the ladder cable tray shall be 225 mm (9 in.).

(2) Welding cables shall comply with the provisions of Article 630, Part IV.

(3)Single conductors used as equipment grounding conductors shall be insulated, covered, or bare, and they shall be 4 AWG or larger.

(4) Medium Voltage. Single- and multiconductor medium voltage cables shall be Type MV cable. Single conductors shall be installed in accordance with 392.10(G) (1)

(H) Equipment Grounding Conductors. Metallic cable trays shall be permitted to be used as equipment grounding conductors where continuous maintenance and supervision ensure that qualified persons service the installed cable tray system and the cable tray complies with provisions of 392.60.

(I) Hazardous (Classified) Locations. Cable trays in hazardous (classified) locations shall contain only the cable types permitted in 501.10, 502.10, 503.10, 504.20, and 505.15.

(J) Nonmetallic Cable Tray. In addition to the uses permitted elsewhere in 392.10, nonmetallic cable tray shall be permitted in corrosive areas and in areas requiring voltage isolation.

(K) Multiconductor Cables Rated 600 Volts or Less. Multiconductor cables rated 600 volts or less shall be permitted to be installed in the same cable tray.

(L)Cables Rated Over 600 Volts. Cables rated over 600 volts and those rated 600 volts or less installed in the same cable tray shall comply with either of the following:

(1) The cables rated over 600 volts are Type MC.

(2) The cables rated over 600 volts are separated from the cables rated 600 volts or less by a solid fixed barrier of a material compatible with the cable tray.

(M)Through Partitions and Walls. Cable trays shall be permitted to extend transversely through partitions and walls or vertically through platforms and floors in wet or dry locations where the installations, complete with installed cables, are made in accordance with the requirements of 300.21.

(N) Exposed and Accessible. Cable trays shall be exposed and accessible except as permitted by 392.10 (M).

(O) Adequate Access. Sufficient space shall be provided and maintained about cable trays to permit adequate access for installing and maintaining the cables.

392.12 Uses Not Permitted.

Cable tray systems shall not be used in hoistways or where subject to severe physical damage. Cable tray systems shall not be used in ducts, plenums, and other air-handling spaces, except as permitted in 300.22, to support wiring methods recognized for use in such spaces.

392.22 Conductors and Multiconductor Cables Completed Before Installation.

Each run of cable tray shall be completed before the installation of cables.

(A) Connected in Parallel.

(1) Where single conductor cables comprising each phase, neutral; or grounded conductor of an alternating-current circuit are connected in parallel as permitted in 310.4, the conductors shall be installed in groups consisting of not more than one conductor per phase, neutral, or grounded conductor to prevent current imbalance in the paralleled conductors due to inductive reactance.

(2) Single conductors shall be securely bound in circuit groups to prevent excessive movement due to fault-current magnetic forces unless single conductors are cabled together, such as triplexed assemblies.

(B) Single Conductors. Where any of the single conductors installed in ladder or ventilated trough cable trays are 1/0 through 4/0 AWG, all single conductors shall be installed in a single layer. Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

(C) Number of Multiconductor Cables, Rated 2000 Volts or Less, in Cable Trays.

The number of multiconductor cables, rated 2000 volts or less, permitted in a single cable tray shall not exceed the requirements of this section. The conductor sizes herein apply to both aluminum and copper conductors.

(1) Any Mixture of Cables. Where ladder or ventilated trough cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, and signal cables, the maximum number of cables shall conform to the following:

(a) Where all of the cables are 4/0 AWG or larger, the sum of the diameters of all cables shall not exceed the cable tray width, and the cables shall be installed in a single layer.

(b) Where all of the cables are smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables shall not exceed the maximum allowable cable fill area in Column 1 of Table 392.22 (C) for the appropriate cable tray width.

(c) Where 4/0 AWG or larger cables are installed in the same cable tray with cables smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables smaller than 4/0 AWG shall not exceed the maximum allowable fill area resulting from the calculation in Column 2 of Table 392.22 (C) for the appropriate cable tray width. The 4/0 AWG and larger cables shall be installed in a single layer, and no other cables shall be placed on them.

(2) Multiconductor Control and/or Signal Cables Only.

(a) Where a ladder or ventilated trough cable tray having a usable inside depth of 150 mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 50 percent of the interior cross-sectional area of the cable tray.

(b) A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).

Table 392.22(C) Allowable Cable Fill Area for Multiconductor Cables in Ladder, Ventilated Trough, or Solid Bottom Cable Trays for Cables Rated 2000 Volts or Less

Maximum Allowable Fill Area for Multiconductor Cables									
		Ladder or Ventilated Trough Cable Trays, 392.22 (C) (1)				Solid Bottom Cable Trays, 392.22 (C) (3)			
Inside Width of Cable Tray		Column 1 Applicable for 392.22 (C) (1) (b) Only		Column 2[a] Applicable for 392.22 (C) (1) (c) Only		Column 3 Applicable for 392. 22 (C) (2) (b)Only		Column 4a Applicable for 392. 22 (C) (2) (c) Only	
mm	in.	mm2	in.2	mm2	in.2	mm2	in.2	mm2	in.2
150	6.0	4,500	7.0	4,500 – (30 Sd)[b]	7– (1.2 Sd)[b]	3,500	5.5	3,500–(25 Sd[b])	5.5–Sd[b]
225	9.0	6,800	10.5	6,800 – (30 Sd)	10.5– (1.2 Sd)	5,100	8.0	5,100–(25 Sd)	8.0–Sd
300	12.0	9,000	14.0	9,000 – (30 Sd)	14– (1.2 Sd)	7,100	11.0	7,100–(25 Sd)	11.0–Sd
450	18.0	13,500	21.0	13,500 – (30 Sd)	21– (1.2 Sd)	10,600	16.5	10,600–(25 Sd)	16.5–Sd
600	24.0	18,000	28.0	18,000 – (30 Sd)	28– (1.2 Sd)	14,200	22.0	14,200–(25 Sd)	22.0–Sd
750	30.0	22,500	35.0	22,500 – (30 Sd)	35– (1.2 Sd)	17,700	27.5	17,700–(25 Sd)	27.5–Sd
900	36.0	27,000	42.0	27,000 – (30 Sd)	42– (1.2 Sd)	21,300	33.0	21,300–(25 Sd)	33.0–Sd

[a] The maximum allowable fill areas in Columns 2 and 4 shall be calculated. For example, the maximum allowable fill in mm2 for a 150-mm wide cable tray in Column 2 shall be 4500 minus (30 multiplied by Sd) [the maximum allowable fill, in square inches, for a 6-in. wide cable tray in Column 2 shall be 7 minus (1.2 multiplied by Sd)].

[b]The term Sd in Columns 2 and 4 is equal to the sum of the diameters, in mm, of all cables 107.2 mm (in inches, of all 4/0 AWG) and larger multiconductor cables in the same cable tray with smaller cables.

(3) Solid Bottom Cable Trays Containing Any Mixture. Where solid bottom cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, and signal cables, the maximum number of cables shall conform to the following:

(a) where all of the cables are 4/0 AWG or larger, the sum of the diameters of all cables shall not exceed 90 percent of the cable tray width, and the cables shall be installed in a single layer.

(b) Where all of the cables are smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables shall not exceed the maximum allowable cable fill area in Column 3 of Table 392.22 (C)for the appropriate cable tray width.

(c) Where 4/0 AWG or larger cables are installed in the same cable tray with cables smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables smaller than 4/0 AWG shall not exceed the maximum allowable fill area resulting from the computation in Column 4 of Table 392.22 (C) for the appropriate cable tray width. The 4/0 AWG and larger cables shall be installed in a single layer, and no other cables shall be placed on them.

(4) Solid Bottom Cable Tray — Multiconductor Control and/or Signal Cables Only.

(a) Where a solid bottom cable tray having a usable inside depth of 150 mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 40 percent of the interior cross-sectional area of the cable tray.

(b) A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).

(5) Ventilated Channel Cable Trays. Where ventilated channel cable trays contain multiconductor cables of any type, the following shall apply:

(a) Where only one multiconductor cable is installed, the cross-sectional area shall not exceed the value specified in Column 1 of Table 392.22 (C) (5)

(b) Where more than one multiconductor cable is installed, the sum of the cross-sectional area of all cables shall not exceed the value specified in Column 2 of Table 392.22 (C) (5)

Table 392.22(C)(5) Allowable Cable Fill Area for Multiconductor Cables in Ventilated Channel Cable Trays for Cables Rated 2000 Volts or Less

		Maximum Allowable Fill Area for Multiconductor Cables			
Inside Width of Cable Tray		Column 1 One Cable		Column 2 More Than One Cable	
mm	in.	mm2	in.2	mm2	in.2
75	3	1500	2.3	850	1.3
100	4	2900	4.5	1600	2.5
150	6	4500	7.0	2450	3.8

(6) Solid Channel Cable Trays. Where solid channel cable trays contain multiconductor cables of any type, the following shall apply:

(a) Where only one multiconductor cable is installed, the cross-sectional area of the cable shall not exceed the value specified in Column 1 of Table 392.22 (C) (6).

(b) Where more than one multiconductor cable is installed, the sum of the cross-sectional area of all cable shall not exceed the value specified in Column 2 of Table 392.22 (C) (6).

Table 392.22(C) (6) Allowable Cable Fill Area for Multiconductor Cables in Solid Channel Cable Trays for Cables Rated 2000 Volts or Less

Inside Width of Cable Tray		Column 1 One Cable		Column 2 More Than One Cable	
mm	in.	mm2	in.2	mm2	in.2
50	2	850	1.3	500	0.8
75	3	1300	2.0	700	1.1
100	4	2400	3.7	1400	2.1
150	6	3600	5.5	2100	3.2

(D) Number of Single-Conductor Cables, Rated 2000 Volts or Less, in Cable Trays.

The number of single-conductor cables, rated 2000 volts or less, permitted in a single cable tray section shall not exceed the requirements of this section. The single conductors, or conductor assemblies, shall be evenly distributed across the cable tray. The conductor sizes herein apply to both aluminum and copper conductors.

(1) Ladder or Ventilated Trough Cable Trays. Where ladder or ventilated trough cable trays contain single-conductor cables, the maximum number of single conductors shall conform to the following:

(a) Where all of the cables are 1000 kcmil or larger, the sum of the diameters of all single conductor cables shall not exceed cable tray width, and the cables shall be installed in a single layer. Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

(b) Where all of the cables are from 250 kcmil up to 1000 kcmil, the sum of the cross-sectional areas of all single-conductor cables shall not exceed the maximum allowable cable fill area in Column 1 of Table 392.22(D) for the appropriate cable tray width.

(c) Where 1000 kcmil or larger single-conductor cables are installed in the same cable tray with single-conductor cables smaller than 1000 kcmil, the sum of the cross-sectional areas of all cables smaller than 1000 kcmil shall not exceed the maximum allowable fill area resulting from the computation in Column 2 of Table 392.22(D) for the appropriate cable tray width.

(d) Where any of the single conductor cables are 1/0 through 4/0 AWG, the sum of the diameters of all single conductor cables shall not exceed the cable tray width.

(2) Ventilated Channel Cable Trays. Where 50 mm (2 in.), 75 mm (3 in.), 100 mm (4 in.), or 150 mm (6 in.) wide ventilated channel cable trays contain single-conductor cables, the sum of the diameters of all single conductors shall not exceed the inside width of the channel.

Table 392.22(D) Allowable Cable Fill Area for Single-Conductor Cables in Ladder or Ventilated Trough Cable Trays for Cables Rated 2000 Volts or Less

		Maximum Allowable Fill Area for Single-Conductor Cables in Ladder or Ventilated Trough Cable Trays			
Inside Width of Cable Tray		Column 1 Applicable for 392.22 (D) (1) (b) Only		Column 1 Applicable for 392.22 (D) (1) (b) Only	Column 2a Applicable for 392.22 (D) (1) (c) Only
mm	in.	mm2	in.2	mm2	in.2
150	6	4,200	6.5	4,200 – (28 Sd)[b]	6.5 – (1.1 Sd)[b]
225	9	6,100	9.5	6,100 – (28 Sd)	9.5 – (1.1 Sd)
300	12	8,400	13.0	8,400 – (28 Sd)	13.0 – (1.1 Sd)
450	18	12,600	19.5	12,600 – (28 Sd)	19.5 – (1.1 Sd)
600	24	16,800	26.0	16,800 – (28 Sd)	26.0 – (1.1 Sd)
750	30	21,000	32.5	21,000 – (28 Sd)	32.5 – (1.1 Sd)
900	36	25,200	39.0	25,200 – (28 Sd)	39.0 – (1.1 Sd)

[a]The maximum allowable fill areas in Column 2 shall be calculated. For example, the maximum allowable fill, in mm2, for a 150 mm wide cable tray in Column 2 shall be 4200 minus (28 multiplied by Sd) [the maximum allowable fill, in square inches, for a 6-in. wide cable tray in Column 2 shall be 6.5 minus (1.1 multiplied by Sd)].

[b]The term Sd in Column 2 is equal to the sum of the diameters, in mm, of all cables 507 mm2 (in inches, of all 1000 kcmil) and larger single-conductor cables in the same ladder or ventilated trough cable tray with small cables.

(E) Number of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays.

The number of cables rated 2001 volts or over permitted in a single cable tray shall not exceed the requirements of this section.

(1) The sum of the diameters of single-conductor and multiconductor cables shall not exceed the cable tray width, and the cables shall be installed in a single layer.

(2) Where single conductor cables are triplexed, quadruplexed, or bound together in circuit groups, the sum of the diameters of the single conductors shall not exceed the cable tray width, and these groups shall be installed in single layer arrangement.

392.24 Field Bends or Modifications. Field bends or modifications shall be so made that the electrical continuity of the cable tray system and support for the cables is maintained.

392.28 Smooth Edges. Cable trays shall not have sharp edges, burrs, or projections that could damage the insulation or jackets of the wiring.

392.30 Supports.

A. Cable Supports

(1)Supports shall be provided to prevent stress on cables where they enter raceways or other enclosures from cable tray systems.

(2) In other than horizontal runs, the cables shall be fastened securely to transverse members of the cable trays.

(B) Cable trays shall be supported at intervals in accordance with the installation instructions.

(C) Raceways, Cables, Boxes, and Conduit Bodies Supported from Cable Tray Systems.

(1) In industrial facilities where conditions of maintenance and supervision ensure that only qualified persons service the installation and where the cable tray systems are designed and installed to support the load, such systems shall

be permitted to support raceways and cables, and boxes and conduit bodies covered in 314.1.

(2) For raceways terminating at the tray, a listed cable tray clamp or adapter shall be used to securely fasten the raceway to the cable tray system. Additional supporting and securing of the raceway shall be in accordance with the requirements of the appropriate raceway article.

(3) For raceways or cables running parallel to and attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of the appropriate raceway or cable article.

(4) For boxes and conduit bodies attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of 314.23.

392.40 Fittings and Covers.

(A) Fittings.

(1) Cable trays shall include fittings or other suitable means for changes in direction and elevation of runs.

(2) Cable trays and associated fittings shall be identified for the intended use.

(B) Covers. In portions of runs where additional protection is required, covers or enclosures providing the required protection shall be of a material that is compatible with the cable tray.

-392.46 Bushed Conduit and Tubing. A box shall not be required where cables or conductors are installed in bushed conduit and tubing used for support or for protection against physical damage.

-392.56 Cable Splices. Cable splices made and insulated by approved methods shall be permitted to be located within a cable tray, provided they are accessible and do not project above the side rails.

392.60 Grounding and Bonding.

(A) Grounding

(1) Metallic Cable Trays. Metallic cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with 250.96.

(2) Steel or Aluminum Cable Tray Systems. Steel or aluminum cable tray systems shall be permitted to be used as equipment grounding conductors, provided that all the following requirements are met:

(a) The cable tray sections and fittings shall be identified for grounding purposes.

(b) The minimum cross-sectional area of cable trays shall conform to the requirements in Table 392.60 (A)

(c) All cable tray sections and fittings shall be legibly and durably marked to show the cross-sectional area of metal in channel cable trays, or cable trays of one-piece construction, and the total cross-sectional area of both side rails for ladder or trough cable trays.

(d)Cable tray sections, fittings, and connected raceways shall be bonded in accordance with 250.96, using bolted mechanical connectors or bonding jumpers sized and installed in accordance with 250.102.

(B) Bonding. A bonding jumper sized in accordance with 250.102 shall connect the two sections of cable tray, or the cable tray and the raceway or equipment. Bonding shall be in accordance with 250.96.

392.80 Ampacity of Cables, Rated 2000 Volts or Less, in Cable Trays.

(A) Multiconductor Cables. The allowable ampacity of multiconductor cables, nominally rated 2000 volts or less, installed according to the requirements of 392.9 shall be as given in Table 310.16 and Table 310.18, subject to the provisions of (1), (2), (3), and 310.15(A)(2).

(1) The derating factors of 310.15(B)(2)(a) shall apply only to multiconductor cables with more than three current-carrying conductors. Derating shall be limited to the number of current-carrying conductors in the cable and not to the number of conductors in the cable tray.

(2) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not over 95 percent of the allowable ampacities of Table 310.16 and Table 310.18 shall be permitted for multiconductor cables.

(3) Where multiconductor cables are installed in a single layer in uncovered trays, with a maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ambient temperature-corrected ampacities of multiconductor cables, with not more than three insulated conductors rated 0 through 2000 volts in free air, in accordance with 310.15(C).

FPN: See Table B.310.3.

(B) Single-Conductor Cables. The allowable ampacity of single-conductor cables shall be as permitted by 310.15(A)(2). The derating factors of 310.15(B)(2)(a) shall not apply to the ampacity of cables in cable trays. The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), nominally rated 2000 volts or less, shall comply with the following:

(1) Where installed according to the requirements of 392.10, the ampacities for 600 kcmil and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 600 kcmil and larger cables shall not exceed 70 percent of the allowable ampacities in Table 310.17 and Table 310.19.

(2) Where installed according to the requirements of 392.10, the ampacities for 1/0 AWG through 500 kcmil single-conductor cables in uncovered cable trays shall not exceed 65 percent of the allowable ampacities in Table 310.17 and Table 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG through 500 kcmil cables shall not exceed 60 percent of the allowable ampacities in Table 310.17 and Table 310.19.

Table 392.60(A) Metal Area Requirements for Cable Trays Used as Equipment Grounding Conductor

Maximum Fuse Ampere Rating, Circuit Breaker Ampere Trip Setting, or Circuit Breaker Protective Relay Ampere Trip Setting for Ground-Fault Protection of Any Cable Circuit in the Cable Tray System	Minimum Cross-Sectional Area of Metal[a]			
	Steel Cable Trays		Aluminum Cable Trays	
	mm2	in.2	mm2	in.2
60	129	0.20	129	0.20
100	258	0.40	129	0.20
200	451.5	0.70	129	0.20
400	645	1.00	258	0.40
600	967.5	1.50[b]	258	0.40
1000	—	—	387	0.60
1200	—	—	645	1.00
1600	—	—	967.5	1.50
2000	—	—	1290	2.00[b]

[a]Total cross-sectional area of both side rails for ladder or trough cable trays; or the minimum cross-sectional area of metal in channel cable trays or cable trays of one-piece construction.

[b]Steel cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 600 amperes. Aluminum cable trays shall not be used as equipment grounding conductors for circuits with ground-fault protection above 2000 amperes.

(3) Where single conductors are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.17 and Table 310.19. Exception to (B)(3): For solid bottom cable trays the ampacity of single conductor cables shall be determined by 310.15(C).

(4) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free airspace of not less than 2.15 times one conductor diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities of two or three single insulated conductors rated 0 through 2000 volts supported on a messenger in accordance with 310.15(B).

FPN: See Table 310.20.

(C) Ampacity of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays. The ampacity of cables rated 2001 volts, nominal, or over, installed according to 392.22(E) shall not exceed the requirements of this section.

(1) Multiconductor Cables (2001 Volts or Over). The allowable ampacity of multiconductor cables shall be as given in Table 310.75 and Table 310.76, subject to the following provisions:

(a) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not more than 95 percent of the allowable ampacities of Table 310.75 and Table 310.76 shall be permitted for multiconductor cables.

(b) Where multiconductor cables are installed in a single layer inuncovered cable trays, with maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ampacities of Table 310.71 and Table 310.72.

(2) Single-Conductor Cables (2001 Volts or Over). The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), shall comply with the following:

(a) The ampacities for 1/0 AWG and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Table 310.69 and Table 310.70. Where the cable trays are covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG and larger single-conductor cables shall not exceed 70 percent of the allowable ampacities in Table 310.69 and Table 310.70.

(b) Where single-conductor cables are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Table 310.69 and Table 310.70.

(c) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free air space of not less than 2.15 times the diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in

III Construction Specifications

392.100 Construction

(A) Strength and Rigidity. Cable trays shall have suitable strength and rigidity to provide adequate support for all contained wiring.

(B) Side Rails. Cable trays shall have side rails or equivalent structural members.

392.110 Corrosion Protection. Cable tray systems shall be corrosion resistant. If made of ferrous material, the system shall be protected from corrosion as required by 300.6.

392.116 Nonmetallic Cable Tray. Nonmetallic cable trays shall be made of flame-retardant material.

Substantiation: As per the TCC to clarify the panel action, Article 392 was reorganized to more closely follow the suggested numbering system established in the NFPA style manual.

This rewrite was completed to format it as closely as possible to the common numbering system.

- Title: add "systems" to clarify this article cover cable tray systems.
- Add Part l General
- 392.2 Definition added new FPN added for clarity definition.
- Add Part ll Installation
- 392.6 "Installation" was no longer needed so it was deleted.
- 392.3 renumbered to "392.10 and revised to style manual. The first sentence from 392.6(A) was added. "Complete System. Cable trays shall be installed as a complete system."
- Old "392.3 renumbered to 392.10 Uses Permitted" will change the numbering system from the normal 1, 2, 3… to A, B, C… to match the style manual. Additionally, the list style shown in the style manual does not provide for sublists within a section and the following changes:
- Old 392.3 (A) renumbered to 392.10 (A)
- Old 392.3 (A) renumbered to 392.10 (B)
- Old 392.3 (A) renumbered to 392.10 (C).
- Old 392.6 (A) renumbered to 392.10 (D)
- Old 392.6 (A) renumbered to 392.10 (E)
- Old 392.3 (A) renumbered to 392.10 (F) and changed table reference to Table 392.3(6) (A) to read Table 392.10 (F). The was an editorial change for adding "In all locations the" and removing "(A) Wiring Methods"
- Old Table 392.3 (A) (6) renumbered to Table 392.10 (F)
- Old 392.3 (B) renumbered to 392.10 (G) "In Industrial Establishments Only"
- Old 392.3 (B), first sentence table reference renumbered to 392.10 (F).
- Old 392.3 (B) second sentence to read "any of the cables in 392.10 (G) (1) to (G) (4)"
- Old 392.3 (B) (1) removed the sentence "(1) Single Conductors. Single-conductor cables shall be permitted to be installed in accordance with (B) (1) (a) through (B) (1) (c) as not needed sub heading.-
- Old 392.3 (B) (1) (A renumbered to 392.10 (G) (1)
- Old 392.3 (B) (1) (B) renumbered to 392.10 (G) (2)
- Old 392.3 (B) (1) (C) renumbered to 392.10 (G) (3)
- Old 392.3 (B) (2) (d) renumbered to 392.10 (G) (4) and changed reference in article of 392.3 (B) (1) to 392.10 (G) (1)
- Old 392.3 (C) renumbered to 392.10 (H) and the grounding reference is changed from 392.7 to 392.60
- Old 392.3 (D) renumbered to 392.10 (I)
- Old 392.3 (E) renumbered to 392.10 (J)
- Old 392.6 (E) renumbered to 392.10 (K).
- Old 392.6 (F) renumbered to 392.10 (L)
- Old 392.6 (G) renumbered to 392.10 (M)
- Old 392.6 (H) renumbered to 392.10 (N) and change the reference within (N) identified as 392.6(G) renumbered to 392.10 (M)
- Old 392.6 (I) renumbered to 392.10 (O)
- Old 392.4 renumbered to 392.12.
- Old 392.6 "Installation" renumbered to 392.22 with a title of "Conductors and Cables" by adding the word "Multiconductor" that is referenced in the section due to the rewrite and numbering sequence. Change title to read "392.22 Conductors and Multiconductor Cables."
- Old 392.8 (D) renumbered to 392.22 (A) and the contents within this article subdivided as two separate conditions to read:

"Where single conductor cables comprising each phase, neutral; or grounded conductor of an alternating-current circuit are connected in parallel as permitted in 310.4, the conductors shall be installed in groups consisting of not more than one conductor per phase, neutral, or grounded conductor to prevent current imbalance in the paralleled conductors due to inductive reactance."

"Single conductors shall be securely bound in circuit groups to prevent excessive movement due to fault-current magnetic forces unless single conductors are cabled together, such as triplexed assemblies.

- Old 392.8 (E) renumbered to 392.22 (B).
- Old 392.9(A) (1) renumbered to 392.22 (C) (1) (a)
- Old 392.9 that was renumbered to 392.22 (C) with subsection (1) (b) to change the existing reference of Column 1 of Table 392.9 changed to Column 1 of Table 392.22 (C).
- Old 392.9 that was renumbered to 392.22 (C) with subsection (1) (c) to change the existing reference of Column 2 of Table 392.9 changed to Column 2 of Table 392.22 (C).
- Old Table 392.9 that was renumbered to Table 392.22 (C) to change the following table references with the table to read as follows:

Ladder or Ventilated Trough Cable Trays 392.9 (A) renumbered to 392.22 (C) (1)

Solid Bottom Cable Trays 392.9 (A) renumbered to 392.22 (C) (3)

Column 1 Application for 392.9 (A) (2) renumbered to 392.22 (C) (1) (b) Only

Column 2 Application for 392.9 (A) (3) renumbered to 392.22 (C) (1) (c) Only

Column 3 Application for 392.9 (C) (2) renumbered to 392.22 (C) (2) (b) Only

Column 4 Application for 392.9 (C) (3) renumbered to 392.22 (C) (2) (c) Only

- Old 392.9 (B) changed the section content now numbered 392.22 (C) (2) into parts (a) and (b) to follow previous article format and will read as follows: Where a ladder or ventilated trough cable tray having a usable inside depth of 150 mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 50 percent of the interior cross-sectional area of the cable tray. A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).
- Old 392.9 (C) renumbered to 392.22 (C) (3)
- Old 392.9 (C) (1) renumbered to 392.22 (C) (3) (a)
- Old 392.9 (C) (2) renumbered to 392.22 (C) (3) (b) to update reference Table to new title of Table 392.22 (C).
- Old 392.9 (C) (3) renumbered to 392.22 (C) (3) (c) to update reference Table to new title of Table 392.22 (C).
- Old 392.9 (D) renumbered to 392.22 (C) (4)
- Old 392.9 (D) changed the section content now numbered 392.22 (C) (4) into parts (a) and (b) to follow previous article format and will read as follows:

Where a solid bottom cable tray having a usable inside depth of 150 mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 40 percent of the interior cross-sectional area of the cable tray.
A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).
- Old 392.9 (E) (1) renumbered to 392.22 (C) (5) (a) table reference changed to read "Column 1 of Table 392.22 (C) (5)."
- Old 392.9 (E) (2) renumbered to 392.22 (C) (5) (b) table reference changed to read "Column 2 of Table 392.22 (C) (5)."
- Old Table 392.9 (E) renumbered to Table 392.22 (C) (5)
- Old 392.9 (F) renumbered to 392.22 (C) (6)
- Old 392.9 (F) (1) renumbered to 392.22 (C) (6) (a) and table reference changed to read "Column 1 of Table 392.22 (C) (6)."
- Old 392.9 (F) (2) changed to 392.22 (C) (6) (b) and table reference changed to read "Column 2 of Table 392.22 (C) (6)."
- Old Table 392.9 (F) is renumbered to Table 392.22 (C) (6)
- Old 392.10 renumbered to 392.22 (D)
- Old 392.10 (A) renumbered to 392.22 (D) (1)
- Old 392.10 (A) (1) renumbered to 392.22 (D) (1) (a)
- Old 392.10 (A) (2) renumbered to 392.22 (D) (1) (b) for table reference to now read Column 1 of Table 392.22 (D)
- Old 392.10 (A) (3) renumbered to 392.22 (D) (1) (c) for table reference to now read Column 2 of Table 392.22 (D)
- Old 392.10 (A) (4) renumbered to 392.22 (D) (1) (d)
- Old 392.10 (B) renumbered to 392.22 (D) (2)
- Old Table 392.10 (A) renumbered to Table 392.22 (D)
- Old Table 392.10 (A) column heading reference renumbered to "Column 1 Applicable for 392.22 (D) (1) (b) Only"
- Old Table 392.10 (A) column heading reference to "Column 2a Applicable for 392.22 (D) (1) (c) Only"
- Old 392.12 renumbered to 392.22 (E)
- Old 392.12 renumbered to 392.22 (E) changed the section content into parts (1) and (2) to follow previous article format style and will read as follows:

The sum of the diameters of single-conductor and multiconductor cables shall not exceed the cable tray width, and the cables shall be installed in a single layer.
Where single conductor cables are triplexed, quadruplexed, or bound together in circuit groups, the sum of the diameters of the single conductors shall not exceed the cable tray width, and these groups shall be installed in single layer arrangement.
- The old 392.6 (A) has relocated this sentence to this newly number section as follows:

392.24 Field Bends or Modifications. Field bends or modifications shall be so made that the electrical continuity of the cable tray system and support for the cables is maintained. Words "Field" and "or Modifications" were editorial changes to provide clarity for job specific installation requirements.
- The old 392.5 (B) has relocated this sentence to the newly numbered section as follows:

392.28 Smooth Edges. Cable trays shall not have sharp edges, burrs, or projections that could damage the insulation or jackets of the wiring.
- The old 392.6 (C) has been renumbered to "392.30" "Supports."
- The old 392.6 has been renumbered to 392.30 "(A) Cable Supports" for multiple support requirements that will be identified as separate requirements.
- The old 392.6 (C) renumbered as 392.39 (A) (1) as one of the requirements for cable supports as follows:

Supports shall be provided to prevent stress on cables where they enter raceways or other enclosures from cable tray systems.
- The old 392.8 (A) second sentence has been relocated to 392.30 (A) (2) to read:

In other than horizontal runs, the cables shall be fastened securely to transverse members of the cable trays. This relocation better fulfills the requirements for cable supports. The old title "Securely Fastened" has been removed from the 392.8 (B) when this was relocated.
- Old 392.6 (A) second sentence is renumbered as 392.30 (B).
- Old 392.6 (J) is renumbered as 392.30 (C) with a title "(C) Raceways, Cables, Boxes, and Conduit Bodies Supported from Cable Tray Systems.
- Old 392.6 (J) now identified as 392.30 (C) was changed to a number format numbered 1 to 4 as separate requirements by the following numbering sequence:

In industrial facilities where conditions of maintenance and supervision ensure that only qualified persons service the installation and where the cable tray systems are designed and installed to support the load, such systems shall be permitted to support raceways and cables, and boxes and conduit bodies covered in 314.1

For raceways terminating at the tray, a listed cable tray clamp or adapter shall be used to securely fasten the raceway to the cable tray system. Additional supporting and securing of the raceway shall be in accordance with the requirements of the appropriate raceway article.

For raceways or cables running parallel to and attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of the appropriate raceway or cable article.

For boxes and conduit bodies attached to the bottom or side of a cable tray system, fastening and supporting shall be in accordance with the requirements of 314.23.
- From the old 392.5 (E) and 392.3 (D) renumbered to a new heading and number to read as follows:"392.40 Fitting and Covers."
- Old 392.5 (E) renumbered and an identification sub (A) 392.40 (A) "Fittings."

From the old 392.5 (E) and a new designation:
Cable trays shall include fittings or other suitable means for changes in direction and elevation of runs.
- From the old 392.3 to have a new (2) for the statement relocated as follows:

Cable trays and associated fittings shall be identified for the intended use.
This change was to correlate with the fitting and covers title line.
- Old 392.6 (D) renumbered to 392.40 and new designation sub (B) titled "Covers."
- Old 392.8 (C) renumbered as 392.46 "Bushed Conduit and Tubing"
- Old 392.8(A) renumbered as 392.56 "Cable Splices."
- From the old 392.7 Grounding has been renumbered to 392.60 to more closely follow the NEC numbering sequence. Additionally, the title has been changed to "Grounding and Bonding" for the title to more accurately describe the content of the article

A new sub-heading "392.60 (A) Grounding" to separate the requirements from bonding.
- Old 392.7 (A) is renumbered 392.60 (A) (1) "Metallic Cable Trays"
- Old 392.7 (B) is renumbered 392.60 (A) (2) "Steel or Aluminum Cable Tray Systems."
- Old 392.7 (B) (1) is renumbered 392.60 (A) (2) (a)
- Old 392.7 (B) (2) is renumbered 392.60 (A) (2) (b) the table reference to Table 392.7 (B) renumbered to Table 392.60 (A)
- Old 392.7 (B) (3) is renumbered 392.60 (A) (2) (c)
- Old 392.7 (B) (4) is renumbered 392.60 (A) (2) (d)
- Old Table 392.7 (B) is renumbered 392.60 (A)
- From the old 392.6 (A) has been re-identified as a sub designation "392.60 (B) Bonding" for the title to more accurately description of the article
- Old 392.11 renumbered to 392.80
- Old 392.13 renumbered to 392.80 (C) "Ampacity of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays" as a sub title under ampacity
- The old 392.13 first sentence code reference should be renumbered from 392.12 to 392.22 (E)
- Old 392.13 renumbered as 392.80 (C) (1)
- Old 392.13 (A) renumbered as 392.80 (C) (1)
- Old 392.13 (A) (1) renumbered as 392.80 (C) (1) (a)
- Old 392.13 (A) (2) renumbered as 392.80 (C) (1) (b)
- Old 392.13 (B) renumbered as 392.80 (C) (2)
- Old 392.13 (B) (1) renumbered as 392.80 (C) (2) (a)
- Old 392.13 (B) (2) renumbered as 392.80 (C) (2) (b)
- Old 392.13 (B) (3) renumbered as 392.80 (C) (2) (c)
- Add Part "III Construction Specifications"
- Change the old 392.5 to 392.100 and title as "Construction" to follow the titles and location assigned to other articles.
- Old 392.5 (A) is renumbered as 392.100 (A)
- Old 392.5 (D) is renumbered as 392.100 (B)
- Old 392.5 (C) is renumbered as 392.110
- Old 392.5 (F) is renumbered as 392.116

Panel Meeting Action: Hold
Panel Statement: The panel believes that Comment 8-77 introduces material that has not had public review in accordance with 4.4.6.2.2 of the Regulations Governing Committee Projects. In taking this action, the panel wishes to also place Proposal 8-180 on hold for reconsideration in the next revision cycle.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-78 Log #1833 NEC-P08 **Final Action: Hold**
(392)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 8-180
Recommendation:
ARTICLE 392 Cable Trays

GENERAL

392.1 Scope
This article covers cable tray systems, including ladder, ventilated trough, ventilated channel, solid bottom, and other similar structures.
Cable trays are mechanical support systems. Cable trays are not raceways. See the definition of raceway in Article 100.

FPN: For further information on cable trays, see ANSI/NEMA–VE 1-1998, Metal Cable Tray Systems; NEMA–VE 2-1996, Metal Cable Tray Installation Guidelines; and NEMA–FG-1998, Nonmetallic Cable Tray Systems.

392.2 Definition
Cable Tray System. A unit or assembly of units or sections and associated fittings forming a structural system used to securely fasten or support cables and raceways.

INSTALLATION

392.3**10** Uses Permitted

Cable tray shall be permitted to be used as a support system for service conductors, feeders, branch circuits, communications circuits, control circuits, and signaling circuits.

(1) Cable tray installations shall not be limited to industrial establishments.

(2) Where exposed to direct rays of the sun, insulated conductors and jacketed cables shall be identified as being sunlight resistant.

(3) Cable trays and their associated fittings shall be identified for the intended use.

(A) Wiring Methods The wiring methods in Table 392.310(A) shall be permitted to be installed in cable tray systems under the conditions described in their respective articles and sections.

Table 392.3**10**(A) Wiring Methods

Wiring Method	Article Section
Armored cable	320
Communication raceways	800
Electrical metallic tubing	358
Electrical nonmetallic tubing	362
Fire alarm cables	760
Flexible metal conduit	348
Flexible metallic tubing	360
Instrumentation tray cable	727
Intermediate metal conduit	342
Liquidtight flexible metal conduit	350
Liquidtight flexible nonmetallic conduit	356
Metal-clad cable	330
Mineral-insulated, metal-sheathed cable	332
Multiconductor service-entrance cable	338
Multiconductor underground feeder and branch-circuit cable	340
Multipurpose and communications cables	800
Nonmetallic-sheathed cable	334
Power and control tray cable	336
Power-limited tray cable	725.61(C) and 725.82(E)
Optical fiber cables	770
Optical fiber raceways	770
Other factory-assembled, multiconductor control, signal, or power cables that are specifically approved for installation in cable trays	
Rigid metal conduit	344
Rigid nonmetallic conduit	352

(B) In Industrial Establishments The wiring methods in Table 392.3**10**(A) shall be permitted to be used in any industrial establishment under the conditions described in their respective articles. In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified persons service the installed cable tray system, any of the cables in 392.3**10**(B)(1) and (B)(2) shall be permitted to be installed in ladder, ventilated trough, solid bottom, or ventilated channel cable trays.

(1) Single Conductors Single-conductor cables shall be permitted to be installed in accordance with (B)(1)(a) through (B)(1)(c).

(a) Single-conductor cable shall be 1/0 AWG or larger and shall be of a type listed and marked on the surface for use in cable trays. Where 1/0 AWG through 4/0 AWG single-conductor cables are installed in ladder cable tray, the maximum allowable rung spacing for the ladder cable tray shall be 225 mm (9 in.).

(b) Welding cables shall comply with the provisions of Article 630, Part IV. Cable trays used to support welding cables are required to be dedicated for welding cable installation. See 630.42 for installation details.

(c) Single conductors used as equipment grounding conductors shall be insulated, covered, or bare, and they shall be 4 AWG or larger.

(2) Medium Voltage Single- and multiconductor medium voltage cables shall be Type MV cable. Single conductors shall be installed in accordance with 392.3**10**(B)(1).

(C) Equipment Grounding Conductors Metallic cable trays shall be permitted to be used as equipment grounding conductors where continuous maintenance and supervision ensure that qualified persons service the installed cable tray system and the cable tray complies with provisions of 392.7**60**.

(D) Hazardous (Classified) Locations Cable trays in hazardous (classified) locations shall contain only the cable types permitted in 501.10, 502.10, 503.10, 504.20, and 505.15.

(E) Nonmetallic Cable Tray In addition to the uses permitted elsewhere in 392.3**10**, nonmetallic cable tray shall be permitted in corrosive areas and in areas requiring voltage isolation.

392.4**12** Uses Not Permitted

(1) Cable tray systems shall not be used in hoistways or where subject to severe physical damage.

(2) Cable tray systems shall not be used in ducts, plenums, and other air-handling spaces, except as permitted in 300.22, to support wiring methods recognized for use in such spaces.

392.9 **22 Cable Tray Conductor Fill (A)** Number of Multiconductor Cables, Rated 2000 Volts or Less, in Cable Trays

The number of multiconductor cables, rated 2000 volts or less, permitted in a single cable tray shall not exceed the requirements of this section. The conductor sizes herein apply to both aluminum and copper conductors.

~~(A)~~ **(1)** Any Mixture of Cables Where ladder or ventilated trough cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, and signal cables, the maximum number of cables shall conform to the following:

~~(1)~~ **(a)** Where all of the cables are 4/0 AWG or larger, the sum of the diameters of all cables shall not exceed the cable tray width, and the cables shall be installed in a single layer.

~~(2)~~ **(b)** Where all of the cables are smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables shall not exceed the maximum allowable cable fill area in Column 1 of Table 392.9 **22** for the appropriate cable tray width.

~~(3)~~ **(c)** Where 4/0 AWG or larger cables are installed in the same cable tray with cables smaller than 4/0 AWG, the sum of the cross-sectional areas of all cables smaller than 4/0 AWG shall not exceed the maximum allowable fill area resulting from the computation in Column 4 of Table 392.9**22** for the appropriate cable tray width. The 4/0 AWG and larger cables shall be installed in a single layer, and no other cables shall be placed on them.

~~(B)~~ **(4)** Solid Bottom Cable Tray — Multiconductor Control and/or Signal Cables Only.

(a) Where a solid bottom cable tray having a usable inside depth of 150 mm (6 in.) or less contains multiconductor control and/or signal cables only, the sum of the cross-sectional areas of all cables at any cross section shall not exceed 40 percent of the interior cross-sectional area of the cable tray.

(b) A depth of 150 mm (6 in.) shall be used to calculate the allowable interior cross-sectional area of any cable tray that has a usable inside depth of more than 150 mm (6 in.).

~~(E)~~ **(5)** Ventilated Channel Cable Trays Where ventilated channel cable trays contain multiconductor cables of any type, the following shall apply:

~~(1)~~ **(a)** Where only one multiconductor cable is installed, the cross-sectional area shall not exceed the value specified in Column 1 of Table 392.9 **22**(E).

~~(2)~~

(b) Where more than one multiconductor cable is installed, the sum of the cross-sectional area of all cables shall not exceed the value specified in Column 2 of Table 392.9 **22**(E).

Table 392.9 **(22)**(E) Allowable Cable Fill Area for Multiconductor Cables in Ventilated Channel Cable Trays for Cables Rated 2000 Volts or Less

~~(F)~~ **(6)** Solid Channel Cable Trays Where solid channel cable trays contain multiconductor cables of any type, the following shall apply:

~~(1)~~ **(a)** Where only one multiconductor cable is installed, the cross-sectional area of the cable shall not exceed the value specified in Column 1 of Table 392.9 **22**(F).

~~(2)~~ **(b)** Where more than one multiconductor cable is installed, the sum of the cross-sectional area of all cable shall not exceed the value specified in Column 2 of Table 392.9 ~~22~~(F).

~~392.10~~ **(B)** Number of Single-Conductor Cables, Rated 2000 Volts or Less, in Cable Trays

The number of single-conductor cables, rated 2000 volts or less, permitted in a single cable tray section shall not exceed the requirements of this section. The single conductors, or conductor assemblies, shall be evenly distributed across the cable tray. The conductor sizes herein apply to both aluminum and copper conductors.

~~(A)~~ **(1)** Ladder or Ventilated Trough Cable Trays Where ladder or ventilated trough cable trays contain single-conductor cables, the maximum number of single conductors shall conform to the following:

~~(1)~~ **(a)** Where all of the cables are 1000 kcmil or larger, the sum of the diameters of all single conductor cables shall not exceed cable tray width, and the cables shall be installed in a single layer. Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

~~(2)~~ **(b)** Where all of the cables are from 250 kcmil up to 1000 kcmil, the sum of the cross-sectional areas of all single-conductor cables shall not exceed the maximum allowable cable fill area in Column 1 of Table 392.~~10(A)~~ **22(G)** for the appropriate cable tray width.

~~(3)~~ **(c)** Where 1000 kcmil or larger single-conductor cables are installed in the same cable tray with single-conductor cables smaller than 1000 kcmil, the sum of the cross-sectional areas of all cables smaller than 1000 kcmil shall not exceed the maximum allowable fill area resulting from the computation in Column 2 of Table 392.~~10(A)~~ **22(G)** for the appropriate cable tray width.

~~(4)~~**(d)**Where any of the single conductor cables are 1/0 through 4/0 AWG, the sum of the diameters of all single conductor cables shall not exceed the cable tray width.

~~(B)~~ **(2)**Ventilated Channel Cable Trays Where 50 mm (2 in.), 75 mm (3 in.), 100 mm (4 in.), or 150 mm (6 in.) wide ventilated channel cable trays contain single-conductor cables, the sum of the diameters of all single conductors shall not exceed the inside width of the channel.

(C) Number of Combination of Multiconductor Cables and Single Conductor Cables in the same Cable Tray.

392.6**24**Installation

(A) Complete System Cable trays shall be installed as a complete system.

(1) Field bends or modifications shall be so made that the electrical continuity of the cable tray system and support for the cables is maintained.

(2) Cable tray systems shall be permitted to have mechanically discontinuous segments between cable tray runs or between cable tray runs and equipment.

(3) The system shall provide for the support of the cables in accordance with their corresponding articles.

(4) Where cable trays support individual conductors and where the conductors pass from one cable tray to another, or from a cable tray to raceway(s) or from a cable tray to equipment where the conductors are terminated, the distance between cable trays or between the cable tray and the raceway(s) or the equipment shall not exceed 1.8 m (6 ft).

(a) The conductors shall be secured to the cable tray(s) at the transition, and they shall be protected, by guarding or by location, from physical damage.

(b)A bonding jumper sized in accordance with 250.102 shall connect the two sections of cable tray, or the cable tray and the raceway or equipment. Bonding shall be in accordance with 250.96.

(B) Completed Before Installation. Each run of cable tray shall be completed before the installation of cables.

(C) Supports. Supports shall be provided to prevent stress on cables where they enter raceways or other enclosures from cable tray systems.
Cable trays shall be supported at intervals in accordance with the installation instructions.

(D) Covers. In portions of runs where additional protection is required, covers or enclosures providing the required protection shall be of a material that is compatible with the cable tray.

(E) Multiconductor Cables Rated 600 Volts or Less. Multiconductor cables rated 600 volts or less shall be permitted to be installed in the same cable tray.

(F) Cables Rated Over 600 Volts. Cables rated over 600 volts and those rated 600 volts or less installed in the same cable tray shall comply with either of the following:

(1) The cables rated over 600 volts are Type MC.

(2) The cables rated over 600 volts are separated from the cables rated 600 volts or less by a solid fixed barrier of a material compatible with the cable tray.

(G) Through Partitions and Walls Cable trays shall be permitted to extend transversely through partitions and walls or vertically through platforms and floors in wet or dry locations where the installations, complete with installed cables, are made in accordance with the requirements of 300.21.

(H) Exposed and Accessible Cable trays shall be exposed and accessible except as permitted by 392.6 **(24)**(G).

I) Adequate Access. Sufficient space shall be provided and maintained about cable trays to permit adequate access for installing and maintaining the cables.

(J) Raceways, Cables, Boxes, and Conduit Bodies Supported from Cable Tray Systems.

(1) In industrial facilities where conditions of maintenance and supervision ensure that only qualified persons service the installation and where the cable tray systems are designed and installed to support the load, such systems shall be permitted to support raceways and cables, and boxes and conduit bodies covered in 314.1.

(2) For raceways terminating at the tray, a listed cable tray clamp or adapter shall be used to securely fasten the raceway to the cable tray system.

(3) Additional supporting and securing of the raceway shall be in accordance with the requirements of the appropriate raceway article.

~~(B)~~ **392.30** Fastened Securely. In other than horizontal runs, the cables shall be fastened securely to transverse members of the cable trays.

392.8 **56**Cable Installation

(A) Cable Splices Cable splices made and insulated by approved methods shall be permitted to be located within a cable tray, provided they are accessible and do not project above the side rails.

~~(C)~~ **(B)**Bushed Conduit and Tubing A box shall not be required where cables or conductors are installed in bushed conduit and tubing used for support or for protection against physical damage.

~~(D)~~ **(C)**Connected in Parallel

(1) Where single conductor cables comprising each phase, neutral, or grounded conductor of an alternating-current circuit are connected in parallel as permitted in 310.4, the conductors shall be installed in groups consisting of not more than one conductor per phase, neutral, or grounded conductor to prevent current imbalance in the paralleled conductors due to inductive reactance.

(2) Single conductors shall be securely bound in circuit groups to prevent excessive movement due to fault-current magnetic forces unless single conductors are cabled together, such as triplexed assemblies.

~~(E)~~ **(D)**Single Conductors

(1) Where any of the single conductors installed in ladder or ventilated trough cable trays are 1/0 through 4/0 AWG, all single conductors shall be installed in a single layer.

(2) Conductors that are bound together to comprise each circuit group shall be permitted to be installed in other than a single layer.

392.7 **60**Grounding

(A) Metallic Cable Trays.

(1) Metallic cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with 250.96.

(2) Section 392.7**(60)**(A), together with 250.96, requires all cable tray systems that support electrical conductors (whether mechanically continuous or with isolated segments) to be electrically continuous and effectively bonded and grounded. This requirement applies whether or not the cable tray is used as an equipment grounding conductor.

(B) Steel or Aluminum Cable Tray Systems Steel or aluminum cable tray systems shall be permitted to be used as equipment grounding conductors, provided that all the following requirements are met:

(1) The cable tray sections and fittings shall be identified for grounding purposes.

(2) The minimum cross-sectional area of cable trays shall conform to the requirements in Table 392.7 **60**(B).

(3) All cable tray sections and fittings shall be legibly and durably marked to show the cross-sectional area of metal in channel cable trays, or cable trays of one-piece construction, and the total cross-sectional area of both side rails for ladder or trough cable trays.

(4) Cable tray sections, fittings, and connected raceways shall be bonded in accordance with 250.96, using bolted mechanical connectors or bonding jumpers sized and installed in accordance with 250.102.

392.11 **80**Ampacity of Cables, Rated 2000 Volts or Less, in Cable Trays

(A) Multiconductor Cables The allowable ampacity of multiconductor cables, nominally rated 2000 volts or less, installed according to the requirements of 392.9 **22(A)**shall be as given in Tables 310.16 and 310.18, subject to the provisions of (1), (2), (3), and 310.15(A)(2).

(1) The derating factors of 310.15(B)(2)(a) shall apply only to multiconductor cables with more than three current-carrying conductors. Derating shall be limited to the number of current-carrying conductors in the cable and not to the number of conductors in the cable tray.

(2) Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not over 95 percent of the allowable ampacities of Tables 310.16 and 310.18 shall be permitted for multiconductor cables.

(3) Where multiconductor cables are installed in a single layer in uncovered trays, with a maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ambient temperature-corrected ampacities of multiconductor cables, with not more than three insulated conductors rated 0 through 2000 volts in free air, in accordance with 310.15(C).
FPN:See Table B.310.3.

(B) Single-Conductor Cables The allowable ampacity of single-conductor cables shall be as permitted by 310.15(A)(2). The derating factors of 310.15(B)(2)(a) shall not apply to the ampacity of cables in cable trays. The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), nominally rated 2000 volts or less, shall comply with the following:

(1) Where installed according to the requirements of 392.10**22 (B)**, the ampacities for 600 kcmil and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Tables 310.17 and 310.19. Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 600 kcmil and larger cables shall not exceed 70 percent of the allowable ampacities in Tables 310.17 and 310.19.

(2) Where installed according to the requirements of 392.103, the ampacities for 1/0 AWG through 500 kcmil single-conductor cables in uncovered cable trays shall not exceed 65 percent of the allowable ampacities in Tables 310.17 and 310.19.Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG through 500 kcmil cables shall not exceed 60 percent of the allowable ampacities in Tables 310.17 and 310.19.

(3) Where single conductors are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Tables 310.17 and 310.19.
Exception to (B)(3): For solid bottom cable trays the ampacity of single conductor cables shall be determined by 310.15(C).

(4) Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free airspace of not less than 2.15 times one conductor diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities of two or three single insulated conductors rated 0 through 2000 volts supported on a messenger in accordance with 310.15(B).
FPN:See Table 310.20.

392.~~12~~ **90 2001Volts or More**
(A) Number of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays
(1) The number of cables rated 2001 volts or over permitted in a single cable tray shall not exceed the requirements of this section.
(2) The sum of the diameters of single-conductor and multiconductor cables shall not exceed the cable tray width, and the cables shall be installed in a single layer.
(3) Where single conductor cables are triplexed, quadruplexed, or bound together in circuit groups, the sum of the diameters of the single conductors shall not exceed the cable tray width, and these groups shall be installed in single layer arrangement.
392.13 **(B)**Ampacity of Type MV and Type MC Cables (2001 Volts or Over) in Cable Trays
(1) The ampacity of cables, rated 2001 volts, nominal, or over, installed according to 392.~~12~~ **90** shall not exceed the requirements of this section.
~~(A)~~ **(a)**Multiconductor Cables (2001 Volts or Over) The allowable ampacity of multiconductor cables shall be as given in Tables 310.75 and 310.76, subject to the following provisions:
~~(1)~~**(2)**Where cable trays are continuously covered for more than 1.8 m (6 ft) with solid unventilated covers, not more than 95 percent of the allowable ampacities of Tables 310.75 and 310.76 shall be permitted for multiconductor cables.
~~(2)~~**(3)**Where multiconductor cables are installed in a single layer in uncovered cable trays, with maintained spacing of not less than one cable diameter between cables, the ampacity shall not exceed the allowable ampacities of Tables 310.71 and 310.72.
~~(B)~~ **(C)**Single-Conductor Cables (2001 Volts or Over) The ampacity of single-conductor cables, or single conductors cabled together (triplexed, quadruplexed, etc.), shall comply with the following:
(1) The ampacities for 1/0 AWG and larger single-conductor cables in uncovered cable trays shall not exceed 75 percent of the allowable ampacities in Tables 310.69 and 310.70.
(2) Where the cable trays are covered for more than 1.8 m (6 ft) with solid unventilated covers, the ampacities for 1/0 AWG and larger single-conductor cables shall not exceed 70 percent of the allowable ampacities in Tables 310.69 and 310.70.
~~(2)~~**(3)**Where single-conductor cables are installed in a single layer in uncovered cable trays, with a maintained space of not less than one cable diameter between individual conductors, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Tables 310.69 and 310.70.
~~(3)~~**(4)**Where single conductors are installed in a triangular or square configuration in uncovered cable trays, with a maintained free air space of not less than 2.15 times the diameter (2.15 × O.D.) of the largest conductor contained within the configuration and adjacent conductor configurations or cables, the ampacity of 1/0 AWG and larger cables shall not exceed the allowable ampacities in Tables 310.67 and 310.68.

392.~~5~~ **100** Construction Specifications.
(A) Strength and Rigidity Cable trays shall have suitable strength and rigidity to provide adequate support for all contained wiring.
(B) Smooth Edges Cable trays shall not have sharp edges, burrs, or projections that could damage the insulation or jackets of the wiring.
(C) Corrosion Protection Cable tray systems shall be corrosion resistant. If made of ferrous material, the system shall be protected from corrosion as required by 300.6.
(D) Side Rails Cable trays shall have side rails or equivalent structural members.
(E) Fittings Cable trays shall include fittings or other suitable means for changes in direction and elevation of runs.
(F) Nonmetallic Cable Tray Nonmetallic cable trays shall be made of flame-retardant material.
Substantiation: The Panel action was to "Accept in Principle", but the only actions stated seem to be three items. One understanding from the CMP-8 meeting was that a number of formatting changes without content changes were in fact made. The attached contains what these changes were and therefore better explains why the action taken was to "Accept in Principle" rather than to just "Accept".
Panel Meeting Action: Hold
Panel Statement: See panel action and statement on Comment 8-77.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-79 Log #51 NEC-P08 **Final Action: Accept**
(392.3 and 392.4)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 8-180
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal in the reorganization of Article 392. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 8-77.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-80 Log #52 NEC-P08 **Final Action: Accept**
(Table 392.3(A))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 8-182
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action taken on Proposal 16-181. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 8-81.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-81 Log #234 NEC-P08 **Final Action: Accept**
(Table 392.3(A))

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 8-181
Recommendation: Accept this proposal.
Substantiation: The listing of multipurpose cables ended on July 1, 2003. This proposal is one of a series of proposals I submitted to complete the elimination of multipurpose cables from the code. The process of eliminating them began in the 2005 Code. Removal of multipurpose cables will not cause any inconvenience for users because all multipurpose cables were also listed as communications cables.
See CMP 16 action on proposals 16-175, 176, 181, 182 and CMP-3 action on proposal 3-169.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-82 Log #235 NEC-P08 **Final Action: Accept**
(Table 392.3(A))

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 8-182
Recommendation: Accept proposal 8-182 in principle by revising the columns "Wiring Method" and "Article" as shown below.

Table 392.3(A) Wiring Methods

Wiring Method	Article
Armored cable	320
CATV cables	820
CATV raceways	820
Class 2 & 3 cables	725
Communications cables	800
Communications raceways	800
Electrical metallic tubing	358
Electrical nonmetallic tubing	362
Fire alarm cables	760
Flexible metal conduit	348
Flexible metallic tubing	360
Instrumentation tray cable	727
Intermediate metal conduit	342
Liquidtight flexible metal conduit	350
Liquidtight flexible nonmetallic conduit	356
Metal-clad cable	330
Mineral-insulated, metal-sheathed cable	332
Multiconductor service-entrance cable	338
Multiconductor underground feeder and branch-circuit cable	340
~~Multipurpose and communications cables~~	~~800~~
Network-powered broadband communications cables	830
Nonmetallic-sheathed cable	334
Non-power-limited fire alarm cable	760
Power and control tray cable	336
Power-limited fire alarm cable	760
Power-limited tray cable	725
Optical fiber cables	770
Optical fiber raceways	770
Other factory-assembled, multiconductor control, signal, or power cables that are specifically approved for installation in cable trays	
Rigid metal conduit	344
Rigid nonmetallic conduit	352
Signaling raceway	725

Substantiation: The panel noted that there were errors in the table. The table in the ROP is missing the title of the left-hand column (Wiring Method) which caused all the items in that column to move up one row.

Panel 16 eliminated multipurpose cables in the last code cycle and succeeded in removing most references to multipurpose cables. See my comment on proposal 8-181.

The following cables and raceways should be added to the table in order to make is complete: CATV cables, CATV raceways, Class 2 & 3 cables, signaling raceways and network-powered broadband cables.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-83 Log #236 NEC-P08 **Final Action: Accept in Principle (Table 392.3(A))**

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 8-182
Recommendation: Revise the columns "Wiring Method" and "Article" as shown below.

Table 392.3(A) Wiring Methods

Wiring Method	Article	Section
Armored cable	320	
CATV cables	820	
CATV raceways	820	
Class 2 & 3 cables	725	
Communications cables	800	
Communications raceways	800	
Electrical metallic tubing	358	
Electrical nonmetallic tubing	362	
Fire alarm cables	760	
Flexible metal conduit	348	
Flexible metallic tubing	360	
Instrumentation tray cable	727	
Intermediate metal conduit	342	
Liquidtight flexible metal conduit	350	
Liquidtight flexible nonmetallic conduit	356	
Metal-clad cable	330	
Mineral-insulated, metal-sheathed cable	332	
Multiconductor service-entrance cable	338	
Multiconductor underground feeder and branch-circuit cable	340	
~~Multipurpose and communications cables~~	~~800~~	-
Network-powered broadband communications cables	830	
Nonmetallic-sheathed cable	334	
Non-power-limited fire alarm cable	760	
Power and control tray cable	336	
Power-limited fire alarm cable	760	
Power-limited tray cable	725	725.61(C) and 725.82(E)
Optical fiber cables	770	
Optical fiber raceways	770	
Other factory-assembled, multi-conductor control, signal, or power cables that are specifically approved for installation in cable trays		
Rigid metal conduit	344	
Rigid nonmetallic conduit	352	
Signaling raceway	725	

Substantiation: Panel 16 eliminated multipurpose cables in the last code cycle and succeeded in removing most references to multipurpose cables. The following cables and raceways should be added to the table tin order to make is complete: CATV cables, CATV raceways, Class 2 & 3 cables, signaling raceways and network-powered broadband cables.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 8-82.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-84 Log #294 NEC-P08 **Final Action: Accept in Principle (Table 392.3(A))**

Submitter: Code-Making Panel 16,
Comment on Proposal No: 8-181
Recommendation: Reconsider and accept the proposal.
Substantiation: Listing of multipurpose cables ended on July 1, 2003. CMP-16 accepted Proposals 16-175, -176, -181 and -182 and CMP-3 accepted Proposal 3-169 to remove references to multipurpose cable. CMP-16 rejected Proposals 16-220 and 16-221 which would have deleted the listing requirements for multipurpose cables because of a Standards Council directiive dealing with NFPA 90A issues. Other than the listing requirements that CMP-16 could not delete, the reference in Table 392.3(A) is the only remaining reference to multipurpose cables in the 2008 NEC. Elimination of references to multipurpose cables began in the 2005 NEC. Removal of a reference to multipurpose cables does not create any problem for users of the code since all multipurpose cables were also listed as communication cables.

This comment was balloted through CMP-16 with the following ballot results:

15 Eligible to Vote
12 Affirmative
1 Negative
2 Not Returned (R. Gubisch and R. Hughes)

Mr. H. Ohde voted negatively stating: "CMP-16 rejected Proposals 16-220 and 16-221 because of a Standards Council directive. Since multipurpose (CMP) cable is still listed in 800.179(G), technically the reference to multipurpose cables should remain in Table 392.3(A) until the standard Council decision is resolved."

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 8-81.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-85 Log #707 NEC-P08 **Final Action: Accept (392.7(A))**

Submitter: Robert Crain, Cablofil
Comment on Proposal No: 8-108
Recommendation: The Panel should accept in principle and modify the existing 392.7(A) as follows:

Metallic cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with 250.96 and Part IV of Article 250.

Substantiation: The proposed revision in 392.7(A) requires the cabletray to be connected to a grounded enclosure rather than simply being grounded. The intent of this section appears to be to ensure the cabletray is grounded as required for conductor enclosures. There are other means for grounding the cabletray rather than connecting it to a grounded enclosure. No substantiation has been provided to require changing the means of grounding cabletray by connection only to grounded enclosure. Enclosures usually occur at the end of a cable tray run. Cable tray is allowed to be mechanically discontinuous as long as it is electrically continuous, and provides cable support per appropriate cable type code section. Those trays are often grounded to building steel via hold down hardware or jumpers. They are often grounded to telecommunication grounding bus as well.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

8-86 Log #2158 NEC-P08 **Final Action: Accept in Principle (392.8(A))**

Submitter: David H. Kendall, Carlon
Comment on Proposal No: 8-192a
Recommendation: Proposal 8-192a should be an "Accept in Principle" and revise the text for 392.8(A) to read as follows:

(A) Cable Splices. Cable splices made and insulated by approved methods shall be permitted to be located within a cable tray, provided they are accessible. Splices that are subjected to physical damage shall not project above the side rails.

Substantiation: The current text accepted by Panel 8 indicates that the only time a splice is permitted is when it is exposed to physical damage. The proposed rewording in this comment attempts to state that splices are allowed in a cable tray. When the splice is subject to physical damage, then the splice cannot project above the side rails of the cable tray.
Panel Meeting Action: Accept in Principle
Revise the text for 392.8(A) to read as follows:

(A) Cable Splices. Cable splices made and insulated by approved methods shall be permitted to be located within a cable tray, provided they are accessible. Splices shall be permitted to project above the side rails where not subject to physical damage.

Panel Statement: The revised wording meets the intent of the submitter.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 396 — MESSENGER SUPPORTED WIRING

7-61 Log #47 NEC-P07 **Final Action: Accept (396.12(B))**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 7-105
Recommendation: The Technical Correlating Committee directs that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC. See panel action and statement on Comment 7-62.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-62 Log #285 NEC-P07 **Final Action: Accept**
(396.12(B))

Submitter: Code-Making Panel 5,
Comment on Proposal No: 7-105
Recommendation: CMP-5 recommends that CMP-7 reject this proposal.
Substantiation: This proposal adds grounding requirements for the messenger cable that do not correlate with the grounding requirements in other parts of the code as has been pointed out by the negative vote comments. Context indicates that 396.12 has to do with the physical uses of the messenger cable. The submitter's substantiation does not specifically address the physical use of the messenger cable. A more appropriate place to address grounding requirements for messenger cables is 396.60. Please refer to CMP-5's comment on Proposal 7-106.

This comment has been balloted through CMP-5 with the following results:
15 Eligible to Vote
13 Affirmative
1 Negative
1 Not Returned (W. Helfrich)

Mr. D. Brender voted negatively stating: "Vote on Panel 5 and Task Group recommendation is negative. Recommendation: Revise the proposed new 396.12(B) as follows: "The messenger shall not be used as a continuous current-carrying conductor such as a neutral unless otherwise permitted in this code."

Substantiation: The NEC generally requires conductors to be insulated. See 310.2(A). This should include where neutral conductors are installed as feeders or branch circuits. 230.22 Exception Permits the grounded conductor of multiconductor cable installed for services to be bare. However, this section does not apply to feeders or branch circuits. CMP-5 disagrees that 225.4 allows current-carrying conductors to be bare or covered. The exception simply states that other sections in the NEC might allow such an installation. While it is normal practice for the electrical utilities to install service drops using bare neutral conductors, these service drops are not covered by the code given the exclusion provided in 90.2(B)(5)."

Mr. D. Hammel voted affirmatively stating: "Accept the proposal in principle and create a new section for the use of the messenger as a current-carrying conductor as follows:

"396.XX Use of Messenger as current-carrying Conductor. The messenger shall only be used as a grounded conductor as provided in 396.XX(A) or (B).

(A) Grounded Service Conductor. The messenger shall only be used as a grounded service conductor as provided in 230.22 exception.

(B) Grounded Feeder Conductor. The messenger shall only be used as a grounded conductor in accordance with 250.32(B)(2)."

Note: If the CMP-5 action on Proposal 5-119 continues to hold through the 2008 NEC development process, the reference to 250.32(B)(2) should be changed to reference 250.32(B)(1) Exception.

CMP-5 agrees with the concepts introduced in this proposal that restricts messengers from generally being used as current-carrying conductors. By inserting the words "unless used as a grounded conductor in accordance with 250.32(B)(2") places a restriction on this use while at the same time allows existing installations to continue this use because the installation met previous requirements in the NEC. The actions taken by CMP-5 on Proposal 5-119 will place further restrictions on this use to only existing installations where the conditions of the exception (former 250.32(B)(2) have been met. CMP-5 recommends that CMP-7 adjusts the accept action to accept in principle on this proposal and add the text suggested for consistent correlation with the CMP-5 actions on Proposal 5-119. This action should meet the intent of the submitter while continuing to recognize the allowance for messengers to carry current under restrictive existing installations only."
Panel Meeting Action: Accept

The panel accepts the comment and rejects Proposal 7-105. This panel action will delete 396.12(B) as accepted by the panel action on Proposal 7-105, and shown in the ROP, and return 396.12 to the text shown in the 2005 Code.
Panel Statement: The panel considered the recommendations to reject Proposal 7-105 submitted in CMP5 Comment 7-62, CMP4 Comment 7-63 and CMP19 Comment 7-64 and the substantiations and recommendations provided in those comments.

The CMP5 action to accept in principle Proposal 5-119 changed 250.32(B)(2) into an Exception to 250.32(B)(1).

Acceptance of Proposal 7-105 would introduce a conflict with the accept in principle action on Proposals 5-21 and 5-36 to add a definition of "neutral conductor" in Article 100. The Article 100 definition, as modified in Proposal 5-36, states "Neutral Conductor. The conductor connected to the neutral point of a system that is intended to carry current under normal conditions." Proposal 7-105 recommends the addition of 396.12(B) to read "(B) The messenger shall not be used as a continuous current carrying conductor such as a neutral conductor."

Acceptance of Proposal 7-105 would also introduce a conflict with 310.15(B)(4).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-63 Log #297 NEC-P07 **Final Action: Accept**
(396.12(B))

Submitter: Code-Making Panel 4,
Comment on Proposal No: 7-105
Recommendation: The following is the **Final Action** of a task group appointed to review Proposal 7-105. CMP-4 recommends rejecting the proposal.
Substantiation: CMP-4 has rejected Proposal 4-6 to delete permission to use a bare or covered conductor as a grounded circuit conductor. A bare messenger wire is used as the grounded conductor throughout the country for overhead utility company service drops without any problems and is permitted by 230.41, Exception for service entrance conductors. Overhead branch circuits and feeders are permitted to be installed in an outside application where the wires are distributed using overhead poles similar to utility company distribution of service conductors. Section 225.4 only requires installation or covering on branch circuit or feeder cables installed using overhead poles where within 10 ft of any building or structure (structures other than supporting poles or towers). If phase conductors can be uninsulated from pole to pole, it would stand to reason that the grounded conductor could be uninsulated.

No evidence is offered that any of the incidents cited by the submitter is or has been corrected by the application of insulated neutrals; no evidence is offered that "Zipse's Law" has credence or is accepted by any recognized authority; and no evidence is offered that using the messenger as a current carrying conductor is a hazard.

This comment was balloted through CMP-4 with the following results:
10 Eligible to Vote
10 Affirmative
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 7-62.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-64 Log #306 NEC-P07 **Final Action: Accept**
(396.12(B))

Submitter: Code-Making Panel 19,
Comment on Proposal No: 7-105
Recommendation: The following is the **Final Action** of a task group appointed to review Proposal 7-105. CMP-19 recommends rejecting this proposal.
Substantiation: CMP-5, not Article 396, should determine grounding requirements including stipulations for the grounded conductor. Based on Proposal 5-119, CMP-5 did not accept the concept of deleting 250.32(B)(2) from the NEC because there are instances where this method of grounding is warranted. They did retain and incorporate the text of 250.32(B)(2) into an exception to the main rule in 250.32(B)(1). CMP-19 agrees with these changes, but points out that they apply to branch circuits and feeders, not services. Proposal 7-105 makes no distinction. Additionally, this new language poses unnecessary restrictions in instances where repairs are needed such as if an entire cable comes down and needs to be replaced.

This comment was balloted through CMP-19 with the following balloting results:
14 Eligible to Vote
12 Affirmative
2 Not Returned (W. Bowman and R. Carlson)

Mr. M. Ewing voted affirmatively stating: "Applying Proposal 7-105 to NEC 396.2(1), (2) and (3) makes sense because these messengers are not intended to carry current and 396.60 requires these messengers to be grounded as equipment. I see a conflict with 230.41 Exception, thus, in addition to Panel 5's input, Panels 4 and 7 need to work together to determine the use of the 396.2(4) bare multiplex cable messenger (which is a bare conductor wrapped around a steel support messenger as an assembly) for service conductors. Beware that the proposal does not prohibit the use of a bare grounded circuit conductor permitted by 230.41 Exception, rather it prohibits the use of the present type combined messenger/conductor from being used as a grounded circuit conductor (a quadruplex cable could be made to have 2-insulated and 2-bare for 3-current carrying conductors or a triplex cable with a bare conductor and a separate bare messenger which defeat the proposal's intent."
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 7-62.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-65 Log #964 NEC-P07 **Final Action: Reject**
(396.12(B))

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 7-105
Recommendation: Revise as follows:
396.12 Uses Not Permitted. ~~(A)~~ Messenger supported wiring shall not be used under the following cond
itions:
(1) In hoistways ~~or~~
(2) where subject to physical damage
~~(B)~~ (3)where the messenger ~~shall not be~~ is used as a continuous current carrying conductor, such as a neutral conductor.
Substantiation: This proposed change follows the format in other wiring method articles and more closely follows the NEC Style Manual.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 7-62.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-66 Log #1173 NEC-P07 **Final Action: Accept**
(396.12(B))

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 7-105
Recommendation: Reject Proposal 7-105.
Substantiation: The submitter's intent is to prohibit the use of the messenger from ever being a current carrying conductor. Sections 250.32(B)(1) and 250.32(B)(2) in the 2005 NEC clearly set forth the rules for when this conductor can be a grounding conductor and when it can be a grounded conductor. Acceptance of this proposal would negate these applicable requirements when this wiring method is used. Article 396 should be used to determine the use, installation, and construction specifications for messenger supported wiring. Article 250 should be used to determine the grounding requirements. No evidence is offered that any of the incidents cited by the submitter is, or has been corrected by the application of insulated neutrals. No evidence is offered that using the messenger as a current carrying conductor is a hazard.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 7-62.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-67 Log #1515 NEC-P07 **Final Action: Reject**
(396.12(B))

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 7-105
Recommendation: The Panel Action should be to Accept in Principle and instead of adding 396.12(B), revise 396.30 to read as follows.
396.30 Messenger.
(A) Support. The messenger shall be supported at dead ends and at intermediate locations so as to eliminate tension on the conductors. The conductors shall not be permitted to come into contact with the messenger supports or any structural members, walls, or pipes.
(B) Neutral Conductor. Where the messenger is used as a neutral conductor, it shall comply with the requirements of 225.4, 250.184(A), 250.184(B)(7), and 250.186(B).
(C) Equipment Grounding Conductor. Where the messenger is used as an equipment grounding conductor, it shall comply with the requirements of 250.32(B), 250.118, 250.184(B)(8), and 250.186(D).
Substantiation: Requirements already exist in the Code for neutral conductors and equipment grounding conductors. It is not necessary nor appropriate to introduce additional requirements in Article 396 that may conflict with other requirements in the Code that address the concerns of the submitter of the Proposal.
CMP7 has the responsibility to define the construction and installation requirements for Messenger Supported Wiring. CMP5 has adequately defined the specific requirements when the messenger is used as a neutral conductor or an equipment grounding conductor.
Expansion of 396.30 will locate all the requirements related to the application and use of the messenger within one section.
The change in the title of 396.30 was made to be consistent with the new text added into the section. The two sentences in (A) are unchanged from the 2005 Code.
This Comment has been correlated with my comment on Proposal 7-106.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 7-62.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-68 Log #1684 NEC-P07 **Final Action: Reject**
(396.12(B))

Submitter: Donald W. Zipse, Electrical Forensics, LLC
Comment on Proposal No: 7-105
Recommendation: The Code Making Panel No. 7 is correct and is to be congratulated in accepting the changes made in the messenger section.
Substantiation: I urge Code Making Panel No. 7 to stay with their decision to make the messenger a non-current carrying support cable.
If Code Making Panel 5 disagrees with your outstanding work, just remember that it took them 21 years to get the electric ranges and dryer wired correctly with 4-wires. I beg you to continue to make this Code electrically correct as you have done in accepting the change to prohibit the messenger from carrying continuous electric current and not to listen to others that lack the knowledge that this Code Panel possesses.
Likewise, since Code Making Panel 19 is having problems understanding stray current, again please disregard them if they are negative on this proposal. Code Making Panel 19 appears to lack any understanding of Ohm's Law, so how are they to understand the principles that you have grasped.
Keep up the GREAT WORK.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 7-62.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-69 Log #48 NEC-P07 **Final Action: Accept**
(396.60)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 7-106
Recommendation: The Technical Correlating Committee directs that further consideration be given to the comments expressed in the voting and that this proposal be reconsidered and correlated with the action on Proposal 5-119. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC. See panel action on Comment 7-76.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-70 Log #286 NEC-P07 **Final Action: Accept in Principle**
(396.60)

Submitter: Code-Making Panel 5,
Comment on Proposal No: 7-106
Recommendation: It is recommended that CMP-7 continue to accept this proposal.
Substantiation: If the CMP-5 action on Proposal 5-119 continues to hold through the 2008 NEC development process, the reference to 250.32(B)(2) should be changed to reference 250.32(B)(1) Exception.
This comment was balloted through CMP-5 with the following balloting results:
15 Eligible to Vote
13 Affirmative
1 Negative
1 Not Returned (W. Helfrich)
Mr. D. Brender voted negatively stating: "Vote on Panel 5 Task Group recommendation is negative.
Recommendation: Reject the proposal.
Substantiation: CMP-5 intends that the practice of grounding the neutral at buildings or structures supplied by a feeder or branch circuit be allowed only where done as provided in editions of the NEC preceding the A2008. As a result, the additional sentence accepted in Proposal 7-106 should not be added."
Mr. D. Hammel voted affirmatively stating: "It is recommended that CMP-7 reject the suggested changes to this section but accept the proposal in principle and refer to the CMP-7 action and statement on Proposal 7-105.
CMP-5 agrees with the concepts introduced in this proposal that restricts messengers from generally being used as current-carrying conductors but feels that the restrictive text more appropriately belongs in a separate section. By inserting the words "only be used as a grounded conductor in accordance with 250.32(B)(2)", it places a restriction on this use while at the same time allows existing installations to continue this use because the installation met previous requirements in the NEC. The actions taken by CMP-5 on Proposal 5-119 will place further restrictions on this use to only existing installations where the conditions of the exception (former 250.32(B)(2) have been met. CMP-5 recommends that CMP-7 adjust the accept action to accept in principle on this proposal and refer to the panel action and statement on Proposal 7-105. This action should meet the intent of the submitter while continuing to recognize

the allowance for messengers to carry current under restrictive existing installations only as currently allowed in 250.32(B)(2)."
Panel Meeting Action: Accept in Principle
The panel accepts in principle the comment by accepting in principle Proposal 7-106.
Panel Statement: The panel agrees with the substantiation to change the reference to 250.32(B)(1) Exception; see panel action on Comment 7-76.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-71 Log #298 NEC-P07 **Final Action: Accept in Principle**
(396.60)

Submitter: Code-Making Panel 4,
Comment on Proposal No: 7-106
Recommendation: The following is the **Final Action** of a task group appointed to review Proposal 7-106. CMP-4 recommends rejecting this proposal.
Substantiation: CMP-4 has rejected Proposal 4-6 to delete permission to use a bare or covered conductor as a grounded circuit conductor. A bare messenger wire is used as the grounded conductor throughout the country for overhead utility company service drops without any problems and is permitted by 230.41, Exception for service entrance conductors. Overhead branch circuits and feeders are permitted to be installed in an outside application where the wires are distributed using overhead poles similar to utility company distribution of service conductors. Section 225.4 only requires insulation or covering on branch circuit or feeder cables installed using overhead poles where within 10 ft of any building or structure (structures other than supporting poles or towers). If phase conductors can be uninsulated from pole to pole it would stand to reason that the grounded conductor could be uninsulated or covered. Service-entrance cable (SE) is an example of a cable where the grounded conductor is only covered, not insulated in accordance 388.10(B)(2) and (B)(4). Section 338.100, last paragraph, permits service entrance (SE) or USE to be constructed with one conductor (the grounded conductor) uninsulated. Accepting this proposal as written, would affect the permission with 338.10(B)(2) and (B)(4).granted for exterior installations of SE cables in not only 225.4, but also in 338.10.

This comment was balloted through CMP-4 with the following results:
10 Eligible to Vote
9 Affirmative
1 Negative

Mr. J. Young voted negatively stating: "CMP-7 has responsibility for this issue."

Mr. J. Rogers voted affirmatively stating: "I am voting in the affirmative on this comment, however, I do believe that the submitter is correct in his concern that the use of messenger cables as grounded circuit conductors has to be further defined. The exception to 225.4 allows this type of an installation for an outside branch circuit or feeder, but there is no defining language as to where and how. It is my belief that the onus is on CMP-4 to clarify this in the next code cycle and that clarification will be dependent upon some of the actions taken by CMP-5 in this code cycle. I do not believe that the 10 ft restriction for energized conductors is intended to apply to grounded or grounding conductors. To reference type SE cable in the Panel statement, could tend to create further confusion as Article 338 would only allow type SE cables to be used in this fashion when they are supported by a messenger cable, thus bringing the uninsulated messenger cable back into the picture."
Panel Meeting Action: Accept in Principle
Panel Statement: The panel did not accept the recommended sentence in Proposal 7-106 but did include in 396.30 references to the applicable sections in the Code when the messenger is used as a neutral conductor or an equipment grounding conductor.
See panel action on Comment 7-76.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-72 Log #307 NEC-P07 **Final Action: Accept in Principle**
(396.60)

Submitter: Code-Making Panel 19,
Comment on Proposal No: 7-106
Recommendation: The following is the **Final Action** of task group appointed to review Proposal 7-106. CMP-19 recommends rejecting this proposal.
Substantiation: Present language in 396.60 requires the messenger in messenger supported wiring to be grounded as required by 250.80 and 250.86 for enclosure grounding. New language in Proposal 7-106 stating that the messenger can only be used as a current carrying conductor if it is a grounded conductor is redundant.

This comment was balloted through CMP-19 with the following balloting results:
14 Eligible to Vote
11 Affirmative
1 Negative
2 Not Returned (W. Bowman and R. Carlson)

Mr. T. McNeive voted negatively stating: "NEMA considers Panel 7 to have jurisdiction."
Panel Meeting Action: Accept in Principle
Panel Statement: The panel did not accept the recommended sentence in Proposal 7-106 but did include in 396.30 references to the applicable sections in the Code when the messenger is used as a neutral conductor or an equipment grounding conductor.
See panel action on Comment 7-76.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-73 Log #965 NEC-P07 **Final Action: Reject**
(396.60)

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 7-106
Recommendation: Provide proper coordination between this proposal (7-106) and 396.12(B) in proposal 7-105 by adding "except as permitted in 396.60" at the end of 396.12(B) as follows:
396.60 Grounding
The messenger shall be grounded as required by 250.80 and 250.86 for enclosure grounding. The messenger shall not be used as a current-carrying conductor unless used as a grounded conductor in accordance with 250.32(B)(2).

The Panel Action in Proposal 7-105 as follows:
396.12 Uses Not Permitted.
(B) The messenger shall not be used as a continuous current carrying conductor such as a neutral conductor, except as permitted in 396.60.
Substantiation: The last sentence in this section (396.60) is in direct conflict with the action to add the following text in 396.12(B) in Proposal 7-105 since a grounded conductor in accordance with 250.32(B)(2) can be a continuous current carrying conductor as prohibited in the new text in 396.12(B).
Panel Meeting Action: Reject
Panel Statement: The submitter's recommendation is no longer valid due to the panel action on Comments 7-76 and 7-62.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-74 Log #1175 NEC-P07 **Final Action: Accept in Principle**
(396.60)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 7-106
Recommendation: Reject Proposal 7-106.
Substantiation: A bare messenger is permitted to be used as a current carrying conductor by the Code for service entrance applications as well as for feeders or branch circuits as allowed in 250.32(B)(2). Section 230.22 allows the grounded conductor of a multi-conductor overhead service drop to be bare. Bare messenger wire is used as the grounded conductor for overhead service drops as permitted by Article 230. Accepting this proposal as written would create a conflict with permission granted for overhead installation of SE cable.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel did not accept the recommended sentence in Proposal 7-106 but did include in 396.30 references to the applicable sections in the Code when the messenger is used as a neutral conductor or an equipment grounding conductor.
See panel action on Comment 7-76.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-75 Log #1516 NEC-P07 **Final Action: Accept in Part**
(396.60)

TCC Action" The Technical Correlating Committee understands that the panel action on Comment 7-76 removes the sentence added to 396.60 by the panel action on Proposal 7-106 and that this information is now contained in revised 396.30, along with the appropriate references.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 7-106
Recommendation: The Panel Action should be to Accept in Principle and revise the reference from "250.32(B)(2)" to "250.32(B)(1) Exception".
Substantiation: The change in reference is due to the Panel Action on Proposals 5-76 and 5-119.

This reference may have to be changed based on the Panel Action on Comments submitted on Proposal 5-119.
Panel Meeting Action: Accept in Part
The Panel Accepts the change in reference to 250.32(B) and adds (1) to the reference but does not Accept the additional word "Exception".
Panel Statement: The reference should be to 250.32(B)(1), not 250.32(B)(1) Exception since 250.32(B)(1) specifies the size of the equipment grounding conductor and the Exception specifies the applicable conditions of use.
See panel action on Comment 7-76. This panel action will modify the action on Comment 7-70.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-76 Log #1517 NEC-P07 **Final Action: Accept**
(396.60)

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 7-106
Recommendation: The Panel Action should be to Accept in Principle and instead of adding an additional sentence to 396.60, revise 396.30 to read as follows.
396.30 Messenger.
(A) Support. The messenger shall be supported at dead ends and at intermediate locations so as to eliminate tension on the conductors. The conductors shall not be permitted to come into contact with the messenger supports or any structural members, walls, or pipes.
(B) Neutral Conductor. Where the messenger is used as a neutral conductor, it shall comply with the requirements of 225.4, 250.184(A), 250.184(B)(7), and 250.186(B).
(C) Equipment Grounding Conductor. Where the messenger is used as an equipment grounding conductor, it shall comply with the requirements of 250.32(B), 250.118, 250.184(B)(8) and 250.186(D).
Substantiation: Requirements in addition to the section referenced in the Proposal already exist in the Code for neutral conductors and equipment grounding conductors. Expansion of 396.30 will locate all the requirements related to the application and use of the messenger within one section.
CMP7 has the responsibility to define the construction and installation requirements for Messenger Supported Wiring. CMP5 has adequately defined the specific requirements when the messenger is used as a neutral conductor or an equipment grounding conductor.
The change in the title of 396.30 was made to be consistent with the new text added into the section. The two sentences in (A) are unchanged from the 2005 Code.
This Comment has been correlated with my comment on Proposal 7-105.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

7-77 Log #1929 NEC-P07 **Final Action: Accept in Principle**
(396.60)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 7-106
Recommendation: Accept the proposal. Even if the CMP 5 action in 250.32 stands, there will still be a use for this provision.
Substantiation: CMP 7 should not interfere in CMP 5 policy decisions regarding the use of a regrounded neutral messenger. This procedure has been used for over a century, and it is an essential part of most overhead utility distributions in North America and elsewhere. It can be used safely.Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept in Principle
See action taken by panel on Comment 7-76.
Panel Statement: Other Sections within the Code already specify the requirements for a neutral conductor or an equipment grounding conductor and it is not necessary to include additional requirements in Article 396 for a messenger used for either of these functions. The recommended text refers the user to the applicable sections of the Code when the messenger is used either as a neutral conductor or an equipment grounding conductor.
See action taken taken by panel on Comment 7-76.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 400 — FLEXIBLE CORDS AND CABLES

6-68 Log #1877 NEC-P06 **Final Action: Accept**
(400.5(B))

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 6-77
Recommendation: Continue to accept the proposal, with the following change:
Make the following change in 400.5(B) fourth paragraph:
On a 4-wire, 3-phase, wye circuit where the ~~major portion~~ more than 50% of the load consists of nonlinear loads, there are harmonic currents present in the neutral conductor and the neutral conductor shall be considered to be a current-carrying conductor.
Substantiation: Using a prescriptive number instead of phrase that might be vague to some people would be much preferred to many code users.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-69 Log #417 NEC-P06 **Final Action: Reject**
(400.8(1)(4))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 6-84
Recommendation: Accept proposal revised:
(1) As a substitute for the ~~fixed~~ wiring ~~of a structure~~ methods covered in Chapters 2 and 3. (4) Where attached to buildings or structures ~~surfaces~~ except as permitted in this code.
Substantiation: Fixed wiring is not defined; it may be interpreted as wiring methods covered in Chapters 2 and 3, or "permanent wiring", although 555.13(A)(2)(1) permits power cables as permanent wiring. The phrase "as permitted in this code" is used in other sections. Structures which are not deemed buildings should be included, such as poles, posts, Fences etc.
Panel Meeting Action: Reject
Panel Statement: The original panel statement on Proposal 6-84 addresses the definition of "Fixed Wiring." The changes recommended in the comment are already addressed in 400.8 Exception to (4).
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-70 Log #1930 NEC-P06 **Final Action: Reject**
(400.8(4) Exception)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-86
Recommendation: Accept the proposal.
Substantiation: The panel statement is not responsive, because it does not provide a technical reason for rejection that is capable of rebuttal. In fact, the statement is incorrect grammatically, in that it refers to "uses" (plural), in an instance where only a single use is allowed (bus drop cable). A traditional use to be sure, but only one. The substantiation presented with the proposal merits a more serious review of past practice.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees with attaching the cord to the structure other than as permitted by other articles in the Code. The Code already requires strain relief for the cord.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-71 Log #1931 NEC-P06 **Final Action: Reject**
(400.14)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 6-88
Recommendation: Accept the proposal.
Substantiation: The panel statement overlooks the substantiation that puts this restriction in Article 400 to begin with, namely, that cord ampacities anticipated operation in unconfined spaces. In fact, if the panel statement were correct,we would establish that the inclusion of this limitation was based on entirely erroneous information since the assigned ampacities already anticipated a diminished air circulation. Not true, of course.
The real reason to revisit this proposal has to do with practical utility. When wiring systems break down, they usually do so where conductors are spliced. This proposal tries to reduce the number of splices in an electrical system. When cord is used at the outer end of control or other circuits to accommodate frequent repositioning, it can be brought back intact to control terminals in an industrial control panel, or it can enter a box for a transition to building wire. Normally avoiding the splices is the better design choice.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the panel action and statement on Proposal 6-88.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ARTICLE 404 — SWITCHES

9-43 Log #2267 NEC-P09 **Final Action: Reject**
(404)

Submitter: Mathew Tarring, Bana Corporation
Comment on Proposal No: 9-82
Recommendation: Revise to read:
Connection points, such as screws on sides of snap switches shall be adequately protected from accidental or inadvertant contact. When installed in areas where they may come in contact with unqualified people or persons.
Substantiation: Although a system is not complete without switch covers, during the life of a system, it is inevitable that said covers will be damaged, removed, or discarded at some point. At that time, leaving a safety risk for any unqualified persons. Throughout the code book there are multiple provisions set forth to protect the end user and/or unqualified persons from safety risks

for the life of the system. I feel adding this text will help take yet another step forward towards an even safer installation. I would also like to site 406.4(F) to further express the need to continue a trend of safety.
Panel Meeting Action: Reject
Panel Statement: The Proposal is not properly submitted since it does not identify a specific location in the NEC. The cover plate is required to complete the enclosure and provides an effective level of protection from accidental or inadvertent contact of energized contact points. If the cover plate is removed the circuit is to be de-energized.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-2 Log #60 NEC-P17 **Final Action: Accept**
(404.2(C))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 9-85
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 17 for Action in Article 422. This action will be considered by Code-Making Panel 17 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the responsibility for Proposal 9-85 but rejects its recommendation. See panel action and statement on Comment 17-3.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9
Ballot Not Returned: 1 Gill, C.

17-3 Log #904 NEC-P17 **Final Action: Reject**
(404.2(C) (New))

Submitter: John McCamish, Amboy, WA
Comment on Proposal No: 9-85
Recommendation: Add a new subsection (C) to read:
(C) Off indication. A switch with a marked off position shall disconnect all ungrounded conductors to the load it controls.
Substantiation: The submitter provides adequate substantiation and description of an unsafe installation practice that is currently legal. Although the panel statement states that this is a maintenance issue-requiring field marking, Panel 9 covers installation practices. This is an allowable practice due to a loophole in the NEC and needs to be corrected. Marking only allows the installer to continue to violate safe installation practices.
The term "OFF" is clear and should be applied in its intended context.
Panel Meeting Action: Reject
Panel Statement: Requirements already exist in 422.34.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9
Ballot Not Returned: 1 Gill, C.

17-4 Log #1441 NEC-P17 **Final Action: Reject**
(404.2(C))

Submitter: Lawrence Cross, Local Union #98 IBEW
Comment on Proposal No: 9-85
Recommendation: None given.
Substantiation: I agree with Mr. Belisle, R. This is a very unsafe practice. An off position with a switch should be deenergized.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 17-3.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9
Ballot Not Returned: 1 Gill, C.

9-44 Log #793 NEC-P09 **Final Action: Reject**
(404.2(C) (New))

TCC Action: Based on the Technical Correlating Committee action on Comment 9-47, the Technical Correlating Committee directs that Comment 9-44 be reported as "Reject".
Submitter: Ian McDonald, Underwriters Laboratories Inc.
Comment on Proposal No: 9-84
Recommendation: Add a new subparagraph 404.2(C) and exception to read as follows:
404.2 Switch Connections.
(C) Switches Controlling Lighting Loads. Where switches control lighting loads supplied by a grounded general purpose branch circuit, a grounded circuit conductor shall be provided at the switch location.
Exception: Grounded conductors shall not be required in installations where it is possible to install conductors into the device boxes without damaging the building structure or building finish.
Substantiation: Acknowledging the ever-increasing use of these devices which need a return path for inboard control circuitry, a step in the right direction would be to add language that limits the new requirement to only those installations where it is impractical to add the grounded conductor at a future date. The reality of such an exception is that, in most installations where a cable wiring method is used, the grounded conductor will be required. This would include the majority of residential applications where the homeowner, unaware of the safety issues related to current flow on the equipment grounding conductor, would have a grounded conductor available at all switch locations which control lighting loads. The exception would have the opposite affect in most commercial applications where raceways are employed and trained electrical workers appreciate the needed for a grounded conductor. It is in these applications, due to the presence of a raceway, that the installer has the ability to install the required conductor without damage to the building structure or building finish.
It is important to note that, since the ROP Meeting, proposals to revise the applicable product standards have been unsuccessful. The original substantiation for Proposal 9-83 cited that the UL Standard for Nonindustrial Photoelectric Switches for Lighting Control, ANSI/UL 773A was being revised to require a grounded conductor termination for control current; however, in the recirculation process of the Standards Technical Panel (STP), this decision was reversed and the proposal was rejected. This decision was due in part to a concern from the manufacturers that the Code does not suggest a need for this wiring method at the switch box. Based on the action of this STP, it was determined that similar proposals to other standards would be unsuccessful. As such, an opportunity now exists, for placing language in the Code, which would provide the installer with the means to correctly terminate these devices with a proper return path for the monitoring current.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 9-47.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 9 Negative: 2
Explanation of Negative:
BREITKREUTZ, B.: This comment should be rejected because it would add a spare conductor for future use.
MCCULLOUGH, R.: See my explanation of negative vote on Comment 9-47.

9-45 Log #819 NEC-P09 **Final Action: Reject**
(404.2(C))

Submitter: Rod Belisle, NECA-IBEW Electrical Training Center
Comment on Proposal No: 9-84
Recommendation: Accepted in principle with the following addition to clarify the scope of the proposal.
Add: <u>In dwelling locations,</u> switches controlling lighting loads supplied by a grounded general purpose branch circuit…
Substantiation: This proposal created a great deal of discussion and concern for the CMP. The proposal has merit and should be required by the NEC in cable wiring methods, where the addition of a grounded conductor is not feasible or practical. The submitter's proposal is all-inclusive and probably not necessary for commercial and industrial applications, as wiring methods would typically permit the addition of a grounded conductor to those specific modified locations.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 9-47, which meets the intent of the submitter.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-46 Log #1240 NEC-P09 **Final Action: Reject**
(404.2(C) (New))

Submitter: Rhett Roe, JATC #26 IBEW/NECA
Comment on Proposal No: 9-84
Recommendation: Add new text as follows:
404.2 Switch Connections.
(A) Three-Way and Four-Way Switches. Three-way and four-way switches shall be wired so that all switching is done only in the ungrounded circuit conductor. Where in metal raceways or metal-armored cables, wiring between switches and outlets shall be in accordance with 300.20(A).
Exception: Switch loops<u>, three-way and four-way,</u> shall not require a grounded conductor.
<u>(B) Grounded Conductors.</u>
<u>(1) Disconnecting</u> Grounded Conductors. Switches or circuit breakers shall not disconnect the grounded conductor of a circuit.
Exception: A switch or circuit breaker shall be permitted to disconnect a grounded circuit conductor where all circuit conductors are disconnected simultaneously, or where the device is arranged so that the grounded conductor cannot be disconnected until all the ungrounded conductors of the circuit have been disconnected.
<u>(2) Providing Grounded Conductors. A grounded conductor shall be provided in all device boxes to permit connection of switches with a grounded conductor termination.</u>

Substantiation: Although the Code panel feels it is the responsibility of the installer to provide the grounded conductor during construction and the manufacturers of products needing additional grounded conductors to provide appropriate, clearly visible warnings and instructions on their packaging and installation instructions. This proposal should be revisited and recommended to be accepted in order to eliminate that any installation problems before and after construction to avoid possible connection to the equipment grounding conductor.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 9-47, which meets the intent of the submitter.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-47 Log #1415 NEC-P09 **Final Action:** Reject
(404.2(C))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 9-84
Recommendation: Accept in Principle and revise the proposed text as follows:
404.2 Switch Connections.
(C) Switches Controlling Lighting Loads. Where switches control lighting loads supplied by a grounded general purpose branch circuit, a grounded circuit conductor shall be provided at the switch location.
Exception: A grounded conductor shall not be required in installations where the wiring method permits the installation of additional conductors without causing damage to the building structure or building finish.
Substantiation: NEMA agrees with the comments of panel members that the original proposal may have been too broad in requiring a grounded conductor in all installations. The rewording of the proposal in this comment is intended to require the grounded conductor in an initial installation only where it is impractical to later install a grounded conductor. For example, a conduit system would permit pulling a grounded conductor into the box after the initial installation whereas a cable wiring method covered by a a finished surface, such as NM cable used in a dwelling, may be difficult to retrofit with an additional conductor.
The intent of this proposal is to provide an installation for lighting control products that will not require the use of the grounding conductor for low-level standby current. If this requirement is adopted, the design of these products will be allowed to migrate from using the grounding conductor to using the grounded conductor for the standby current. Without a code requirement it is unlikely that the present wiring installation practices will change and designers of these products will be forced to continue to rely on the grounding conductor.
Occupancy sensors are permitted by UL 773A to have a current of up to 0.5 mA on the grounding conductor. This is allowed because the operation of an occupancy sensor requires a low level standby current. The standard permits this current on the grounding conductor because in a typical installation there is no grounded circuit conductor in the switch box which can be used as the return conductor for the standby current. There was a recent proposal to revised UL 773A to delete the section that allows 0.5 mA on the grounding conductor. The UL 773A Standards Technical Panel rejected this change to the standard. Consequently, UL 773A continues to permit 0.5 mA on the grounding conductor.
Products that have ground leakage are not uncommon. There are more than 200 UL standards that permit leakage current to ground. Acceptance of this requirement will help to eliminate the need for leakage current on the grounding conductor in lighting control devices and other similar products. The design of these products will eventually change to use the grounded conductor for standby current if the code is changed to ensure that the grounded conductor is available or could be easily installed at the switch location.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 6 Negative: 5
Explanation of Negative:
BREITKREUTZ, B.: This comment should be rejected because it would add a spare conductor for future use.
HARTWELL, F.: The comment should have been rejected. Although the concept of limiting the requirement to instances where a grounded conductor can be easily installed at later date is a substantial improvement over the original proposal, the exact wording of the exception is just not ready for prime time. Electricians routinely fish new cables into existing openings to address desired changes, and the more skilled among them very often do so without damaging the wall. What level of skill, then, should the AHJ assume while pondering a potential citation? Any time the wiring method uses a cabled wiring method? That would probably be excessive because it would clearly be improper to cite an instance where a wall wired with Type MC cable, but finished on only one side, failed to include a grounded conductor in a switch box. What then about the common commercial applications where the walls are only finished as far up as the suspended ceiling? Any electrician, almost regardless of skill, could replace a two-wire with a three-wire cable in that case. How would that be assessed by an AHJ? What about a box fed with a raceway wiring method, but fully loaded in terms of volume? Some form of extension would be required to contain the additional conductor, which the owner would probably resist in terms of appearance, but no damage to the wall would be required to complete the installation.
Good code is never necessarily code with which one is in technical agreement. It is code that will be consistently applied and understood. This wording does not meet that test. It also does not respond to the presentation at the panel meeting that demonstrated a (to this member) surprising correlation between occupancy type and difficulty in applying the objectives of this comment, with good compliance in residential occupancies and very poor compliance in commercial occupancies. This deserves further study over the next code making cycle.
MCCULLOUGH, R.: This comment should be rejected. Writing code rules based on endless "what if" scenarios is not logical. Trying to come up with rules that cover every possible thing that may be done later is going to result in a book too large to carry and installations too expensive for anybody to afford. the proposed language and the exception would seem to unnecessarily burden the residential and small commercial markets where the buildings are typically wired using cable methods. These installations would more than likely require a grounded conductor be included as part of the original installation at every switch location. It is just not reasonable to assume that an occupancy sensor will replace every switch that controls lighting outlets. Since this is not a retroactive rule, it would be more reasonable to assume that design professionals would include the sensors on their plans taking into account those locations where the may actually be installed and then the grounded conductor would be included as part of the original installation. This way you wouldn't have to run the grounded conductor to the switch(es) that controls your under cabinet lights, the eyeball spots over your fireplace, the light in your crawl space, the keyless in your furnace room, or lighting accenting wall pictures or other room decor.
The panel's statement in rejecting (correctly) Proposal 9-84 is still valid and more attention should be paid by the manufacturers to the suggestion for clear warnings and instructions on these types of devices. There was much discussion at both the ROP and ROC meetings about UL 773A which allows 0.5mA on the grounding conductor and proposed changes to that standard. These proposed changes were rejected in part we were told, because the NEC didn't require the grounded conductor at the switch. In my opinion the code doesn't have to change to require the grounded conductor because 250.6 doesn't allow for normal operating current to be imposed on the equipment grounding conductor now. Installers and the standards writers need to be aware of 250.6 and take the proper steps to ensure compliance. UL 773A should be changed to delete the allowance for the "standby current" on the grounding conductor, thus, bringing the installation into compliance with the existing rules of the code. This would force the manufacturers of the devices to mark them in such a way so as to make it crystal clear to the installers that they have to make provisions for a connection to the grounded conductor of the circuit. 0.5mA doesn't sound like much, but, think of the cumulative effect in a large building with perhaps hundreds of switch locations and there is considerable current flowing on the equipment ground system. In summary, this is clearly a design issue and the code should not be imposing requirements that may never be utilized.
SENGUPTA, S.: This provision of a grounded circuit as a spare in a switch, controlling lighting loads, will be interpreted as the only code requirement for any future modification. It may be a good idea for a specific purpose and should not be a code requirement which covers a whole range of safety issues.
It is recognized that this grounded circuit conductor will be used in the future to facilitate a special switching arrangement like a dimmer, sensor, ceiling fan switch or other programmable switch. This conductor is not required for the present switching and will only be required for provision of a circuit for current path for the future switch modification. So, this spare grounded circuit conductor, required by 2008 NEC, is for convenience of a fast track introduction of a future controlling switch. The future switch may be a safe product, but its installation as a replacement of an existing switch may create a safety hazard, violating other requirements of the NEC.
All modifications to any existing installations must take total safety into consideration following all code requirements. This 2008 NEC requirement of a grounded conductor in a switch may give a notion that there are no other code requirements to comply for modification of a switch.
YOUNG, R.: See the Comment on Negative Vote from IEEE (Mr. S. Sengupta).
Comment on Affirmative:
RUPP, B.: The intent of this proposal is to provide an installation for lighting control products that will not require the use of the grounding conductor for low-level standby current. If this requirement is adopted the design of these products will be allowed to migrate from using the grounding conductor to using the grounded conductor for the standby current. Without a code requirement it is unlikely that the present wiring installation practices will change and designers of these products will be forced to continue to rely on the grounding conductor. Acceptance of this requirement will help to eliminate the need for leakage current on the grounding conductor in lighting control devices and other similar products The design of these products will eventually change to use the grounded conductor for standby current, if, the code is changed to ensure that the grounded conductor is available or cold be easily installed at the switch location.

9-48 Log #917 NEC-P09 **Final Action: Reject**
(404.8(B))

Submitter: Richard Shackelford, NEO Products LLC
Comment on Proposal No: 9-91
Recommendation: Revise as follows:
Voltage Between Adjacent Devices. A snap switch shall not be grouped or ganged in enclosures with other snap switches, receptacles, or similar devices unless they are arranged so that the voltage between adjacent devices does not exceed 300 volts, or unless they are installed in enclosures equipped with identified, securely installed barriers or other means listed for the purpose between adjacent devices.
Substantiation: In the response, it was stated that if the devices were individually insulated, the insulation could be left off after a repair was made. Partitions could also be left out after a repair because all partitions sold now are removable. The advantage to an approved insulator on each device is if one device is replaced and left unprotected the other device insulator will still provide the separation. Another situation that occurs during building renovations is when lighting systems are changed from 120 volts to 277 volts using the existing conduits and boxes, the boxes are not always designed for partitions but an individual approved insulator would solve the problem. There have been numerous complaints from electricians (since the code required the grounding of switches) that the bare ground wire of romex is causing short circuiting. To use some approved means to insulate the devices would also solve this problem.
An insulating band is currently going through the UL approval process.
This insulator has received raving reviews from twelve electrical inspectors, four chief inspectors, and three fire chiefs.
Letters of approval are available upon request.
Panel Meeting Action: Reject
Panel Statement: The barriers that are the focus of this section are independent of the switch. The barrier needs to be part of the enclosure and stay with the enclosure, and not with the device.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-49 Log #1238 NEC-P09 **Final Action: Accept**
(404.9(B))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 9-18
Recommendation: Accept CMP-9's Panel actions on 404.9(B) in Proposal 9-18.
Substantiation: The NEC TCC Task Group on Grounding and Bonding notes Proposal 9-93 was "Accept in Principle, see Panel action on Proposal 9-18." As a result, the Panel action on Proposal 9-93 did not modify the Panel action on Proposal 9-18 as indicated in the Comment on the Panel votes. Refer to companion comment on Proposal 9-94.
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-50 Log #1245 NEC-P09 **Final Action: Accept**
(404.9(B))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 9-94
Recommendation: Continue to accept the Panel action on Proposal 9-94.
Substantiation: The TCC Task Group on Grounding and Bonding agrees with the Panel action to accept Proposal 9-94 in Principle and with the changes made to 404.9(B) in Proposal 9-18.
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-51 Log #2101 NEC-P09 **Final Action: Reject**
(404.9(B))

Submitter: Brent Kidman, Cheetah usa Corp., Dale C. Gledhill
Comment on Proposal No: 9-18
Recommendation: Wording below is from the 2008 draft. Because of changes to identification that switch shall be connected to an equipment grounding conductor, the additional wording telling how to do that is not needed, so it is being proposed to be removed. In addition, where there is no likelihood of shock, the exception should include those situations.
(B) Grounding. Snap switches, including dimmer and similar control switches, shall be connected to an equipment grounding conductor and shall provide a means to connect metal faceplates to the equipment grounding conductor, whether or not a metal faceplate is installed. ~~Snap switches shall be considered to be par to fan effective ground fault current path if either of the following conditions is met:~~ [ROP 9-18]
~~(1) The switch is mounted with metal screws to a metal box or metal cover that is a connected to an equipment grounding conductor or to a nonmetallic box with integral means for connecting to an equipment grounding conductor. [ROP 9-96]~~
~~(2) An equipment grounding conductor or equipment bonding jumper is connected to an equipment grounding termination of the snap switch.~~
Exception to (B): Where no means exits within the snap switch enclosure for connecting to the equipment grounding conductor or where the wiring method does not include or provide an equipment grounding conductor, a snap switch without a connection to an equipment grounding conductor shall be permitted for replacement purposes or where there is no possibility of exposure of dead metal parts or no provision for installation of a metal faceplate only. A snap switch wired under the provisions of this exception and located within reach of earth, grade, conducting floors, or other conducting surfaces shall be provided with a faceplate of nonconducting, noncombustible material or shall be protected by a ground-fault circuit interrupter.
Substantiation: Since the wording has been revised to indicate connection to the equipment grounding conductor, the additional wording previously there to describe effective grounding is not needed. In addition where the switch and faceplate combination are such that no dead metal is available (plastic switch and faceplate combination) there is no reason for the grounding conductor to be provided on the switch.
Panel Meeting Action: Reject
Panel Statement: The comment would eliminate necessary provisions that cover the characteristics of an acceptable equipment grounding return path with respect to snap switch yokes and metal faceplates. Those requirements exist in part because the exchange of a nonmetallic faceplate for a metallic one will not, as a general rule, be supervised by qualified persons. There is no need for the additional wording in "Exception to (B)" since the existing requirement allows a plastic switch and cover plate to be installed.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-52 Log #820 NEC-P09 **Final Action: Reject**
(404.9(B)(1))

Submitter: Rod Belisle, NECA-IBEW Electrical Training Center
Comment on Proposal No: 9-95
Recommendation: "Accept" to read as follows:
Revise 404.9(B)(1) as follows:
The switch is mounted with metal screws to a surface-mounted metal box with at least one of the insulating washers removed or to a nonmetallic box with integral means for grounding devices.
Substantiation: The requirements in 404.9(B) state that a switch shall be "effectively grounded".
The definition of effectively grounded in Article 100, states that it shall be sufficiently low impedance and have sufficient current carrying capacity to prevent the buildup of voltages that may result…
It is not accurate to state that a switch mounted on a non-conductive surface, secured to a metal box that is recessed _", therefore not touching the switch, meets the requirements of "Effectively grounded".
The CMP substantiated it's vote by stating that the requirement is not the same as the requirement for receptacles, but the terminology used in 404.9(B) does not differentiate for the code user.
The use of the term "effectively grounded" needs to mean the same thing as used throughout the NEC, as it is described in Article 100.
Panel Meeting Action: Reject
Panel Statement: The proposed requirement is the same as 250.146(A) for receptacles and as such is excessive for snap switches that do not form an element in the extension of a circuit beyond the fixed wiring of a building or structure. This has been the consistent position of CMP 9 on this point for at least 70 years, and there has not been adequate technical substantiation presented to justify this change.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-53 Log #903 NEC-P09 **Final Action: Reject**
(404.9(B)(1))

Submitter: John McCamish, Amboy, WA
Comment on Proposal No: 9-96
Recommendation: This proposal should be rejected.
Substantiation: The proposed action and statement by the panel allows for switches mounted in raised industrial covers to be grounded via the cover, therefore, exposing the electrician to a shock hazard when mounting screws become loose, the cover is removed to service the device, take test measurements, or other activities OSHA would allow while the circuit is in the energized state.

Installation of a bonding jumper from the box to the device is a small request in exchange for a safe installation. The CMP needs to be reminded of the purpose of the NEC as described in 90.1.
Panel Meeting Action: Reject
Panel Statement: Refer to the panel statement on Comment 9-52. In addition, safe work on the energized terminals of a snap switch must involve other work procedures beyond the continuity of the equipment grounding return path in this instance. In fact, if there were a fault in the switch, and the enclosure and device were wired in accordance with the 2005 NEC, the circuit would have opened long before the electrician went to work on the box.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:

BELISLE, R.: The panel should have accepted the comment and rejected the original proposal. Allowing switches mounted in raised industrial covers to be grounded by the cover mounting screws is a poor practice and certainly does not provide a safe installation or working environment. Too often cover screws become loosened in working environments, exposing both the general public and the electrician to a potential shock hazard due to the inadequate grounding. As the panel stated, we cannot rely on the equipment grounding return path to provide a safe work environment if it does not exist. This could easily be resolved through the addition of an equipment grounding conductor installed to ground the device.

9-54 Log #1199 NEC-P09 **Final Action: Reject**
(404.9(B)(1))

Submitter: Richard A. Holub, Middletown, DE
Comment on Proposal No: 9-96
Recommendation: Retain the existing wording in this section and Reject the Proposal.
Substantiation: I share the opinion of the lone negative vote on this subject. While I don't advocate working on snap switches live, I do agree that grounding a snap switch through the cover presents an additional hazard if the cover becomes loose or when the cover is removed for maintenance access to the snap switch (you have to remove the cover to verify absence of voltage). We should not change the existing language - it was put there for a reason. The panel's justification that this puts snap switches in the same category as receptacles ignores one important difference between snap switches and receptacles: when an electrician needs to work on a receptacle, they can verify absence of voltage prior to removing the cover...when working on a snap switch, they cannot. We should not rely on the mounting screws in the cover for the ground path. A separate bonding jumper should still be required.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 9-53.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:

BELISLE, R.: See my explanation of negative vote on Comment 9-53.

9-55 Log #1834 NEC-P09 **Final Action: Reject**
(404.9(B)(1))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 9-96
Recommendation: This proposal should have been rejected.
Substantiation: The proposal as accepted in principal and reworded by the panel would allow for switches in raised industrial covers to be grounded via the cover. Therefore if the cover is removed, the electrician could be exposed to a shock hazard if the switch body has become energized and is no longer grounded.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 9-53.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10 Negative: 1
Explanation of Negative:

BELISLE, R.: See my explanation of negative vote on Comment 9-53.

ARTICLE 406 — RECEPTACLES, CORD CONNECTORS, AND ATTACHMENT PLUGS (CAPS)

18-1 Log #1266 NEC-P18 **Final Action: Accept**
(406, 410, 600 and 605)

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 18-8
Recommendation: Continue to accept the TCC Grounding and Bonding Task Group proposal 18-8 as modified and revised by the actions of CMP-18.
Substantiation: The CMP-18 revisions to the proposal have been made for clarity and continue to be consistent with the Grounding and Bonding Task Group's original initiatives.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-2 Log #1274 NEC-P18 **Final Action: Reject**
(406.2 (New))

Submitter: Bob Boutin, BE Safe Consultants, Inc.
Comment on Proposal No: 18-11
Recommendation: Add new text to read as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter Protection for Personnel.
Substantiation: My proposal was rejected for improper style, lack of substantiation and lack of independent testing on various topics. The revised wording above should address improper style, but does introduce a new term "Overload Fault Circuit Interrupter" that has also been proposed to CMP-2 (Proposals 2-154 and 2-155). With regards to independent testing, one company that makes a product that has been listed by CSA (Certificate #1818336) has provided me with a test report from ETL/Intertek. This report - as well as the CSA listing - addresses the product's ability to perform under conditions outlined by both CMP 18 and Nationally Recognized Testing Labs (NRTLs) that are applicable to electrical outlets and supplemental testing for Overload Fault Circuit Protection features.

On the front page of the NFPA website there is a new report taken from the NFPA Journal titled "U.S. Fire Loss for 2005". In this article concern was shown that "with home fire deaths still accounting for 3,030 fire deaths or 82 percent of all civilian deaths, fire safety initiatives targeted at the home remain the key to any reductions in the overall fire death toll". The fourth (of five) major strategy to address this issue stated that "additional ways must be sought to make home products more fire safe." The fifth strategy is to address "the special fire safety needs of high-risk groups, e.g., the young, older adults, and the poor." This new technology would be a major step in the right direction to achieve these objectives set forth by the NFPA, by making homes safer and saving lives.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-4.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-3 Log #1355 NEC-P18 **Final Action: Reject**
(406.2 (New))

Submitter: Gary S. Santoro, Town of Wethersfield / Rep. New England Association of Fire Marshals
Comment on Proposal No: 18-11
Recommendation: Add new text to read as follows:

All 125-volt single-phase 15- and 20-ampere receptacles shall have Overload Fault Circuit Interrupter and Power Fault Circuit Interrupter protection.
Substantiation: 2D2C, Inc., a US company, has developed several technologies to prevent the ignition of fires from excess heat due to electrical faults. These fire prevention technologies have been implemented in the form of circuit interrupters. The interrupters disconnect loads before adequate heat can be generated to ignite a fire. These interrupters supplement the preventative protection already provided by circuit breakers, by Arc Fault Circuit Interrupters, and by Ground Fault Circuit Interrupters. They fill the fire-cause gaps that remain after implementation of these protective devices - they are complimentary and not redundant technologies that should be implemented in all residential wiring systems to prevent fires.

I personally learned about the technology at the NFPA Exposition in Orlando in June 2006. I received a demonstration of the technology as implemented in the SafePlug brand of electrical safety outlets. The technology works. And from my experience as a Fire Marshal, it will save lives by preventing a large number of fires. You can view an overview of the products at their website: www.safeplug.com. I am sure company representatives would travel to the NFPA review meeting to demonstrate the product. The contact that demonstrated the product to me and gave me NFPA sanctioned technical talk of the technology at the NFPA Expo was Steve Montgomery.

These primary causes of fires from electrical faults are outlined in three primary reference documents used in the fire investigation industry. These documents include the following:

- "Guide to Fire and Explosion Investigations", NFPA 921
- "Kirk's Fire Investigation, 6th Edition", John DeHaan, Prentice Hall, 2007, Chapter 10 "Electrical Causes of Fire" by Chris Korinek, P.E.
- "Fire Ignition", Dr. Vyto Babrauskas, Fire Science Publishers, 2003

These documents all suggest that the top electrical causes of heat to ignite flammables consist of the following:

1. High current flowing through high resistance connections
2. Excess voltage across electrical device loads, and
3. Excess current flowing through electrical device loads

2D2C, Inc. has designed Fault Circuit Interrupters to remove the load after detecting these conditions. The heat source disappears if no current flows. Thus, although the Interrupter approach does not fix the wiring or load device problem, it prevents the calamity of ignition from the fault. Below is a simple description of what the two types of interrupters accomplish to prevent fires:

- Power Fault Circuit Interrupter (PFCI): Removes a load if it detects excess current flowing through a high resistance connection in the circuit OR if it detects excess AC Line utilization voltage across the device load
- Overload Fault Circuit Interrupter (OFCI): Removes a load if it detects excess current flowing into the load using a fast-trip, variable threshold, resettable breaker. The trip level matches the electrical load ampacity through RightPlug communication.

NOTE: PFCI and OFCI will prevent fires that presently occur in the presence of circuit breaker, AFCI and GFCI protection. The PFCI and OFCI protection is needed in a structural wiring system - protection does not presently exist for these faults. PFCI will prevent the super-heating of loose wire junctions inside wire nuts and screw connections that cause fires. PFCI will also protect against voltages up to 200-220 VAC across 120 VAC rated electrical devices caused by "floating neutral" conditions. OFCI will prevent against excess-current heating in the small wires (18, 20, 22, 24 gauge) inside electrical devices caused by poor maintenance, damage, abuse, improper designs, and poor quality manufacturing. OFCI also limits current through each 120 VAC outlet to a cumulative maximum of 15 amps or (as rated for the outlet type) to prevent distribution wiring from overheating due to overloads allowed by improper size fuse or circuit breaker replacement (presently the company has not completed the designs for a 20A outlets - only 15A versions exist at the time of this writing).

Additionally, 2D2C, Inc. has invented complimentary shock safety technology to the Ground Fault Circuit Interrupter (GFCI). The GFCI prevents electrocutions from line-to-ground leakage paths. The Shock Fault Circuit Interrupter (SFCI) prevents shocks through the normal line-to-line paths. To accomplish this, the SFCI keeps electricity off at unused receptacles and only delivers electricity to tagged electrical plugs.

Please approve proposals 18-11, 18-12, and 18-13. Make this technology part of the 2008 Code. If the PFCI and OFCI technology had been installed in homes in our community where I serve as Fire Marshal, a number of fires would never have started. Please help me to save lives by requiring the use of PFCI and OFCI in the electrical outlets in residential wiring systems.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-4.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-4 Log #1614 NEC-P18 **Final Action: Reject**

(406.2 (New))

Submitter: Steve Montgomery, OFI Inc.

Comment on Proposal No: 18-13

Recommendation: Add new text to read as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter protection.

Substantiation: Thank you for considering the Overload Fault Circuit Interrupter (OFCI) located in an electrical outlet for fire protection of structures. In these comments, I have tried to respond to your concerns as stated:

1) The submitter's use of the term "should not" could be interpreted as not being mandatory language and may not satisfy the submitter's original intent.

2) Over the past several code cycles, much of the same incident data has been used to support AFCI proposals indicating that the incidents are the result of arcing faults on the interior wiring. The last code cycle, this data was used to support a thermally protected receptacle indicating that the incidents resulted from overheated receptacle contacts or terminals. Now the claim is that the incidents are resulting from electrical overload of connected utilization

3) This appears to be a proposal that would recommend a "theoretical" product. CMP 18 is not aware of any such product on the market. Nor is CMP 18 aware of any standards or fact finding report covering such a product. Before considering a proposal such as this, CMP 18 would look for information from a standard or fact finding report dealing with performance characteristics such as (but not limited to) the following:

- Endurance
- Capacity to withstand overload and short circuit
- Ability to operate in normal and abnormal temperature ranges
- Ability to withstand surges
- Ability to withstand under-voltages
- Ability to withstand moisture/corrosive atmosphere

My comments are as follows:

1) Change the wording in Proposal 18-11 and 18-12 to match the Proposal 18-13 as follows:

"All receptacles shall incorporate Overload Fault Circuit Interrupter protection."

2) I cannot accurately state what percentage of electrically-ignited fires would have been prevented by the use of OFCI. It is impossible for anyone without the forensic evidence to accurately analyze the fire examples listed in Proposal 18-13. However, the OFCI covers many of the previous gaps in electrical fire protection.

As I am sure you know, the surveys that the NFPA conducts are mostly based upon Fire Marshal Reports. I am a member of the International Fire Marshals Association (IFMA) and have spoken to a number of Fire Marshals about the level of detail regarding their investigations. In addition to the fact that only about a third of the big fires leave enough evidence to trace back to the cause, very few of them have time or the forensic tools to dive in really deep to identify the specific cause. It is often an accomplishment for anyone to determine that an electrical fault, versus another ignition source, generated the fire, let alone what type of electrical fault caused it. The insurance company fire investigator gets more detail on cause, since they must try to indict one or more product manufacturers to assign the insurance payout burden away from the insurance company. But the product liability defense forensic expert, hired to prove the product manufacturer to be innocent, is the one with the best knowledge. He understands electricity very well, replicates ignition situations in his/her lab, and even X-rays burned electrical components (appliances, circuit breakers, etc.) to identify internal states to prove cause. Only these electrical forensic experts know the detailed fire cause facts, but rarely can they share them since the evidence is associated with a court case or simply held as confidential by the electrical appliance or device manufacturer.

To identify how many of electrically ignited fires would be prevented by OFCI, we interviewed several of these expert forensic electrical fire investigators including the following persons:

- Dr. Vyto Babrauskas, Fire Science and Technology, 9000 300th Place SE, Issaquah, WA 98027, fire researcher, forensic investigator, expert witness, author of the book "Ignition Handbook," ISBM 0-9728111-3-3.
- Chris Korinek, P.E., Synergy Technologies LLC, N144 W6466 Pioneer Road, Cedarburg, WI 53012, expert witness, electrical forensic investigator, author, contributor to Chapter 10 "Electrical Causes of Fire" of "Kirk's Fire Investigation" 5th and 6th editions, by John DeHaan, ISBN 0-13-171922-X.
- Jim Finneran, ElectroTek Consultants Inc., 18925 SR 1, Spencerville, IN 46788, fire researcher, electrical forensic investigator, expert witness, co-author of "Fire Findings."
- John S. Robison, Robison Consulting LLC, PO Box 680854, Prattville, AL 36068-0854, electrical forensic investigator, expert witness, ex Fire Marshal.

The general consensus is that the three primary electrical causes of fires consist of the following in order of prevalence:

1. High current flowing through high resistance connections
2. Excess voltage across electrical device loads, and
3. Excess current flowing through electrical device loads

None of these experts wanted to commit to percentages of specific electrical fire cause. All of them feel that high current through a high resistance connection is the most common electrical ignition source. Most estimated high resistance connections as causing 50 to 80 percent of all electrically induced fires. Most suggested that floating neutral problems (excess voltage across loads) are the next biggest cause of fires. Third, would be excess current draw through extension cords, lamps, appliances, electronics and other loads. The cause of excess current in a load device represents reduced impedance. Some causes of reduced load impedance include the following:

- Improper device use (e.g., oversized light bulbs)
- Poor product manufacturing quality (flaws)
- Poor product design
- Insulation breakdown and leakage through carbonization (age and fatigue)
- Locked motor rotors (worn bearings, dirt)

Other electrical fire causes, such as induction, are extremely rare. The experts' general opinion is that arcing from line to ground is usually a result of a fire, not the cause of a fire.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: Nothing in the NEC prohibits installation of such a listed device. The commenter submitted two significant reports. One was a Fact Finding Report demonstrating that the device in question performs the functions claimed by the manufacturer. The other was a CSA certification

report that demonstrates that the device is suitable for certification as a receptacle or plug, but making no certification as an OFCI. What continues to be missing is information clearly defining the problem, justifying that the magnitude of the problem is sufficient to warrant addressing by this Code, and demonstrating that the performance characteristics of this device are the appropriate and necessary performance characteristics.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-5 Log #1621 NEC-P18 **Final Action: Reject**
(406.2 (New))

Submitter: Scott Tegler, City of Woodstock / Rep. Fire Department City of Woodstock
Comment on Proposal No: 18-13
Recommendation: All 125-volt single-phase 15- and 20-ampere receptacles shall have Overload Fault Circuit Interrupter and Power Fault Circuit Interrupter protection.
Substantiation: I do not have the information that you request to make a decision on this proposal. Nevertheless, since I proposed this code change, I am responding to your request for comments.

1. My proposal did comply with NFPA Regulations Governing Committee Projects and the NEC Manual of Style. I used the word “shall” and not “should”.

2. As a Fire Chief, I cannot provide an absolute analysis of fire data. Most of the NFPA data is collected from Fire Marshals and Fire Prevention Officers, not fire investigators, and few fire departments have forensic equipment or the resources to perform these detailed analyses.

Additionally, the number of fires that occur each year in each fire department jurisdiction is statistically inadequate, even if the analysis granularity and accuracy existed. Nevertheless, NFPA 921 provides guidelines for electrical fire cause and the book “Ignition Handbook” by Vytenis Babrauskas provides excellent detail on electrical fire cause. Circuit breakers, GFCIs, AFCIs, and resettable fuses on strip outlets all provide good protection. However, the protection coverage map leaves gaps and Overload and Power Fault Circuit Interrupters fill many of these gaps. These new technologies are not comprehensive, but they address several of the primary fault causes including:

Current overloads
Voltage overloads
Inadequate voltage
High resistance connections

They do not cover arcing (improvements continue to be made on AFCIs though) nor induction (written about, but extremely rare as a fire cause). The other protection you mentioned, of sensing heat rise inside an outlet caused by poor wire connections at the outlet or inside the electrical box makes sense too. However it would miss high resistance connections in junction boxes or inside the electrical panel, whereas Power Fault Circuit Interrupters do cover these locations also. All these technologies are mutually supportive in preventing fires. No solution should by positioned as “absolute” or “all-encompassing.”

3. A product implementation of Overload and Power Fault Circuit Interrupter exists today. It is not a “theoretical” product; it is real and I have witnessed its functionality. It interrupts current and overload faults before they can damage insulation (long term fire cause) or ignite flammables (short term fire cause). I first became aware of these product solutions in May 2005 at the Ontario Fire Chief Association meeting. 2D2C, Inc. has a product line called SafePlug electrical safety outlets that implement these products. I do not know if other companies are making the product. Their research and development facility is located in Waterloo, Ontario, Canada and their corporate headquarters are in Gurnee Illinois. The leader of the Canadian operation is Steve Montgomery. He would be better prepared to provide the evidence of product performance characteristics and reliability than I would. I have requested that he provide this evidence directly to you.

Based upon my experience as Fire Chief, I truly believe that this Overload and Power Fault Circuit Interrupter technology implemented either in new structure or retrofitted into existing structure electrical outlets would reduce the number of fires. Please require them in the 2008 NEC.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-4.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-6 Log #2235 NEC-P18 **Final Action: Reject**
(406.2 (New))

Submitter: Greg Baker, 2D2C, Inc.
Comment on Proposal No: 18-13
Recommendation: Add new text to read as follows:

All 125-volt phase receptacles shall incorporate Overload Fault Circuit Interrupter Protection for Personnel.

Substantiation: I am the president of 2D2C, Inc. My company has developed products that implement Overload Fault Circuit Interrupter technology that would satisfy Proposals 18-11, 12, and 13 (as well as 2-154 and 2-155). These products are, and will be commercially available regardless of your actions for the 2008 NEC.

One of our products was listed by CSA in late 2005. We have sold some of this product without any marketing push. Our other OFCI product was recently listed. Now that we know that our high quality products exceed industry accepted safety standards, in addition to internal quality tests, we will commercially launch both products in the first quarter of 2007. While we strongly believe that this technology should be part of the NEC, our products do not need a change to the NEC to be used. Therefore, we will get the products into the marketplace to prevent fires and save lives.

We have established manufacturing capabilities to support the significant demand that we expect for these products. We have included in our manufacturing plans, contingencies for additional production capacity if you choose to include this technology in the 2008 NEC. We are working with several companies that will provide additional sources of products utilizing OFCI technology through both licensing and brand labeling agreements.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-4.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-7 Log #2238 NEC-P18 **Final Action: Reject**
(406.2 (New))

Submitter: John S. Robison, Robison Consulting, LLC
Comment on Proposal No: 18-11
Recommendation: Add text to read as follows:

All 125-volt single phase receptacles shall have Overload Fault Circuit Interrupter protection.

Substantiation: I sincerely request that you accept the proposed technology described in Proposals 2-154 and 2-155. A company called 2D2C, Inc. (www.2d2c.com) has developed a simple approach to protecting against incorrect sizing of light bulbs to fixtures. The technology is called Overload Fault Circuit Interrupter (OFCI). I witnessed this technology in operation at an NFPA Expo, evaluated it and found that it works as described. Based upon my expertise, OFCI would eliminate most fires caused by improperly sized light bulbs if it was installed. From my experience, the only way to ensure that this OFCI technology prevents these fires, is to require its usage. If it is optional, it will not get used and these fires will continue.

Simply stated, OFCI is effectively a resettable fast-trip breaker located in the outlet or in a light fixture. The light fixture version of OFCI has a fixed trip-current level that matches the light fixture rating. If the wrong size light bulb is installed in the fixture, the OFCI disconnects electricity to the bulb and will toggle power to the light with a very low duty cycle until it detects a current draw below its trip threshold and then resets itself.

The OFCI electrical outlet version has 14 different trip-current levels and automatically matches its trip level to the device rating plugged into each receptacle independently. Outlet OFCI reads this trip level from RightPlug safety encoding inside the plug (www.RightPlug.com). The RightPlug encoding embeds a wireless memory stick inside the plug that contains information about the appliance such as its maximum current draw and power rating. Therefore, a 60 Watt, 120V lamp will have a RightPlug hold current of 0.5 Amp. When the plug is inserted in the OFCI outlet, the RightPlug reader inside the outlet reads the appliance rating and sets it trip level accordingly. If a 100 Watt light bulb is inserted in the fixture, the OFCI outlet will disconnect electricity after a few seconds to give instant feedback to the operator that an oversized light bulb has been inserted in the light fixture. On the OFCI outlet, the breaker is reset by removing the plug and reinserting it in the socket. If the correct sized bulb has been installed, the OFCI outlet will turn on power to the outlet and operate the same as any standard outlet. If an oversized bulb remains in the fixture, the OFCI outlet will trip again and disconnect electricity to the lamp cord. A red indicator light flashes adjacent to the overloaded receptacle to ease troubleshooting.

I presently act as an expert investigator for fire cause and am a retired fire marshal. As such, I have personal experience with identifying the cause of thousands of fires. On several occasions, the use of light bulbs of a higher rating than the fixture in which they were used has resulted in fires. The NFPA 101 Life Safety Code requires apartment building owners to provide annual information to tenants regarding safety procedures in the event of fire or the sounding of a fire alarm. I believe a portion of that information should include the proper use of correct wattage bulbs in light fixtures. Unfortunately, this safety practice does not normally occur nor is it practical to regulate. OFCI is a practical solution to this fire cause.

Some examples of fires that OFCI would have prevented include the following:

A fatal apartment house fire where 100 watt bulbs were routinely installed in both interior and exterior fixtures, although the fixtures carry warnings regarding the use of bulbs in excess of 60 watts.

Several interior lamp fires where bulbs in excess of 60 watts were used overheating combustible shades.

Warnings regarding this improper practice of over-sizing bulbs in fixtures and lamps are displayed on websites of nationally recognized safety organizations, however, the practice continues and fires do likewise.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-4.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-8 Log #396 NEC-P18 **Final Action: Reject**
(406.3(G) (New))

Submitter: Earl W. Roberts, Reptec
Comment on Proposal No: 18-15
Recommendation: Add new section 406.3(G), "Receptacle Testing", as follows:
"Receptacle outlet circuit testers designed for use in 15A and 20A, 125V, 2P3W receptacles shall display a lighted warning signal when the equipment grounding contacts are energized at 90 volts or more."
Substantiation: The Panel has agreed that a serious shock hazard can exist under the conditions specified in the proposal. The submitter is familiar with eight electrocutions that resulted from the very conditions described.
90.1(A) of the NEC states that the purpose of the code is the practical safeguarding of persons and property from hazards arising from the use of electricity. Note that there is no limitation concerning devices "not permanently connected".
The Panel rejected the proposal, stating - "The Panel disagrees that requirements for usage of a device not permanently connected to the premises wiring system belong in the NEC." The submitter is encouraged to work with the UL 1436 STP.
This is a "chicken-egg" situation. We know that if a requirement is included into the NEC, since the NEC becomes an American National Standard, that the UL standard must not be in conflict, in order for it to become an American National Standard.
The NEC is full of examples where requirements are included for devices not permanently connected to the premises wiring. Several NECs ago, we were involved in the requirements for hair dryers in 422.41. At that time, we located about 100 other examples. I have provided a list that includes several articles, with many examples, should suffice to make the point.
The wide-spread usage of 3-wire receptacles to replace 2-wire receptacles, protected by GFCIs and properly labeled, have greatly increased the likelihood of equipment grounding contacts of these receptacles becoming energized. Plugging in any tool or appliance with a 3-wire cord causes a serious shock hazard. The existing listed testers will not detect this shock condition.
The Panel is urged to address this serious safety issue, and not to push it off to another organization beyond their control to resolve.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: CMP 18 continues to reject this proposal and comment as the receptacle testers referenced do not fall within the scope of the NEC. The NEC does contain provisions for the proper use of cord wiring, the proper polarization of cord-caps, and the proper identification of the grounded-circuit conductor within a cord. Article 422 on appliances addresses the circuit requirements to an appliance and not the wiring of the appliance. Section 410.42 addresses the grounding and polarization of portable lamps but does not address usage. A receptacle tester is not a device similar in usage to a portable luminaire or an appliance which is cord-connected and left in-place for an extended period of time. Receptacle testers are used intermittently to verify safe wiring and operation of receptacles. The appropriate standard for the safe construction and operation for receptacle testers is ANSI/UL 1436, Standard for Outlet Circuit Testers and Similar Indicating Devices.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-9 Log #1423 NEC-P18 **Final Action: Accept**
(406.4(D) Exception No. 2)

TCC Action: The Technical Correlating Committee notes that in addition to the Fact-Finding Report referred to in the substantiation of this comment the Taymac Corporation has submitted additional substantiation in support of retaining 406.4(D), Exception No. 2, including a further Fact-Finding Report. See Comment 18-10.
Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 18-19
Recommendation: The panel should Accept this Proposal.
Substantiation: This exception creates a direct conflict with other parts of the NEC and nationally recognized standards and can create an unsafe condition by allowing a wall plate to:
1. Prevent full engagement of a plug into a receptacle.
2. Prevent the seating of the wall plate against the wall.
3. Circumvent the basic design, installation and safety standards for plugs and receptacles.

ANSI/UL Standard 514D is the ANSI standard for Coverplates (Wallplates, Faceplates).
Section 4.1 requires:
● A cover plate or outlet box hood that is used with a receptacle shall not hinder the complete seating of an attachment plug of the type intended for use with the receptacle.
● A cover plate shall have dimensions that comply with ANSI/NEMA WD6 for features intended to accommodate a flush-mounted receptacle.

ANSI/NEMA WD6 contains the dimensional requirements to accommodate these important safety functions:
● The minimum height of the receptacle boss is specified to allow wall plates to be designed so that the duplex bosses are flush or protrude from the installed wall plate and "...not preclude the flush seating of a plug into a receptacle". The minimum blade length of the plug is specified, not the depth of the receptacle contacts. Receptacles are designed to work with a minimum blade length with the plug fully seated against the receptacle face.
● The maximum height of the receptacle boss is not specified, thus the holes specified for the bosses in the wall plate allow it to slip over the bosses and seat against the wall surface safely completing the electrical enclosure.

The NEC has installation requirements that support both of these safety objectives.
● NEC 406.4(D) requires "After installation, receptacle faces shall be flush with or project from faceplates of insulating material and shall project a minimum of 0.4 mm (0.015 in.) from metal faceplates".
● Article 406.5 requires "Receptacles faceplates shall be installed so as to completely cover the opening and seat against the mounting surface".

Clearly there has been a comprehensive and collaborative set of codes and standards requirements that recognize these relationships and work together to establish a safe environment.
NEC 406.5 Exception No. 1 recognizes this important relationship.
● It permits "Listed kits or assemblies encompassing receptacles and nonmetallic faceplates that cover the receptacle face, where the plate cannot be installed on any other receptacle...".
● This is a very reasonable exception. It permits a specific receptacle and faceplate to be tested, evaluated and listed for the purpose.
● It also acknowledges the fact that it is not possible to determine if the face plate will function safely with the billions of other receptacles installed, produced or being designed and, thus, requires it to be non-interchangeable.

NEC 406.5 Exception No. 2 overlooks this important relationship.
It universally permits "Listed nonmetallic faceplates that cover the receptacle face to a maximum thickness of 1 mm (.040 in.)...".
● This exception in effect arbitrarily reduces the plug engagement on any receptacle where it is installed.
● This would be the same as the NFPA allowing an exception for all plug blades to be 1 mm (.040 in.) shorter than the minimum length published in the ANSI standards.

There are several safety issues involved:
● The typical duplex receptacle is designed to mount to an outlet box installed in a wall and the electrical enclosure is completed by the installation of a faceplate. To do this, it must seat on the surface of the wall. A faceplate as described in Exception No. 2 that covers the receptacle face must also seat on the receptacle face. It will only seat against the wall if its dimensions match the receptacle face height exactly. There are millions of receptacles being produced and installed that have a face height significantly higher than the minimum specified in ANSI/NEMA WD6. If the plate is designed to the minimum face height dimension, then it will not seat against the wall with these receptacles. This is a direct violation of NEC 406.5 cited previously and creates a potential safety hazard by permitting access to live parts in the outlet box.
● If the plate is designed to be greater than the minimum face height dimension, in order to seat against the wall, then it may not seat against the face of the receptacle creating a gap between the plate and receptacle face precluding the full insertion of a plug even further. This can create an arcing condition and potential for fire with any receptacle where the contacts are deeply recessed. The billions of installed receptacles have widely varying contact recesses as they are designed to work with a minimum length of plug blade.
● Even if the receptacle and the plate are perfectly matched, the installation must also be perfect. If the receptacle is slightly raised, it will lift the plate off the wall. If the receptacle is slightly recessed it will result in a gap between the plate and receptacle resulting in far more than a.040 in. obstruction.
● By its very nature this type of plate can be used to cover an improperly recessed receptacle or be used to cover an old worn and broken receptacle. The finished installation will look perfect while actually concealing the hazard.

The TayMac code panel presentation cites a fact-finding to justify the exception. The test program is seriously flawed, as it does not follow the standard test protocols in the appropriate ANSI/UL standards. However, even if corrected it would still be irrelevant as it cannot test or anticipate the wide variety of receptacle designs and installation conditions that can create the safety issues cited above. It can only demonstrate, at best, that it can work where it can work. There are many receptacle designs where the plate will not work safely because the plate will not seat on the wall or the plug engagement is significantly compromised.
This is a dimensional compatibility issue, not just a performance issue. Clearly, Exception No. 1 was intended to address this issue by allowing a Nationally Recognized Testing Laboratory (NRTL) to evaluate and list nonmetallic faceplates that cover the receptacle face for use with specific receptacles and cannot be installed on non-tested receptacles. This in effect acknowledges that it is not possible to test or evaluate the face plate with the billions of other receptacles already installed, being produced or being designed.

Exception No. 2 is dimensionally incompatible with the current and future receptacle infrastructure and can create a hazardous condition. Therefore, the proposal to delete Exception No. 2 should be accepted.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
OWENS, T.: I continue to support the current language contained within 406.4(D) Exception No. 2. Persuasive arguments for and against this issue were submitted during both the proposal and comment stages. The panel narrowly supported removal of this exception. I firmly believe that it is a case of "throwing out the baby with the bath water."
The proponents of removing the exception provided some examples of where the cover plate could cover up unsafe receptacles or improperly installed receptacles. The issue addressed from this side really is a case of an installation that is in violation of other sections of the NEC by the receptacle not being maintained in a serviceable condition or not installed with the plaster ears against the wall surface. This is similar to stating that a surface-mounted fluorescent luminaire should not be allowed because the box was not installed in a code complaint manner. The correction action is to require proper installation of the receptacle and not preclude the installation of the plate.
The only operative issue that was presented concerns the ability of a receptacle to make proper contact with the blades of a cord cap. The single receptacle that was used in the demonstration is no longer produced in the same configuration according to a representative of the manufacturer. The proponents of retaining the exception provide testing results that indicated one manufacturer's plate and certain receptacles complied with the blade retention requirements of the appropriate ANSI/UL Standard 514D. Thus, stating that 406.4(D) Exception No. 2 is inherently dangerous is really a disingenuous argument. In fact, one nationally recognized testing agency has listed this manufacturer's plate.
Another issue raised is that 406.4(D) Exception No. 2 violates language contained in ANSI/UL 514D and ANSI/NEMA Standard WD6. This is not an issue new to the NEC process. The revision cycle of the NEC does not always correspond to the revision cycles of UL or NEMA standards. Allowance is always made for other standards to catch up. For example, take the proposed new requirement for weather-resistance receptacles in damp and wet locations. At the time the original proposal was made the current standards did not have requirements covering weather-resistant type receptacles. During this comment stage, statements were made that the standards are in the process of being revised and new listed devices should be available upon code implementation. Finally, both standards do allow cover plates that cover a receptacle specifically in the floor mounted receptacles.
In conclusion, I did not see any presentation that an otherwise code complaint installation is denigrated by 406.4(D) Exception No. 2 or that existing standards could be modified to allow these coverplates under specified conditions and with appropriate installation instructions and restrictions.
PIERCE, J.: I recommend a reject on the proposal to remove Exception No. 2 from this Article. Let the certification labs decide by controlled evaluations/ tests whether an additional 1.0 mm insulating material between the receptacle face and plug is the same or better than a standard wall plate. Intertek did that evaluation and confirmed the same or better test results per standard UL498. The demonstration in the meeting was very convincing, but was it an accurate representation of a test in UL498? (Note the Masque wallplate was held against the old receptacle by finger pressure only and secured with a screw as intended).

18-10 Log #1607 NEC-P18 **Final Action: Reject**
(406.4(D) Exception No. 2)

Submitter: Robert W. Miller, Taymac, Inc.
Comment on Proposal No: 18-19
Recommendation: Continue to reject the proposal.
Substantiation: The substantiation for the proposal provides no evidence of field problems, although products meeting the provisions of the exception have been sold for over ten years, with millions of installations. Additional substantiation requested by some members of CMP-18 to retain the current wording is contained in the report provided.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The panel does not support this proposal based upon the dimensional compatibility issue of assuring that a cover plate when used with any receptacle will not produce a safety hazard. Panel members rely on technical facts and not on the basis of the number of unreported field problems or a series of tests that do not encompass the entire range of available products to justify continued acceptance. It is clearly evident that ANSI/NEMA WD6 standard contains the critical dimensional requirements to assure the safe usage of a receptacle and an attachment plug regardless of whom and where each is individually produced. The ANSI/UL 514D Standard, which states that a cover plate or outlet box hood that is used with a receptacle shall not hinder the complete seating of an attachment plug of the type, intended for use with the receptacle. The submitter has not demonstrated that the unimpeded plug insertion has been addressed as well as assured compliance with 406.5 regarding the seating of the faceplate against the wall surface. The panel urges the submitter to continue to address this issue through the ANSI Standard process for Cover Plates for Flush-Mount Wiring Devices, the ANSI/UL 514D.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
OWENS, T.: See my explanation of negative vote on Comment 18-9.
Comment on Affirmative:
PIERCE, J.: See my Explanation of Negative Vote on Comment 18-9.

18-11 Log #328 NEC-P18 **Final Action: Reject**
(406.4(D)(1))

Submitter: Bruce King, Black & Veatch
Comment on Proposal No: 18-19a
Recommendation: (1) 2-pole, 3-wire, and 3-pole, 4-wire grounding, blade type receptacles shall have the ground pin oriented on the top for vertical installations, and to the left hand side for horizontal installations.
Substantiation: IEEE standard 602-1996 Section 4.2.2 specifcally address' ground prong orientation to be on top for vertical alignment, or on left when on horizontal installation. FDA has issued warnings attributing ground prong installation being on bottom as the cause of hospital bed fires. As a minimum, NFPA should include an FPN to this section taking a position that gives preference to the top or left position. Through use of an FPN, other orientations could still be allowed when based on either equipment manufacturer recommendations, or equipment installed location. This issue is a true safety concern, not a design preference, and needs to be addressed.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-15.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
BER, M.: This comment is a result of the perennial proposal to require the ground prong up in a receptacle installation. The only substantiation that has ever been presented to the panel is the "what if" defense. What if a receptacle had a metallic cover plate? What if the cover plate screw fell out? What if when the screw fell out there was a cord plugged into the receptacle? What if the cover plate fell down and contacted both grounded and ungrounded prongs at the same time? What if the switch controlling this receptacle was on? What if the resulting short tripped the breaker? Fin, Cased closed! Then there is the other scenario where: What if the cord cap was not all the way into the receptacle? What if some very thin conductive object fell between the cord cap and the cover plate? What if this object contacted the ungrounded and the grounded or the grounding prongs at the same time? What if the resulting short tripped the breaker? Fine, case closed. Too many "what ifs" to make this a code requirement, and not enough logic or gravity to make it a sure thing that upside down mounting would have a different result. But, if someone feels that they can save the world by installing receptacles upside down then let them proceed, there is nothing in current code language that would prohibit this.

18-12 Log #2147 NEC-P18 **Final Action: Reject**
(406.4(E))

Submitter: Brandon Lott, Gephart
Comment on Proposal No: 18-20
Recommendation: While technical substantiation is lacking, common sense should prevail. Gravity will hold any currents in the receptacle when not in use. It would make sense that a cover i.e., whether proof hinged cover is installed to protect the receptacle when not in use.
Substantiation: None given.
Panel Meeting Action: Reject
Panel Statement: In accordance with Sections 4.4.5(c) and 4.4.5(d) of the Regulations Governing Committee Projects this comment is rejected because the submitter has not provided specific code text to be added and has also not provided technical substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-13 Log #216 NEC-P18 **Final Action: Accept**
(406.4(G) (New))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 18-24
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Add a new 406.4(G) to read:

Voltage between Adjacent Devices. A receptacle shall not be grouped or ganged in enclosures with other receptacles, snap switches, or similar devices, unless they are arranged so that the voltage between adjacent devices does not exceed 300 volts, or unless they are installed in enclosures equipped with identified, securely installed barriers between adjacent devices.

Panel Statement: The panel concludes that the hazard addressed by 404.8(B) for switches and other devices is also present for receptacles and other devices. Section 404.8(B) states: "Voltage Between Adjacent Devices. A snap switch shall not be grouped or ganged in enclosures with other snap switches, receptacles, or similar devices, unless they are arranged so that the voltage between adjacent devices does not exceed 300 volts, or unless they are installed in enclosures equipped with identified, securely installed barriers between adjacent devices." Therefore, a receptacle installed in a box with an adjacent switch where the voltage between devices exceeds 300 would require a barrier. The new section will require barriers where two receptacles are installed.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-14 Log #581 NEC-P18 **Final Action: Accept in Principle (406.4(G))**

Submitter: Russell LeBlanc, Peterson School of Engineering

Comment on Proposal No: 18-24

Recommendation: This proposal should be accepted.

It's a simple, logical extension of existing requirements for similar devices. Being proactive may prevent incidents in the first place. Why wait for an incident and then be reactive.

Substantiation: Sometimes logic and common sense is an appropriate reason for making changes instead of waiting for something bad to happen and then reacting to the incident. I urge the panel members to use forward thinking in this matter.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 18-13.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-15 Log #2149 NEC-P18 **Final Action: Reject**
(406.4(G), FPN (New))

Submitter: Charles Browning, Travis Tech

Comment on Proposal No: 18-21

Recommendation: A Fine Print Note should be added to give direction during installation as follows:

Receptacle orientation should be considered when installing receptacles for fixed or stationary equipment with the receptacle position best suited for the cord being installed.

Substantiation: None given.

Panel Meeting Action: Reject

Panel Statement: The panel is unable to accept a fine print note for a section that is non-existent. The proposed fine print note is informational concerning receptacle orientation when mounted in a vertical surface. There is not a current section that addresses this issue.

The panel reiterates that receptacle orientation is a recommended practice by many organizations but has not received sufficient technical documentation that a correctly installed receptacle and cord cap connection presents an inherently unsafe situation.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-15a Log #1299 NEC-P18 **Final Action: Reject**
(406.8(A))

Submitter: Robert D. Detter, Phoenix, AZ

Comment on Proposal No: 18-28

Recommendation: Revise the 2nd sentence to read as follows:

The receptacle shall be a listed ~~weather resistant~~ sunlight resistant type if subject to solar exposure.

Substantiation: It should not be required to be weather-resistant since it is required to be protected by a weatherproof coverplate. It may or may not be subject to the effects of solar exposure depending on its location and the type of weatherproof cover installed.

Panel Meeting Action: Reject

Panel Statement: The panel rejects this comment as it presents new wording that is significantly different from the concept of the referenced proposal. The panel did not take a "Hold" action on this comment, in accordance with Section 4.4.6.2.2 of the Regulations Governing Committee Projects, because the submitter did not provide sufficient technical substantiation to support this comment being automatically resubmitted to CMP 18 as a proposal in the next NEC revision cycle.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-16 Log #1424 NEC-P18 **Final Action: Accept in Principle (406.8(A))**

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)

Comment on Proposal No: 18-28

Recommendation: The Proposal should be Accepted in Principle with the proposed text revised to read as follows and with the addition of a new Figure and FPN. This comment is a companion to the NEMA comments on Proposals 18-33 and 18-35.

15- and 20-amperes, 125- and 250-volt receptacles conforming to the configurations shown in Figure 406.8(B) shall be Listed weather-resistant type. ~~The listed weather resistant requirement shall become effective on January 1, 2011.~~

FPN: Complete details of the configurations can be found in ANSI/NEMA WD6, National Electrical Manufacturers Association Standard for Dimensions of Attachment Plugs and Receptacles.

[Reference Note for panel information only — the FPN and Figure are similar in format to 552.44(C)(2)].

Substantiation: NEMA supports the intent of the proposals to require listed weather resistant receptacles in damp and wet locations. However, this requirement should be limited to 15 and 20 ampere, 125 and 250 volt straight blade receptacle configurations. These are the receptacles that were covered by NEMA/UL field study cited in the substantiation for the proposals. In reviewing available field data, the NEMA wiring device manufacturers have concluded that it is predominately 15 and 20 ampere straight blade receptacles that are affected by the conditions described in the substantiation. This is most likely due to the use and installation practices commonly associated with these receptacles. Requiring 15 and 20 amp straight blade receptacles to be the Listed weather resistant type will ensure that the receptacles subject to the conditions described in the proposal substantiations will be of sufficiently robust design to withstand these conditions. Requiring all receptacles to be Listed weather resistant type would include many receptacles not typically subject to the same conditions as the 15 and 20 amp straight blade receptacles. These other types of receptacles would include devices such as pin and sleeve, high ampere locking devices and other similar categories of receptacle. NEMA wiring device manufacturers have been unable to identify any information that indicates an adverse impact on these receptacles used in damp and wet locations similar to the effect on 15 and 20 amp straight blade receptacles.

NEMA is currently working with UL to develop requirements for Listed weather resistant receptacles that will be included in UL 498. This will ensure availability of Listed weather resistant receptacles prior to the adoption of the 2008 NEC. NEMA recommends deleting the January 1, 2011 effective date from this proposal.

Panel Meeting Action: Accept in Principle

Revise the last paragraph of 406.8(A) to read:

A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff. All nonlocking 15- and 20- ampere, 125- and 250-volt receptacles ~~The receptacle~~ shall be a listed weather-resistant type. ~~This listed weather-resistant requirement shall become effective on January 1, 2011.~~

FPN: The types of receptacles covered by this requirement are identified as 5-15, 5-20, 6-15, and 6-20 in ANSI/NEMA WD 6-2002, National Electrical Manufacturers Association Standard for Dimensions of Attachment Plugs and Receptacles.

Panel Statement: The panel accepts in the principle the restriction on listing 15- and 20- ampere 125- and 250-volt receptacles. The panel has revised the recommended fine print note to identify the product standard and configuration types which makes inclusion of the recommended figure unnecessary.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-17 Log #2321 NEC-P18 **Final Action: Reject**
(406.8(A))

Submitter: Jim Pauley, Square D Company

Comment on Proposal No: 18-28

Recommendation: Reject this Proposal.

Substantiation: There are no listed weather resistant receptacles. In fact, there are not even any requirements for a listed weather resistant receptacle. Why would the code panel agree to such a requirement when they have no idea if the claimed situation will be addressed by the ultimate requirements. In fact, the proposal doesn't even outline the problems in enough detail.

We have code requirements for the installation of boxes and covers that are to handle the situation described. If the receptacle is performing poorly, then the receptacle manufacturers should improve their product designs to accommodate the intended installations. It's clear that the receptacle manufacturers know that their product will be installed in these environments (since the code has requirements for certain installations to have outdoor receptacles), so they should have already taken this into account into their designs.

In addition, the requirement will end up applying to situations that are not impacted by some of the stated issues. One example is receptacles in Power Outlets. These receptacles are typically behind metal covers that can be closed with the cord in place. Why is a UV resistant receptacle needed.

Lastly, it is somewhat ridiculous to attempt to have two different receptacles. Contractors and inspectors will be faced with continual problems in trying to sort out the right receptacle for indoor versus outdoor. Receptacle applications such as this are universal. If the receptacle needs to be improved, then the receptacle manufacturers need to make the improvements - not complicate the code.

Panel Meeting Action: Reject

Panel Statement: The substantiation provided with Comment 18-16 indicates that these receptacles will be available prior to the effective date shown in Proposal 18-28.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-18 Log #1426 NEC-P18 **Final Action: Accept in Principle (406.8(B)(1))**

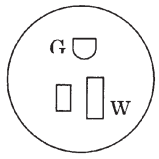
Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)

Comment on Proposal No: 18-33

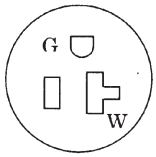
Recommendation: The Proposal should be Accept in Principle with the proposed text revised as follows and with the addition of a new Figure and FPN. This comment is a companion to the NEMA comments on Proposals 18-28 and 18-35.

The receptacles conforming to the configurations shown in Figure 406.8(B) shall be Listed weather-resistant type. ~~The listed weather resistant requirements shall become effective on January 1, 2011.~~

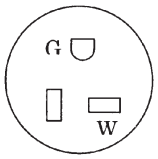
FPN: Complete details of the configurations can be found in ANSI/NEMA WD6, National Electrical Manufacturers Association Standard for Dimensions of Attachment Plugs and Receptacles.



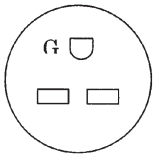
15-A, 125-V, 2-pole, 3-wire, grounding type



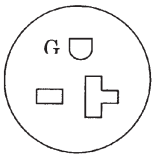
20-A, 125-V, 2-pole, 3-wire, grounding type



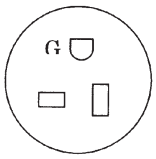
20-A, 125-V, 2-pole, 3-wire, grounding type



15-A, 250-V, 2-pole, 3-wire, grounding type



20-A, 250-V, 2-pole, 3-wire, grounding type



20-A, 250-V, 2-pole, 3-wire, grounding type

FIGURE 406.8(B) Receptacle Configurations.

[Reference Note for panel information — the FPN and Figure are similar in format to Section 552.44(C)(2)]

Substantiation: NEMA supports the intent of the proposals to require listed weather resistant receptacles in wet locations. However, this requirement should be limited to 15 and 20 ampere, 125 and 250 volt straight blade receptacle configurations. These are the receptacles that were covered by NEMA/UL field study cited in the substantiation for the proposals. In reviewing available field data, the NEMA wiring device manufacturers have concluded that it is predominantly 15 and 20 ampere straight blade receptacles that are affected by the conditions described in the substantiation. This is most likely due to the use and installation practices commonly associated with these receptacles. Requiring 15 and 20 amp straight blade receptacles to be the Listed weather resistant type will ensure that the receptacles subject to the conditions described in the proposal substantiations will be of sufficiently robust design to withstand these conditions. Requiring all 15 and 20 ampere, 125 and 250 volt receptacles to be Listed weather resistant type would include locking type receptacles of these ratings. NEMA wiring device manufacturers have been unable to identify any field reports that indicate that the locking receptacles are experiencing the same adverse affects that occur with the 15 and 20 amp straight blade receptacles installed in wet locations.

NEMA is currently working with UL to develop requirements for Listed weather resistant receptacles that will be included in UL 498. This will ensure availability of Listed weather resistant receptacles prior to the adoption of the 2008 NEC. NEMA recommends deleting the January 1, 2011 effective date from this proposal.

Panel Meeting Action: Accept in Principle

Revise the recommended text to read:

(B) Wet Locations.

(1) 15- and 20-Ampere Receptacles in a Wet Location. All 15- and 20-ampere, 125- and ~~through~~ 250-volt receptacles installed in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted. All 15- and 20-ampere, 125- and 250-volt nonlocking receptacles shall be listed weather-resistant type. ~~This listed weather-resistant requirement shall become effective on January 1, 2011.~~

FPN: The types of receptacles covered by this requirement are identified as 5-15, 5-20, 6-15, and 6-20 in ANSI/NEMA WD 6-2002, National Electrical Manufacturers Association Standard for Dimensions of Attachment Plugs and Receptacles.

Insert the exception added by the panel action on Proposal 18-34 following the new fine print note.

Panel Statement: The panel revised the recommended text “through” to “and” as a result of their action on Comment 18-19 and 18-20. The panel has also revised the text and added a fine print note to clarify that only nonlocking receptacles are required to be listed and identified as weather-resistant type. The substantiation provided with this comment indicates that these receptacles will be available prior to the effective date shown in Proposal 18-28.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-19 Log #1884 NEC-P18 **Final Action: Accept**
(406.8(B)(1))

Submitter: Mike Holt, Mike Holt Enterprises, Inc.

Comment on Proposal No: 18-30

Recommendation: Reject the proposal.

Substantiation: After reviewing Mr. Well’s negative comment, I believe he is correct. The receptacle type discussed in the proposal should be subject to 406.8(B)(2), not (B)(1).

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-20 Log #1932 NEC-P18 **Final Action: Accept**
(406.8(B)(1))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 18-30

Recommendation: Reject the proposal.

Substantiation: A 208Y/120-volt application should be addressed in 406.8(B)(2) that allows for receptacles to be behind wet location covers that only exclude water with the cord not inserted. This allows for screw-down covers with enclosed gaskets that easily withstand a hose stream exposure.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

18-21 Log #2322 NEC-P18 **Final Action: Reject**
(406.8(B)(1))

Submitter: Jim Pauley, Square D Company

Comment on Proposal No: 18-33

Recommendation: Reject the Proposal.

Substantiation: There are no listed weather resistant receptacles. In fact, there are not even any requirements for a listed weather resistant receptacle. Why would the code panel agree to such a requirement when they have no idea if the claimed situation will be addressed by the ultimate requirements? In fact, the proposal doesn't even outline the problems in enough detail.

We have code requirements for the installation of boxes and covers that are to handle the situation described. If the receptacle is performing poorly, then the receptacle manufacturers should improve their product designs to accommodate the intended installations. It's clear that the receptacle manufacturers know that their product will be installed in these environments (since the code has requirements for certain installations to have outdoor receptacles), so they should have already taken this into account into their designs.

In addition, the requirement will end up applying to situations that are not impacted by some of the stated issues. One example is receptacles in Power Outlets. These receptacles are typically behind metal covers that can be closed with the cord in place. Why is a UV resistant receptacle needed?

Lastly, it is somewhat ridiculous to attempt to have two different receptacles. Contractors and inspectors will be faced with continual problems in trying to sort out the right receptacle for indoor versus outdoor. Receptacle applications such as this are universal. If the receptacle needs to be improved, then the receptacle manufacturers need to make the improvements - not complicate the code.

Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-16.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-22 Log #1425 NEC-P18 **Final Action: Reject**
(406.8(B)(1) Exception (New))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 18-34
Recommendation: NEMA agrees in Principle with the exception to not require an "in-use" cover under certain conditions, but does not agree with the reference to high-pressure spray washing. We recommend changing the exception as follows:

[406.8(B)(1) Exception (New)]

Exception: 15- and 20-ampere, 125- through 250-volt receptacles installed in a wet location and subject to ~~routine high-pressure spray washing~~ wash down or similar procedures where cord openings of an in-use cover would allow water entry shall be permitted to have an enclosure that is weatherproof when the attachment plug is removed.

Substantiation: Covers that are weatherproof only with the plug removed have not been tested for high-pressure spray washing. This exception would provide a weatherproof enclosure only with plug removed similar to 406.8(B)(2)(b), other receptacles attended while in use. There are covers and devices listed that can provide higher levels of protection as needed.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided sufficient technical substantiation to support the expansion of the applications covered in the exception.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

CARPENTER, F.: NEMA believes that in applications where a receptacle is subjected to routine wash-down it is better to use a cover that is weatherproof when the attachment plug is removed than to use a cover that is designed for leaving the attachment plug connected. However, the current wording implies that these covers have been tested for "high-pressure washing". Since these covers have not been tested for this application, we object to this phrase being used in the code.

WELLS, J.: To state, as the substantiation did, that the product is not tested for "high pressure spray" is, I believe, sufficient technical justification calling to our attention that we are requiring something that is not technically valid.
Comment on Affirmative:

WRIGHT, R.: I concur with the panel action to reject this proposal based on the fact that the proposed text is too broad. I do feel the commenter has a good point on expanding the requirements.

18-23 Log #1427 NEC-P18 **Final Action: Accept**
(406.8(B)(2))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 18-35
Recommendation: This Proposal should be Rejected. This comment is a companion to the NEMA comments on Proposals 18-28 and 18-33.

~~The receptacles shall be Listed weather-resistant type. The listed weather-resistant requirement shall become effective on January 1, 2011.~~

Substantiation: NEMA supports the intent of the proposals to require listed weather resistant receptacles in wet locations. However, this requirement should be limited to 15 and 20 ampere, 125 and 250 volt straight blade receptacle configurations. These are the receptacles that were covered by the NEMA/UL field study cited in the substantiation for the proposals. In reviewing available field data, the NEMA wiring device manufacturers have concluded that it is predominantly 15 and 20 ampere straight blade receptacles that are affected by the conditions described in the substantiation. This is most likely due to the use and installation practices commonly associated with these receptacles. Requiring 15 and 20 amp straight blade receptacles to be the Listed weather resistant type will ensure that the receptacles subject to the conditions described in the proposal substantiations will be of sufficiently robust design to withstand these conditions. Requiring all receptacles to be Listed weather resistant type would include many receptacles not typically subject to the same conditions as the 15 and 20 amp straight blade receptacles. These other types of receptacles would include devices such as pin and sleeve, high ampere locking devices and other similar categories of receptacle. NEMA wiring device manufacturers have been unable to identify any information that indicates an adverse impact on these receptacles use din damp and wet locations similar to the effect on 15 and 20 amp straight blade receptacles.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-24 Log #2323 NEC-P18 **Final Action: Accept**
(406.8(B)(2))

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 18-35
Recommendation: Reject the Proposal.
Substantiation: There are no listed weather resistant receptacles. In fact, there are not even any requirements for a listed weather resistant receptacle. Why would the code panel agree to such a requirement when they have no idea if the claimed situation will be addressed by the ultimate requirements? In fact, the proposal doesn't even outline the problems in enough detail.

We have code requirements for the installation of boxes and covers that are to handle the situation described. If the receptacle is performing poorly, then the receptacle manufacturers should improve their product designs to accommodate the intended installations. It's clear that the receptacle manufacturers know that their product will be installed in these environments (since the code has requirements for certain installations to have outdoor receptacles), so they should have already taken this into account into their designs.

In addition, the requirement will end up applying to situations that are not impacted by some of the stated issues. One example is receptacles in Power Outlets. These receptacles are typically behind metal covers that can be closed with the cord in place. Why is a UV resistant receptacle needed?

Lastly, it is somewhat ridiculous to attempt to have two different receptacles. Contractors and inspectors will be faced with continual problems in trying to sort out the right receptacle for indoor versus outdoor. Receptacle applications such as this are universal. If the receptacle needs to be improved, then the receptacle manufacturers need to make the improvements - not complicate the code.

Panel Meeting Action: Accept
Panel Statement: The panel does not agree with the substantiation provided by the submitter. See the panel action on Comment 18-23 which limits the application of the weather-resistant receptacles to 15- and 20- ampere, 125 volt and 250 volt nonlocking types.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-25 Log #395 NEC-P18 **Final Action: Reject**
(406.9(F))

Submitter: Earl W. Roberts, Reptec
Comment on Proposal No: 18-39
Recommendation: Accept the proposal revised as follows:

(F) A listed device included as an integral part of a plug, cord set, or power supply cord that disconnects automatically and simultaneously all three conductors - the line conductor, the grounded circuit conductor, and the equipment grounding conductor, shall be permitted, when a voltage to ground of 90v or more exists on the equipment grounding conductor, where all of the following conditions exist:

1) The plug configuration is 15 or 20 amp, 125 volt, 2P3W.

2) A listed 15 or 20 amp, 125 volt GFCI is installed in the power supply cord, either integral with the plug, or within one foot of the plug.

3) The device provides labeling and a clear signal by a light or other means that the equipment grounding conductor has been interrupted.

Substantiation: Mr. Silverman is proposing a reasonable solution to a serious safety problem not addressed in the present NEC. The disconnection of all three conductors automatically when the equipment grounding conductor is energized at line voltage is no different functionally from pulling a plug out of a receptacle.

The proposal provides a solution to a shock condition that a GFCI does not protect against. The energized equipment grounding conductor bypasses the GFCI function entirely.

The substantiation submitted with my Comment on Proposal 18-15 is applicable here also. Rather than repeat the information, there is certainly substantial evidence that the solution to this issue belongs in the NEC. It is ironic that the Panel has recommended sending the proposal to Panel 5 “for action”, while taking the position that requirements for usage of a device not permanently connected to the premises wiring system do not belong in the NEC.

Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-26.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-26 Log #579 NEC-P18 **Final Action: Reject**
(406.9(F))

Submitter: Arthur Silverman, General Wire Spring Company
Comment on Proposal No: 18-39
Recommendation: Accept the proposal revised as follows:

(F) A listed device included as an integral part of a plug, cord set, or power supply cord that disconnects automatically and simultaneously all three conductors - the line conductor, the grounded circuit conductor, and the equipment grounding conductor, shall be permitted, when a voltage to ground of 90v or more exists on the equipment grounding conductor, where all of the following conditions exist:

1. The plug configuration is 15 or 20 amp, 125 volt, 2P3W.

2. A listed 15 or 20 amp, 125 volt GFCI is installed in the power supply cord, either integral with the plug, or within one foot of the plug.

3. The device provides labeling and a clear signal by a light or other means that the equipment grounding conductor has been interrupted.

Substantiation: There have been six electrocutions of operators on our machines in the past years. These machines had GFCIs as standard equipment. These electrocutions were not caused by the machine or plumbing snake coming in contact with an outside source of electricity. They were not caused by an electrical short on the machine that the GFCI did not sense. They were caused by faulty wiring at the receptacle or extension cord that allowed current to pass into the machine through the ground wire.

I am not saying that the electrical grounding on our machines does not protect the operator in the event that the machine or plumbing snake comes in contact with an alternate electrical source (it allows the alternate source of electricity to follow the path of least resistance to a harmless ground).

Our device will protect any electrical piece of equipment using a 3-wire cord on all three wires, not two out of three. In the event that the device is plugged into a receptacle with no ground, or a “hot” ground, all three lines are disconnected electrically and a warning light comes on. This is, in effect, the same as pulling the plug with a bonus of a warning light.

We are having difficult getting our device manufactured because it is not listed. We are having difficulty getting it listed because it doesn’t appear to conform to the electrical code.

Early Jewish writing states: “To save on one life is as if you have saved the world.” I am not going to comment on this. I will say that your decision to approve this device will put it on all of our equipment and should put it on all 3-wire electrical equipment. This will save lives.

The author agrees with the substantiation for Comment on Proposal 18-15 submitted by Earl W. Roberts. Rather than repeat the information here, there is certainly substantial evidence that the solution to the issue belongs in the NEC. It is ironic that the panel has recommended sending the proposal to Panel 5 “for action”, while taking the position that requirements for usage of a device not permanently connected to the premises wiring system do not belong in the NEC.

Panel Meeting Action: Reject
Panel Statement: The panel reiterates that the proposed device is intended for inclusion within the cord for a specific type of equipment and as such is part of the equipment listing process. The panel also reviewed the conditions presented in the original proposal as the justification for requiring this device. The issue presented is not with the equipment but the premises wiring system to which the equipment is connected. It is apparent that prior testing of the circuit for proper wiring with a listed circuit tester would alert the user to the unsafe condition. This proposed device would not correct the problem but bypass the safety problem.

The directions to the TCC that the original proposal be forwarded to CMP 5 for comment is required by the proposal’s recommendation to disconnect the equipment grounding conductor to a piece of equipment. This would pose a violation of the requirements within Article 250 which is under the purview of CMP 5.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

18-27 Log #266 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Stanley J. Folz, Morse Electric, Inc.
Comment on Proposal No: 18-40
Recommendation: Delete the text proposed in the ROP.
Substantiation: I have to agree with the negative Panel comment by Mr. Wall. As a point of information to the TCC I had tamperproof receptacles quoted today (5/16/2006). A residential grade is not available so I was quoted specification grade. 15 and 20 ampere P&S tamperproof receptacles were $15.00 and $17.00, respectively. I know a residential model of this device coupled with mass production will be more economical. However, until such a device exists I think the CMP should put this proposal on HOLD until the next Code cycle.

Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:

BER, M.: Although presented to the panel as a safety issue this is not a safety issue, it is not an economical issue, it is a responsibility issue and it is not good code. This blanket requirement to install tamper resistant receptacles in all dwelling unit locations is a blatant example of creeping socialism and rampant big-brotherism. It is time for us as a nation to accept our responsibilities and protect our own children. It should not be the position of the NFPA, the government, or the local police to force our responsibilities upon us. If our kids are uninformed enough to stick something in a receptacle and not learn the first time then it is our responsibility as parents to buy some covers. If the kid is smart enough and has enough manual dexterity to be able to defeat the covers then it is time to start his college fund. But requiring the installation of all new receptacles to be tamper resistant is not necessary or prudent. What is the next step? Childproof barriers along all streets and roads? Surgically installed water wings?

Whenever we are presented with any subject that concerns “the children” the ability to keep eyes dry and analyze data rationally immediately leaves the room. This inability to make intelligent decisions has been enhanced in this instance with dubious data presented with introductory terms like, probability sample” and “estimated”. As soon as we are presented with this type of undata, without any technical substantiation, it is time for all good men and women to look for underlying reasons. Compound this with photos presented to the panel of severely burned children that have no connection to the discussion. A child that chews on an extension cord has no relationship to an unsupervised kid with a hair pin in his hand that is allowed to be in a location with receptacles.

It is ridiculous and ludicrous that grown people should spend as much time, effort, and money on a subject that is best left to the individual parent. All that it takes is a short trip o the local home improvement store to see an entire section that is devoted to child protection, including many items not electrically related such as drawer hardware and cabinet latches. Not only are there the common plastic receptacle covers, there are complete covers that provide protection with and without cord caps installed. Also, there are receptacle covers with the sliding protection that a tamper resistant receptacle would provide. And all of these inexpensive devices can be easily installed by the homeowner. If the parents feel that these could be defeated by their budding Phi Bata Kappa, then an electrician could be hired to install some tamper resistant receptacles. But to saddle the entire country with and mandate that all new dwelling units would be required to have tamper resistant receptacles is severe overkill and without justification.

On the concern for the elderly being able to use these tamper resistant receptacles I did not think that this was a true issue until I tried to insert a cord

cap into the sample that was available during the panel meeting. At over 250 pounds I have always felt I was pretty strong, but I cold not push the cord into the sample provided I am truly concerned as to how my 115 pound, 86 year old mother would be able to handle plugging in her oxygen pump!

BOYNTON, C.: I am voting against the panel and recommending to delete section 406.11. Tamper proof receptacles will be difficult for some people to use, not just due to the force, but because the blades have to be precisely aligned and perpendicular to the receptacle for the shutters to move. Any shaking by the hand or unsteady movement of the hand will result in extreme frustration in trying to insert the plug. I do not know of any data or studies that have proven this will not be an issue.

Deleting this proposal does not preclude the use of tamper proof receptacles if persons choose to do so. However, it allows persons who do not need them to not be forced to do so. Some of the examples seen in the burn presentation show children that have burns where the child chewed on the cord. This is not applicable unless "chew proof cords" are also mandated. As it stands, other options such as the caps can prevent children from inserting objects in the receptacle. The code is not a product standard. In addition, some of the objects that are inserted in the receptacle, which the presentation listed as "not perceived as dangerous by parents", such as knives, pins, screws, nails, etc., to me are perceived as dangerous in the hands of a child regardless of a receptacle being involved or not.

18-28 Log #324 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Alan H. Nadon, City of Elkhart, IN
Comment on Proposal No: 18-40
Recommendation: The panel should reject this proposal.
Substantiation: The panel is correct in being concerned about the problems an aging population may have in using devices that comply with this new requirement. I agree with the comments of Mr. Wall that many households do not contain small children and may be only inhabited by adults, older children, the elderly or adults with physical impediments. I do not feel that there is sufficient substantiation to justify the installation and use of tamper resistant receptacles in all dwellings.
This is a design matter and does not belong in the Code.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.

18-29 Log #325 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Alan H. Nadon, City of Elkhart, IN
Comment on Proposal No: 18-40
Recommendation: The panel should reject this proposal.
Substantiation: This is a design consideration and should not be mandated by the Code. Not just tamper resistant receptacles but, other products and design considerations are available at this time that will achieve the goal proposed by the submitter. The NFPA Electrical Safety Sheet recommends plastic safety covers as a product that would achieve this goal. The placement of receptacles at an elevation that would reduce the probability of an infant or small child from reaching a receptacle is a permitted design change that would achieve this goal. The latter would achieve the goal with no additional expense, and cause no additional problems for elderly persons or adults with physical impediments.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.

18-30 Log #326 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Alan H. Nadon, City of Elkhart, IN
Comment on Proposal No: 18-40
Recommendation: The panel should reject this proposal.
Substantiation: The proposal is too broad as submitted. There is no allowance made for receptacles located above the level a small child could reach nor is there consideration for receptacles located behind large appliances, stoves, refrigerators, washing machines, etc.
To the best of my knowledge there are no GFCI recepticals designed as tamper proof.

In my experience I have seen these types of receptacles defeated through mis-use usually from being painted locking them in the open position and more troublesome in the closed position which leads occupants to use extension cords.

Well intentioned as this proposal may be the panel should reject it.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.

18-31 Log #339 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Ronald Sweigart, Dupont
Comment on Proposal No: 18-40
Recommendation: Delete the following text:
~~406.11 Tamper Resistant Receptacles in Dwelling Units. In all areas specified in 210.52, all 125-volt, 15 and 20 ampere receptacles shall be listed tamper-resistant receptacles.~~
Substantiation: This proposal is based on children inserting an object into a receptacle. The statistics suggest that the incidents are very rarely fatal, but will result in electric shocks and mild to severe burns.

Although the implementation of this proposal would minimize the potential of the insertion of objects into a receptacle, there still exists a remote possibility that the shutters of this receptacle could be compromised. Note, the panel is additionally concerned about the possible increased insertion force required for the aging population.

My suggestion is not to add this text, but to modify 210.8(A) by installing GFCI protection to all rooms in a dwelling unit. This would eliminate any hazard associated with objects being inserted into any receptacle, not just minimize the potential.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 2
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.

18-32 Log #616 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Robert A. Jones, IEC Texas Gulf Coast
Comment on Proposal No: 18-40
Recommendation: This proposal should be rejected.
Substantiation: I am as concerned about the welfare of children as NEMA, however Code-Making Panel 18 was not provided with enough technical substantiation to require all 125-volt, 15- and 20-ampere receptacles in areas specified in 210.52 to be listed tamper resistant receptacles.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-33 Log #639 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Robert A. Jones, IEC Texas Gulf Coast
Comment on Proposal No: 18-40
Recommendation: This proposal should be Rejected.
Substantiation: The current requirements contained in UL 498 for tamper resistant receptacles only investigates single pole insertion of a test probe with a force of 8 ounces (1N) in an attempt to simulate someone (a child) to bypass the tamper resistant mechanism. A standard does not exist for the insertion force necessary to insert a two or three prong plug into a tamper resistant receptacle. The requirement for tamper resistant receptacles to be installed in dwelling units could have a serious affect on the safety of elderly or impaired people. These people may not have the strength to fully insert a plug into these types of receptacles. If the plug prongs are not fully engaged, then the exposed parts could lead to shock or fire hazards. This could be a very serious problem since the population of America is aging and more new dwelling units

are being built as assisted living and independent living housing in retirement communities. A study should be made and a standard developed for the insertion force necessary for these tamper resistant receptacles before the code requires they be installed in dwelling units.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-34 Log #640 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Martin Schumacher, Howard County Government Electrical Plan Review
Comment on Proposal No: 18-40
Recommendation: Delete new section 406.11.
Substantiation: There is not enough evidence to substantiate this new article. Now that GFI and AFCI circuits are or will be installed throughout all or most of the house, this will reduce the hazards that are exposed with standard receptacles to our children. Without clear evidence that our children are being killed or severely injured, this article cannot be justified.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-35 Log #691 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Gordon A. Stewart, Joe Swartz Electric Company, Inc. Ltd.
Comment on Proposal No: 18-40
Recommendation: This proposal should be rejected.
Substantiation: NEMA Business Information Services Department estimated the average new home cost will be increased by $37.50, however, that cost estimate does not cover the cost increase for a tamper resistant GFCI receptacle. At the present time, a tamper resistant GFCI receptacle is $19.50 higher than a non-tamper resistant GFCI receptacle. There is an average of 4 GFCI receptacles used in the average home. This equates to $115.50 plus tax, plus distributor, electrical contractor, and general contractor markup per home, not $37.50. Depending on percentage of markup the increase per home could be over $200.00.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-36 Log #692 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Gordon A. Stewart, Joe Swartz Electric Company, Inc. Ltd.
Comment on Proposal No: 18-40
Recommendation: This proposal should be rejected.
Substantiation: If Proposal 2-142 is made a requirement of the 2008 NEC, then all 125V 15 and 20 amp branch circuits will have arc fault protection. NEMA Business Information Services Department estimated the average new home cost will be increased by $37.50 for the addition of tamper resistant receptacles; however, that cost estimate does not cover the cost increase for the additional arc fault protection. Exactly how much will a new home's cost be increased? Will anyone be able to afford to live in these ultra safe homes?
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-37 Log #897 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Michael P. O'Quinn, MOGO Enterprises, Inc.
Comment on Proposal No: 18-40
Recommendation: Reject this proposal.
Substantiation: Mr. Wall's Explanation of Negative points out that no sufficient technical substantiation has been provided to warrant installation of tamper-proof receptacles in all dwelling locations, especially addressing the possible effects of these receptacles with the increase aging of the American population. There is also no data to note the effective cost or availability of tamper-resistant GFCI, which could cover a large percentage of the receptacles in question.
Please note that 210.60 and 210.18, along with this change, would require tamper-proof receptacles in guest rooms or guest suites with cooking provisions - probably not the intent of the submitter. There is also no provision for the allowance of tamper-proof receptacle covers - an alternative more likely to be installed in existing dwelling units with adults concerned about small children's safety.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-38 Log #907 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Patsy Spirelli, Spirelli Electric Inc. / Rep. Putnam County Electrical Contractors Association
Comment on Proposal No: 18-40
Recommendation: Delete the following text:
406.11 Tamper resistant receptacles in dwelling units. In all areas specified in 210.52 all 125 volts, 15 and 20-ampere receptacles shall be listed tamper resistant receptacles. [ROP 18-40]
Substantiation: This entire wording should be deleted and revisited at a later code change cycle.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-39 Log #1042 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Gilbert L. Thompson, MEIA Codes and Standards
Comment on Proposal No: 18-40
Recommendation: The Panel should reconsider their action and reject the new proposal and delete all of the proposed new wording that would add a new Section 406.11. This is a manufactures' recommendation to make a drastic change to existing wiring devices without evaluating the problems that could be generated or the cost to the industry and public. There is no time table in the proposal to accommodate existing stocks. What happens to contractors, supply houses and discount stores with supplies on hand? Many jurisdictions have not adopted the new code and are still using other editions. Have GFCI and special outlets been designed for this new requirement? What happens to replacements and existing installations?
Substantiation: Our inspectors associations agree with the negative comments of Mr. Wall. There are many communities that cater to assisted living and elder care residents and the only children in the units are the ones that visit. Tamper-resistant receptacles or covers for specific locations where children are located have already been addressed in Section 517.18(C) for pediatric care.

Also, many health care facilities that threat mental patients require these type receptacles in psychiatric wards. Parents and concerned parties already have alternate means (special covers, plastic inserts, etc.) to protect their children. An example of good sense are dangerous chemicals stored in kitchen cabinets and a simple lock for the cabinet doors keeps the children out. It still should be a choice for safety-minded people as to how to protect their children.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-40 Log #1192 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 18-40
Recommendation: Reject Proposal 18-40.
Substantiation: Rejection of this proposal is based on the issues identified by Mr. C. Wall in his negative ballot comment on Proposal 18-40.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-41 Log #1297 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Steven Roncourt, Roncourt Enterprises Inc / Rep. Electrical Contractors Business Associates
Comment on Proposal No: 18-40
Recommendation: This proposal should be rejected.
Substantiation: Please consider the information below before making a decision concerning this proposal.

There are major concerns about the insertion force required that would affect the elderly and the physically impaired as well as many people with physical ailments that would be limited by the strength in their hands.

According to the submitter, there would only be an additional cost of approximately 0.50 per receptacle. In speaking to suppliers in the area the estimated cost could range from $5.00 to $13.00 at today's rates. This was based on calls made to get pricing for this product to 3 suppliers in the NH area. If using NEMA's information concerning average receptacles in a house of 75, this could cost an average anywhere from $750.00 to $2,000.00 depending on the size of the house, and would place an undo burden on anyone purchasing a new home who can easily and very inexpensively install safety caps. We are not sure if this justifies the additional expense for all of those people that do not have children within the age group that was referenced.

There is not enough true raw data to support any possible issues that a standard receptacle creates an additional hazard as opposed to a tamper resistant one. There is just an estimate based on sample counts. Even though what is shown is very informative it is not an actual count of the incidents, which we feel should be taken into consideration before making any decision on this proposal.

This will create possible conflicts with concerns to AFCI & GFCI outlets in the future. Not all conditions allow for circuit breakers to be installed, and if so, again at additional cost to the homeowner compared to receptacles. Presently, there is no such device available on the market to allow us to meet these requirements that would be set forth in this proposal or anything to show that this would have a dramatic affect with concerns to this issue.

The submitter's data is based on sample counts and historical estimates and clearly states "The results of these incidents are rarely fatal". This proposal should require additional research with proven facts and product development that would allow for this to become a possible option to homeowners in the future. The panel should also require the break down to show in which years these incidents occurred. It is our feeling that since 1991 the public awareness on the child safety issue with receptacles has dramatically increased. These statistics do not reflect that. They are, however, reflected within the fatality estimated reports which show that there has not been a fatality since 1998 through 2001, and only four in total.

We agree that any fatality is of grave concern and not acceptable. But as we are sure the panel knows you are unable to protect everyone in every situation from every danger. Some of this responsibility must remain on the parents or person responsible for the 2 year old child who is left unattended long enough to insert a foreign object into an outlet.

Even based on the information supplied by the submitter there were no deaths from 1998 through 2001. For almost 3 years there were no fatalities from what we believe was public awareness. And, we also believe that this trend has continued over the last 5 years, as more and more of our members see the plastic protective caps installed on outlets in a dwelling during routine service calls.

As far as safety caps go we are sure that some of the older ones may be removed with a little more ease then the newer ones. Anything over time will start to show signs of wear and tear, which includes the tensile strength of a tamper resistant outlet. Our experience is that we need to use a screwdriver to get them out and it takes quite a bit to get them out.

So instead of a homeowner being able to go out on their own, and get new safety caps if they are loosing there retention strength, they now have to call an electrician to replace the entire outlet for what is surely to be up to 5 times the cost. This does not seem to make a lot of sense. They are more likely to replace an inexpensive safety cap on their own, long before they will call an electrician and spend almost $75-$90 on a service call with a new receptacle. Which then create a long lasting safety hazard because more than likely as long as the outlet works they won't replace it. This is just human nature.

As an organization made up of Electrical Contractors and Associate members consisting of many suppliers within the area, we hope that you will take the time to consider these issues before making a decision. We thank you for your time in hearing our comments and look forward to working with you in the future.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-42 Log #1322 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Tino Bermudez, TAG Electric
Comment on Proposal No: 18-40
Recommendation: This proposal should be rejected.
Substantiation: There was no evidence provided that the operation of these devices will not or cannot be circumvented by small children. The submitter has not provided a fact-finding report showing the potential reductions of the injuries with the implementation of the proposed solution of having all dwelling unit receptacles as tamper resistant.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-43 Log #1329 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Larry W. Burns, Burns Electric, Inc.
Comment on Proposal No: 18-40
Recommendation: This proposal should be rejected.
Substantiation: Why start this requirement with dwelling units? The report given to Panel 18 states 71% of the injuries were in the home, but it did not state the extent of the injuries. The four fatalities stated in the report did not identify the occupancy where the fatality occurred. I would think the best place for this requirement would be for daycare centers, preschools, and elementary schools. The caregivers and teachers at these facilities are more overburdened with supervising children than a parent within their own home.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-44 Log #1330 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Tommy Skaff, OHMS Electric
Comment on Proposal No: 18-40
Recommendation: This proposal should be rejected.
Substantiation: This proposal will only require the installation of tamper resistant receptacles in new dwelling units. The report submitted as substantiation did not identify if the incidents were occurring in new dwelling units or existing dwelling units. I don't see how this new requirement is going to have a significant impact on reducing the number of incidents because new dwelling units are a very small percentage of available dwelling units.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-45 Log #1331 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Bill Sherrill, Selo Industrial
Comment on Proposal No: 18-40
Recommendation: This proposal should be rejected.
Substantiation: If NEMA is so concerned with protecting children from electrical shock or burns why not make the requirement for all occupancies? I guess the 696 children that will be injured in occupancies other than dwellings are of no concern to NEMA. A Code requirement is not needed. All NEMA has to do is quit manufacturing non-tamper resistant receptacles. I think their motive is more profit driven than protecting children. Obviously there is more profit in selling tamper resistant receptacles than non-tamper resistant.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-46 Log #1332 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Larry R. Brown, Seco Industrial Maintenance and Controls
Comment on Proposal No: 18-40
Recommendation: This proposal should be rejected.
Substantiation: There is no evidence provided about the reliability of these devices. How many insertions can be made before the "automotic internal shutters" fail to operate properly? If the "shutter" fails does the receptacle remain in an open position? There may be tamper resistant receptacles that employ other means to achieve tamper resistant listing but the "automatic internal shutter" type seems to be most prevalent.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-47 Log #1429 NEC-P18 **Final Action: Accept**
(406.11)

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 18-40
Recommendation: The panel should continue to Accept this Proposal.
Substantiation: Tamper resistant receptacles will significantly reduce the number of injuries to children that result from children inserting foreign objects into a receptacle. Tamper resistant receptacles are readily available from the major receptacle manufacturers. Tamper resistant receptacles are also available as GFCI receptacles. Tamper resistant receptacles are listed to UL 498. UL 498 has a section that contains specific requirements for tamper resistant receptacles that ensure that a foreign object cannot be inserted into the receptacle and contact a live part.

The panel expressed concern with the amount of force necessary to insert a plug into a tamper resistant receptacle. NEMA wiring device manufacturers conducted tests to compare the insertion forces required to insert a plug into a standard receptacle and into a tamper resistant receptacle. A NEMA 5-15P, 15 amps, 125 volt plug was used. The plug was mounted in a force measuring gauge as shown in the photograph. The receptacle was mounted to allow lateral movement to prevent binding of the plug upon initial insertion. The values for insertion forces with and without the tamper resistant mechanism were recorded.

The typical insertion forces observed could be characterized as follows: When the plug blades are initially inserted into a tamper resistant receptacle, a small force of approximately 1 - 1.5 lb is required to overcome the initial resistance of the tamper resistant mechanism. This is followed by a drop in force as the plug blades have opened the tamper resistant mechanism and are passing through. As insertion continues, at the point where the blades reach and become engaged with the receptacle contacts the force increases. This is where the maximum force is observed.

The typical insertion force varied from 10 - 20 lb, depending on the design of the receptacle. There was no appreciable difference in insertion force between tamper resistant receptacles and receptacles without the tamper resistant mechanism. The overriding forces required to open the receptacle contacts are far greater than the force exerted by the tamper resistant mechanism.

The negative vote on this proposal mentioned several issues that merit comment. It was indicated that many homes do not have small children. While this may be correct at any point in time, houses are sold, kids visit grandparents and neighbors. Controlling where children are and aren't isn't possible, but providing a safer environment for them is...for under $40 per house.

The negative vote also indicated there is no evidence that kids can't defeat these receptacles. While the manufacturers would not claim that defeating them is impossible, they are, after all called tamper "resistant" not "proof", the UL standard is quite thorough in testing the unintended insertion of objects. Further, for over 20 years, these products have been used in the pediatric area of hospitals with no report of injuries.

The negative comment further stated that this requirement will require GFCI receptacles to be "tamper resistant". This is correct and such GFCIs have been on the market for over a year.

The negative comment stated that it was not demonstrated that AFCIs and GFCIs are not effective in preventing such incidents. First, AFCIs are not intended to protect against such incidents. They are intended to prevent arcing initiated fires, not burns to the finger. While GFCIs can provide some level of protection, they are only required on a limited number of circuits and only protect against some of the circumstances associated with such incidents.

Finally, the negative comment indicated that each dwelling owner should be given the choice. Since most new home construction is speculative, prospective owners are not even known at the time the electrical installation is made. More importantly, considering the cost per home and the number of incidents a clear mandate to add these proven safety products is justified.

See my Proposal 18-40 (Log #1944) that was Accepted, along with the Explanation of Affirmative and Negative Comments on Vote for that proposal.
Panel Meeting Action: Accept
Panel Statement: The panel agrees with the substantiation provided with this comment. The documentation provided with the proposal is very thorough and comprehensive. The substantiation clearly addresses the concerns raised in the comments included with the voting during the ROP process. An identified safety hazard will be mitigated with the installation of tamper- resistant receptacles.
The panel recognizes that not all receptacles listed within 210.52 are subject to child access. Yet, the overall material cost should outweigh the mind set of providing two different type of receptacles to the electricians in hopes that they would not accidentally install a standard receptacle in a location requiring the tamper-resistant type. This type of mistake could cost as much to correct, as would the amount of the savings.

The panel disagrees with the conclusions reached by most of the remaining submitters of comments to 406.11. Tamper-resistant receptacle costs cited in the substantiation provided with several comments are based on today's limited demand and does not take into account the reduction that an increased demand with corresponding increase in supply. This would be similar to the difference in cost of GFCI receptacles today over when they first were required. Pediatric areas already require listed tamper-resistant receptacles.
Finally, GFCI's and AFCI's are not intended to prevent the type of burn incidences resulting from inserting conductive foreign objects into a receptacle. GFCI's provide protection from electrocution resulting from low level ground faults and AFCIs provide protection against fires resulting from arcing type faults.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: I am voting negative on Comment 18-47. EEI agrees that there is sufficient substantiation that using tamper resistant receptacles in areas accessible to unattended small children is safer than standard receptacles in that same area. However, there is no justification presented for a requirement for these receptacles where they are not accessible to children. Tamper resistant

receptacles furthermore should not be required in homes that do not contain small children. The commenter requested the Panel continue to accept Proposal 18-40. Proposal 18-40 requires all 125-volt, 15- and 20-ampere receptacles in areas specified by 210.52 be listed tamper resistant receptacles even though not all of the area will be accessible to small children (ages 9 months to 5 years) which are the people the substantiation states that these devices are to protect. This all-encompassing change puts an unnecessary burden on the end use customer for those installations of receptacles inaccessible to small children such as for refrigerators or for wall receptacles above countertops. Furthermore, tamper resistant receptacles or faceplates with tamper resistant features are not available at the $0.50 premium as discussed in the substantiation. Although EEI supports the safe installation of premises wiring in the Code and the concept proposed in the original proposal and this comment, EEI cannot accept this change without having the specific facts to broadly apply this requirement throughout the entire dwelling's premises wiring.

Comment on Affirmative:

PIERCE, J.: I continue to recommend an affirmative vote on this proposal to add tamper resistant receptacles to this Article. Some have said the increased cost and intrusion into our homes is not worth it. I disagree. This is an improved design with obvious benefits. These points against the proposal are always used and we as Committee members should rise above those tired reasons to vote reject.

18-48 Log #1870 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 18-40
Recommendation: This proposal should be rejected.
Substantiation: Child resistant caps are readily available for those people who want them. The fact that some end-users have children that stick things in outlets should not influence the end users who do not.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-49 Log #1934 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 18-40
Recommendation: Reject the proposal.
Substantiation: There are a host of practical problems in this proposal, as well, as major issues of significant principle regarding the function of the NEC. The practical issues concern whether the new receptacle designs will be adult proof, and on what range of receptacles the features will be available. For example, my house is wired throughout with 5362 series industrial grade 20-amp duplex receptacles that cost on the order of $15 each. Would it be possible to achieve that level of quality in the future if this proposal goes forward? I rather doubt it, because the receptacle manufacturers will probably make the business decision that they will only make child-resistant receptacles in the residential and commercial grades of receptacle. Unless CMP 18 imposes the rule as a construction specification for all such receptacles, I would look forward to a decreased quality expectation regarding receptacle performance.

The more serious issue, however, concerns the extent to which The National Electrical Code is expected to act in loco parentis. I have raised four children, and part of the process of having a toddler is kid-proofing the house. Receptacle inserts go in all the unused receptacle slots, latch retainers go into the under-sink cabinets, etc. Then, when they get a little older, the inserts come out. Is it really necessary to impose a rule with practical problems that only has significant value during a very small fraction of the life cycle of a house or apartment? My house was built in 1868, and as near as I can figure from deed and probate records, toddlers only were in residence for about 10 percent of that history.

The debate over receptacle placements on kitchen island may be relevant here. CMP 2 was going to require, in effect, tombstone receptacle outlets on flat islands because a receptacle on the side of the island would be an attraction for a toddler, who might pull a hot appliance off the counter and get scalded. In the end, I was successful in convincing CMP 2 that the parent was the appropriate arbiter of when it was appropriate to use a receptacle on the side of an island, and not the code making panel. The same is true with toddler access to receptacles.

This proposal is one of several from NEMA this cycle that increase the value added to electrical products in mature markets, and as such are grounds for skepticism. This proposal does not comply with 90.1(B).
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-50 Log #1975 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 18-40
Recommendation: This Proposal should be Rejected.
Substantiation: There is no legitimate reason that every receptacle should be suitable for use around small children. Many are not installed where they would be accessible to small children - kitchen countertops, behind refrigerators and other dedicated spaces for appliances. Many products are available that preclude insertion, and people can easily obtain these items if they need them. This proposal is dramatic over-reaching in solving a problem that does not exist in the majority of dwelling units. Furthermore, the panel statement and comments on affirmative indicate that additional information should have been provided or obtained before a decision was made. This submitter agrees with the comment on negative by Mr. Wall.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-51 Log #2098 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: James H. Maxfield, Dover, NH
Comment on Proposal No: 18-40
Recommendation: Delete the following text:
~~406.11 Tamper Resistant Receptacles in Dwelling Units. In all areas specified in 210.52, all 125-volt, 15- and 20-ampere receptacles shall be listed tamper resistant receptacles.~~
Substantiation: The proposal appears to be unconvincingly substantiated. (unreadable) the acceptance of this proposal appears to provide a safer installation. It is a design specification rather than a minimum standard, for example, GFCI protection on luminaires and exhaust fans for tub/showers could be safer. However, proposals have been rejected for several code cycles. Secondly, the proposal only references 125-volt, 15- and 20-ampere receptacles. Alternately the proposed text would apply to receptacles which are not readily accessible. The proposal should be rejected as this previously accepted by Panel 18 during the proposal process. Lastly, I do not believe the industry manufacturers tamper resistant multi outlet assemblies.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-52 Log #2121 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Jason Evans, Moriaety Electric Co.
Comment on Proposal No: 18-40
Recommendation: Delete the following text:
~~406.11 Tamper Resistant Receptacles in a Dwelling Unit. In all areas specified in 210.52, all 125-volt, 15- and 20-ampere receptacles shall be listed tamper resistant receptacles.~~

Substantiation: Why tamper resistant receptacles should not be code for dwelling units. I agree with the increase. Insertion of force not only for the aging population, but for anybody. Also, the increased risk of using finger or other object to push aside the tamper resistant switchand should apply to daycare, hospitals waiting areas.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-53 Log #2137 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Robert Garza, Joe Swartz Electric Company
Comment on Proposal No: 18-40
Recommendation: This Proposal should be Rejected.
Substantiation: The report submitted to Code Panel 18 was dated 2002 and based on data collected years before. Since that time, arc fault protection requirements have been implemented in dwelling unit bedrooms. We have been told that arc fault protection is the answer to most injuries and fires in dwelling units. If the insertion of a conductive item in a receptacle causes a burn, then surely an arc will be present. The signature of this arc would be very different from that of an actual load and the arc fault protective device would operate and the circuit would be turned off. Why require another form of protection?
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-54 Log #2138 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Scott Badger, Lebanon, ME
Comment on Proposal No: 18-40
Recommendation: Delete the following text:
~~406.11 Tamper Resistant Receptacles in Dwelling Units. In all areas specified in 210.52, all 125-volt, 15- and 20-ampere receptacles shall be listed tamper-resistant receptacles.~~
Substantiation: My concern is the elderly or physical impediments. This should be up to the home owner if they need tamper resistant. This code should be for child care facilities, not dwellings.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-55 Log #2143 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Gordon A. Stewart, Joe Swartz Electric Company, Inc. Ltd.
Comment on Proposal No: 18-40
Recommendation: This Proposal should be Rejected.
Substantiation: Panel 18 needs to consider more than one report of injuries. The report submitted to the Panel is a probability sample not an actual report of injuries. The report states there were 129 reported incidents and somehow that translates to 3,277 incidents for 2002. Panel 18 should request information on what methodology was used to arrive at that figure. Also, of the 129 reported incidents what was the extent of the injuries? This report needs to be scrutinized because it seems to be written as a scare tactic.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-56 Log #2252 NEC-P18 **Final Action: Reject**
(406.11)

Submitter: Stephen Barrett, Bear Electric
(Log #2472) Kenny Adair, Portsmouth, NH
(Log #2464) Cragi Allard, Manchester, NH
(Log #2474) Dan Barfield, Portsmouth, NH
(Log #2436) Anne Barrett, South Berwick, ME
(Log #2253) Anne Barrett, South Berwick, ME
(Log #2455) Leo Boivin, South Berwick, ME
(Log #2470) Randall Burnham, Portsmouth, NH
(Log #2465) Chris Burns, Manchester, NH
(Log #2445) Rich Casey, South Berwick, ME
(Log #2499) Chester Cilley, Pelham, NH
(Log #2478) Dana W. Clarke, Loudon, NH
(Log #2460) Tracey Collins, Manchester, NH
(Log #2500) Matt Connors, Pelham, NH
(Log #2484) Frank Cookinham, Loudon, NH
(Log #2462) Louis Crescentini, Manchester, NH
(Log #2467) Alfred Demers, Manchester, NH
(Log #2451) Dale Fife, South Berwick, ME
(Log #2454) Samantha Fife, South Berwick, ME
(Log #2495) Bill Fraser, Pelham, NH
(Log #2448) Penny Gagney, South Berwick, ME
(Log #2444) Albea Gagnon, South Berwick, ME
(Log #2496) Mark Gemas, Pelham, NH
(Log #2447) Susan W. Gilley-Casey, South Berwick, ME
(Log #2469) Matt Greenwood, Portsmouth, NH
(Log #2473) Terry Harvey, Portsmouth, NH
(Log #2491) Nicholas Hayward, Pelham, NH
(Log #2459) Michael Healy, Manchester, NH
(Log #2450) Tracey Hovan, South Berwick, ME
(Log #2476) Martin Jennison, Portsmouth, NH
(Log #2446) Jeff Jones, South Berwick, ME
(Log #2489) Syvain Lacasse, Pelham, NH
(Log #2487) Daniel Laliberte, Pelham, NH
(Log #2471) Gregg Lamantagne, Portsmouth, NH
(Log #2502) Richard Lannan, Pelham, NH
(Log #2497) Kevin Lefebvre, Pelham, NH
(Log #2456) R. A. Longtin, South Berwick, ME
(Log #2480) Harold MacLauchlan, Loudon, NH
(Log #2477) Renato Maldini, Portsmouth, NH
(Log #2463) Steve McClintock, Jr., Manchester, NH
(Log #2453) David Melvin, South Berwick, ME
(Log #2494) Don Mendzela, Pelham, NH
(Log #2449) Carol Mick, South Berwick, ME
(Log #2488) Daniel Moriarty, Pelham, NH
(Log #2482) Heath Mulney, Loudon, NH
(Log #2439) Jane Parent, South Berwick, ME
(Log #2438) Robert Parent, South Berwick, ME
(Log #2481) Gary Potvin, Loudon, NH
(Log #2468) Michael Putune, Manchester, NH
(Log #2490) Tamara Quint, Pelham, NH
(Log #2479) Janet Rachdorf, Loudon, NH
(Log #2483) Kevin Rae, Loudon, NH
(Log #2492) Alice Rancourt, Pelham, NH
(Log #2501) Joanna Rancourt, Pelham, NH
(Log #2493) Robert Rancourt, Pelham, NH
(Log #2485) Steven Rancourt, Pelham, NH
(Log #2437) Sandy Rice, South Berwick, ME
(Log #2475) Mike Ronder, Portsmouth, NH
(Log #2461) Bob Saunders, Manchester, NH
(Log #2443) Alan Smith, South Berwick, ME
(Log #2498) Henry Szumiesz, Pelham, NH
(Log #2441) Michael Taylor, South Berwick, ME
(Log #2458) Michael Thibeau, South Berwick, ME
(Log #2457) Peter Thibeau, South Berwick, ME
(Log #2440) Bill Tobey, South Berwick, ME
(Log #2442) Stephanie Tobey, South Berwick, ME
(Log #2466) Timothy Vallee, Manchester, NH
(Log #2452) Sue Woodman, South Berwick, ME
(Log #2486) Bruce Zheaunne, Pelham, NH

Comment on Proposal No: 18-40
Recommendation: Proposal 18-40 (Log #1944) should be rejected.
Substantiation: 1. There are major concerns about the insertion force required that would affect the elderly and the physically impaired as well as many people with physical ailments that would limit the strength in their hands.
2. According to the submitter, there would only be an additional cost of.50 per receptacle. According to suppliers in the area, the cost could range from $5.00 to $13.00. This would place an undue burden on anyone purchasing a new home who can easily and very inexpensively install safety caps.
3. There is not enough data to support any possible issues that a standard receptacle creates an additional hazard as opposed to a tamper resistant one.
4. This will create possible conflict with concerns to AFCI and GFCI outlets in the future. Not all conditions allow for circuit breakers to be installed, and if so, again at additional cost to the homeowner.
5. The submitter's data is based on sample counts and historical estimates and clearly states: "The results of these incidents are rarely fatal." This proposal should require additional research with proven facts and product development that would allow for this to become a possible option to homeowners in the future.
Panel Meeting Action: Reject
Panel Statement: The Panel has reviewed all comments and concludes that requiring tamper-resistant receptacles will effectively reduce child burns and electrocution. Specific responses to comments are as follows.
(1) Test data presented to the panel indicates insertion and withdrawal forces will not be a problem for the aged or physically challenged. Insertion forces necessary to open the shutter at 20-25% those necessary to insert a plug into a receptacle and once the shutters are cleared no additional force is required to engage the plug into the receptacle contacts.
(2) The safety justification is compelling. CPSC and CHIRPP use highly sophisticated statistical models that allow accurate estimates of the total universe. The fact that CPSC data was remarkable similar to a totally different study in Canada corroborates both sets of data.
(3) The plastic safety caps mentioned in some substantiations have been available during the entire time of the hospital emergency room data collection in both the US and Canada and did not mitigate thousands of burn incidents each year.
(4) The UL/ANSI standard has requirements and tests that attempt to defeat the shutters. UL fully tests with a probe to try to manipulate opening. Similar products have been in use for over 20 years in pediatric areas with no evidence of them being defeated. Shutters are commonly used in European electrical receptacle devices.
(5) The NEMA cost estimate was based on the cost adder for residential type tamper resistant receptacles produced in the volumes this requirement would result in. Cost estimates based on hospital
or specification grade products are based on today's market size and do not provide a valid comparison.
(6) The panel considered limiting the requirements. The hazard exists on vanity and kitchen countertops on which children are placed and which have easily accessed receptacles. Given the very few receptacles that would, under all circumstances, not be accessible and the modest cost of the receptacles, it was decided that a clear, unambiguous requirement would be easier to follow and enforce.
(7) Neither AFCI nor GFCI eliminate the faults that result in the child burns. Neither product is intended to protect against the type of burn incidents on which this requirement is based.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-57 Log #2354 NEC-P18 **Final Action: Accept**
(406.11)

Submitter: Ken Brewer, Tampa Area JATC / Rep. IBEW 915
Comment on Proposal No: 18-40
Recommendation: Continue to Accept this Proposal.
Substantiation: The minimal cost increase associated with the proposed requirement is far outweighed by the benefit of protecting small children. With their inquisitive nature, small children learn through exploration and don't have the ability to recognize the inherent danger of a receptacle that is conveniently at their level as they crawl about. The proposed requirement would lessen the chances that a child would come into contact with an electrical source.
The requirement should not be optional for each individual dwelling owner, and would only lead to confusion and inconsistency. Dwellings are typically occupied by a succession of owner-occupants over time, and allowing the initial owner to decide against the protections offered by the requirement leaves the possibility open that small children inhabiting the dwelling at some point in time will be exposed to danger. Just as required seat belts in motor vehicles have saved many lives, the requirement of tamper resistant receptacles will help to ensure the safety of our children. Accordingly, the proposed requirement should apply not only to new home construction, but to new work in existing homes as well.
Panel Meeting Action: Accept
Panel Statement: See the panel action and statement on their accept action in Comment 18-47.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:
BER, M.: See my explanation of negative vote on Comment 18-27.
BOYNTON, C.: See my explanation of negative vote on Comment 18-27.
TODD, S.: This comment should have been accepted. See my explanation of negative vote on Comment 18-47.

18-58 Log #2115 NEC-P18 **Final Action: Reject**
(406.11 Exception (New))

Submitter: Matthew Hoffman, Dover, NH
Comment on Proposal No: 18-40
Recommendation: Add an Exception to read as follows:
This article will not apply to elderly housing, hospitals or other types of core facilities.
Substantiation: By adding this exception it will help prevent situations where elderly or disabled persons may have trouble using tamper resistant receptacles, due to the excessive force needed to insert a plug into this type of receptacle.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-56.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
BOYNTON, C.: I am voting with the panel to reject this exception for the simple reason that I am rejecting 406.11 being in the code in the first place. See my explanation of negative vote on Comments 18-27 through 18-57.

ARTICLE 408 — SWITCHBOARDS AND PANELBOARDS

9-56 Log #61 NEC-P09 **Final Action: Accept**
(408.4)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 9-101
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal with respect to the Panel Action on Proposal 9-105. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The final text incorporates the actions on both Proposals 9-101 and 9-105. The resulting text is as follows:
Every circuit and circuit modification shall be legibly identified as to its clear, evident, and specific purpose or use. The identification shall include sufficient detail to allow each circuit to be distinguished from all others. Spare positions that contain unused overcurrent devices or switches shall be described accordingly. The identification shall be included in a circuit directory that is located on the face or inside of the panel door in the case of a panelboard, and located at each switch on a switchboard. No circuit shall be described in a manner that depends on transient conditions of occupancy.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-57 Log #62 NEC-P09 **Final Action: Accept**
(408.4)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 9-105
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal with respect to the Panel Action on Proposal 9-101. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See the action on Comment 9-56 for the resulting text.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-58 Log #643 NEC-P09 **Final Action: Reject**
(408.4)

Submitter: Mark Shapiro, Farmington Hills, MI
Comment on Proposal No: 9-105
Recommendation: Reject the proposed new last sentence:
~~No circuit shall be described in a manner that depends on transient conditions of occupancy.~~
Substantiation: Is this new requirement really necessary? Labeling a circuit, "copying machine" or "so-and-so's bedroom" does have the disadvantage of describing a potential transient condition in the life of a building. But, it has the important advantage of communicating.
I am afraid that under the guise of making things clearer, we will wind up marking them murkier. (Otherwise known as, The Law of Unintended Consequences.)
Panel Meeting Action: Reject
Panel Statement: The intent of the panel is to be clear and use a method that will be valid over an extended period of time.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-59 Log #1048 NEC-P09 **Final Action: Accept in Principle**
(408.4)

Submitter: Robin Johnson, Buchanan, VA
Comment on Proposal No: 9-101
Recommendation: Revise text to read as follows:
Every circuit and circuit modification shall be legibly identified as to its clear, evident, and specific purpose or use. The identification shall include sufficient detail to allow each circuit to be distinguished from all others. Spare positions that contain unused overcurrent devices or switches shall be described accordingly. The identification shall be included in a circuit directory that is located on the face or inside of the panel door in the case of a panelboard, and located at each switch on a switchboard.
Substantiation: This proposal should be accepted as written marking on switchboards panelboards is a major concern for building owners and operators the term "and located at each switch on a switchboard" is a good practice when the panel directories have been lost or not updated.
Panel Meeting Action: Accept in Principle
Panel Statement: The comment text appears to be a verbatim transcription of the final panel action on Proposal 9-101, but does not include the action on Proposal 9-105. Refer to the action on Comment 9-56 for the complete text.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-60 Log #722 NEC-P09 **Final Action: Accept**
(408.6)

TCC Action: The Technical Correlating Committee does not agree with the request of the submitter, as accepted by the panel, to globally prohibit these types of Fine Print Notes and that each panel should continue to act on the merits of such proposals, if any, within its purview.
Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 9-106
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 9 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM,I CEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-61 Log #861 NEC-P09 **Final Action: Accept**
(408.6)

TCC Action: The Technical Correlating Committee does not agree with the recommendation of the submitter to move all such Fine Print notes into an Annex as recommended in the substantiation. Each panel should continue to act on the merits of such proposals.
Location of all references in an Annex does not enhance usability.
Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 9-106
Recommendation: The panel is encouraged to continue to Reject Proposal 9-106.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

(Note: The sequence no. 9-62 was not used.)

9-63 Log #265 NEC-P09 **Final Action: Accept**
(408.24)

Submitter: Stanley J. Folz, Morse Electric, Inc.
Comment on Proposal No: 9-109
Recommendation: Text to remain as presented in the ROP.
Substantiation: I agree with the action of the CMP. This proposal is an excellent answer to a problem that has plagued installations for years.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-64 Log #1883 NEC-P09 **Final Action: Accept in Principle**
(408.30)

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 9-114
Recommendation: Continue to accept the proposal with the following change:
Replace the word "and" with the word "or", as indicated in proposal number 4-47.
Substantiation: Refer to panel 4's remarks on proposal 4-47, which are accurate.
Panel Meeting Action: Accept in Principle
In addition to the change submitted in the comment, add the words "as applicable" after "Article 220."
Panel Statement: Not all of the itemized parts of Article 220 will apply in any given case.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-65 Log #1506 NEC-P09 **Final Action: Accept in Principle (408.34)**

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc.
Comment on Proposal No: 9-116
Recommendation: If action to delete 408.34 is not accepted, then use the term "neutral conductor" as originally proposed.
Substantiation: This comment was developed by the Technical Correlating Committee (TCC) Task Group (TG) on the definition of "Neutral Conductor." Task Group members were: Jeffrey Boksiner (Chair) (CMP 5, TCC), Paul Dobrowsky (CMP 5), Walter Skuggevig (CMP 5), Doug White (CMP 5), Michael Toman (CMP 2, TCC), Bob Wilkinson (CMP2), Jim Daly (CMP 6, CMP 7, TCC), Bill Laidler (CMP 6), and Oran Post (CMP 6). The TCC directed that the action on this proposal be sent to the TG for review and comment.

The TG takes no position on proposal 9-117, however, the TG concludes that if proposal 9-117 is not accepted then the words "neutral conductor" are preferable to "neutral busbar or equivalent connection provisions." This provides consistency with other articles. Also, the connection is essentially made to the neutral conductor even though it may through a terminal, busbar or other arrangement.
Panel Meeting Action: Accept in Principle

Take no action under this comment.
Panel Statement: The underlying text to which this comment refers is being deleted. Refer to the panel action and statement on Comment 9-70.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-66 Log #970 NEC-P09 **Final Action: Accept in Principle (408.36)**

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 9-117
Recommendation: Correct the second sentence in Exception No. 1 by inserting a hyphen in "multipole" and replace the word "disconnectable" with "capable of being disconnected by a..." to read as follows:
408.36 Overcurrent Protection.
In addition to the requirements of 408.30, a panelboard shall be protected by an overcurrent protective device having a rating not greater than that of the panelboard. This overcurrent protective device shall be located within or at any point on the supply side of the panelboard.
Exception No. 1: Individual protection shall not be required for a panelboard used as service equipment and containing not more than six overcurrent devices. For the purposes of this exception, the term "overcurrent device" means a single or a multi-pole circuit breaker, or a single fuse or set of fuses, operable or ~~disconnectable~~ capable of being disconnected by a by a single motion of the hand and that supplies a single load.

Exception No. 2: Individual protection shall not be required for a panelboard individually protected on its supply side by not more than two main circuit breakers or two sets of fuses having a combined rating not greater than that of the panelboard. A panelboard wired under this exception shall not contain more than 42 overcurrent devices. For the purposes of this exception, a 2-pole or a 3- pole circuit breaker shall be considered as two or three overcurrent devices, respectively.

Exception No. 3: For existing panelboards, individual protection shall not be required for a panelboard used as service equipment for an individual residential occupancy.
Substantiation: A hyphen has been added to "multipole" and "disconnectable" has been replaced with "capable of being disconnected by a" since multipole and disconnectable are not actually words.
Panel Meeting Action: Accept in Principle

Take no action under this comment.
Panel Statement: The underlying text to which this comment refers is being deleted. Refer to the panel action and statement on Comment 9-70.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-67 Log #1428 NEC-P09 **Final Action: Accept in Principle (408.36)**

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 9-117
Recommendation: Proposal 9-117 should continue to be Accept in Principle, but the Exceptions need revisions. 408.36 should be revised as follows:

408.36 Overcurrent Protection. In addition to the requirements of 408.30, a panelboard shall be protected by an overcurrent protective device having a rating not greater than that of the panelboard. This overcurrent protective device shall be located within or at any point on the supply side of the panelboard.

Exception No. 1: Individual protection shall not be required for a panelboard used as service equipment ~~and containing not more than six overcurrent devices. For the purposes of this exception, the term "overcurrent device" means a single or a multipole circuit breaker, or a single fuse or set of fuses, operable or disconnectable by a single motion of the hand and that supplies a single load.~~ with multiple disconnecting means in accordance with 230.71. Each single-pole circuit breaker or single-pole fused switch within the disconnecting means shall be rated greater than 30 amperes. In panelboards protected by three or more main circuit breakers or sets of fuses, the circuit breakers or sets of fuses shall not feed a second bus structure within the same panelboard assembly.

Exception No. 2: Individual protection shall not be required for a panelboard ~~individually~~ protected on its supply side by ~~not more than~~ two main circuit breakers or two sets of fuses having a combined rating not greater than that of the panelboard. A panelboard constructed or wired under this exception shall not contain more than 42 overcurrent devices. For the purposes of ~~this exception~~ determining the maximum of 42 overcurrent devices, a 2-pole or a 3-pole circuit breaker shall be considered as two or three overcurrent devices, respectively.

~~Exception No. 3: For existing panelboards, individual protection shall not be required for a panelboard used as service equipment for an individual residential occupancy.~~
Substantiation: The text of the main rule is acceptable as worded in the Panel Action.

Exception No. 1. The first sentence of the proposed exception should return to wording similar to the original Exception to 408.36(B), in order to regain proper tie to the requirements of 230.71. This gives the proper rules for the disconnects and removes the need to attempt clarification of overcurrent protection requirements. (These are Service Equipment panelboards, in which the overcurrent protection is achieved through rules for loading.)

Eliminating the lighting and appliance panelboard rules has inadvertently resulted in permitting service disconnects to be rated 30 ampere or less in a multiple-disconnect service panelboard. Exception No. 1 as written in the ROP would permit, for example, a service of (6) – 20A single pole circuits (disconnects) without a main. The rules in 408.34 presently prohibit that, and there has been no substantiation presented to convey the impact of permitting multiple single pole devices serving loads. Therefore, the second sentence of this comment suggests that a device must be rated greater than 30A in this application – to more closely align it with the present rules and reduce the impact from this change.

The requirement at the end of Exception No. 1 that requires each overcurrent device to serve a "single load" is unclear, at best. This would seem to prohibit the overcurrent devices being used in a six-disconnect application to feed other panelboards. We believe the intent was to disallow feeding other bus splits within the panelboard. The proposed new third sentence addresses that more clearly.

Exception No. 2. Deleting the words "individually" and "not more than" makes the wording of this exception better fit with the rest of the revised section. Adding the words "constructed or" acknowledges the fact that panelboards normally will be built in this manner – not wired into the configuration. Changes to the last sentence are to make the "definition" for overcurrent devices apply only to the maximum count. As written, the definition would also apply to mains, in the first sentence, resulting in a single 2-pole main being the most that is permitted.

Exception No. 3. This exception is no longer necessary. It was added to the NEC a number of years ago to help clarify changes to the rules that previously permitted split-bus service panelboards having more than two mains. It has outlived its purpose.
Panel Meeting Action: Accept in Principle

Refer to the panel action and statement on Comment 9-70.
Panel Statement: The actions and panel statement on Comment 9-70 address the concerns raised in this comment.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-68 Log #1622 NEC-P09 **Final Action: Accept in Principle in Part (408.36)**

Submitter: Phil Simmons, Olympia, WA
Comment on Proposal No: 9-120
Recommendation: It appears the second page of the proposal was sent to the Panel since the proposal as printed in the ROP is not complete. A complete Proposal with substantiation was not submitted. I apologize to the Panel that it did not have this material available for consideration, and thus, made the statement regarding Substantiation, "None provided."

I have provided a copy of the complete Proposal.

Change 408.36 in the 2008 NEC ROP Draft to read as follows:

408.36 Overcurrent Protection. In addition to the requirements of 408.30, a panelboard shall be protected by an overcurrent protective device having

a rating not greater than that of the panelboard. This overcurrent protective device shall be located within or at any point on the supply side of the panelboard.

Exception No. 1: Individual protection shall not be required for a panelboard used as service equipment and containing not more than six overcurrent devices. For the purposes of this exception, the term "overcurrent device" means a single or a multipole circuit breaker, or a single fuse or set of fuses in a switch, that can be opened ~~operable or disconnectable~~ by a single operation ~~motion of the hand and that supplies a single load~~.

Exception No. 2: Individual protection shall not be required for a panelboard individually protected on its supply side by not more than two main circuit breakers or two sets of fuses having a combined rating not greater than that of the panelboard. A panelboard wired under this exception shall not contain more than 42 overcurrent devices. For the purposes of this exception, a 2-pole or a 3-pole circuit breaker shall be considered as two or three overcurrent devices, respectively.

Exception No. 3: For existing panelboards, individual protection shall not be required for a panelboard used as service equipment for an individual residential occupancy.

(A) Snap Switches Rated at 30 Amperes or Less. (No change.)

(B) Supplied Through a Transformer. (Retain existing text in main rule.)

Exception No. 1: A panelboard supplied by the secondary side of a transformer shall be considered as protected by the overcurrent protection provided on the primary side of the transformer where that protection is in accordance with 240.21(C)(1.

Exception No. 2: A panelboard containing not more than six overcurrent devices that is supplied by conductors complying with 240.21(C)(2) shall not be required to have individual overcurrent protection on the supply side.

Exception No. 3: A panelboard containing not more than six overcurrent devices installed to comply with Note 2 to Table 450.3(A) or Note 2 to Table 450.3(B) shall not be required to have individual overcurrent protection on the supply side.

For the purposes of 408.36(B) Exception No. 2 and 3, the term "overcurrent device" means a single or a multipole circuit breaker, or a single fuse or set of fuses in a switch, that can be opened by a single operation.

(C) Delta Breakers. (No change.)

(D) Back-Fed Devices. (No change.)

Substantiation: This Comment is intended to correlate the requirements of permissions of other sections on panelboards that are supplied by certain tap rules or through transformers as presently provided in the Code.

Substantiation for proposed Exception No. 2: The rule for 10-ft secondary conductors in 240.21(C)(2) permits the conductors to terminate in a "device" so long as the conductors have an ampacity not less than the rating of the "device." In this case, the conductors on the secondary of the transformer are not required to terminate directly in an overcurrent device. Since CMP-9 has primary jurisdiction for overcurrent protection rules for the panelboard, adding the exception to recognize the provisions in 240.21(C)(2) will make the Code more "user-friendly". Also, overcurrent protection for the panelboard is assured by the requirement in 408.30 that the panelboard be suitable for the calculated load.

Substantiation for proposed Exception No. 3: Note 2 to Tables 450.3(A) and 450.3(B) recognize up to six disconnecting means to be suitable for the overcurrent protection for transformers. Since the rule in 408.36 deals with overcurrent protection of panelboards, the rules need to be correlated. If it is acceptable to have up to six disconnects in one panelboard serve as the overcurrent protection for a service, why not for the secondary of transformers? Also, overcurrent protection for the panelboard is assured by the requirement in 408.30 that the panelboard be suitable for the calculated load. CMP-9 has long equated being suitable for the calculated load as overcurrent protection for power panelboards.

These proposed exceptions do not introduce a new concept as the provisions for overcurrent protection of secondary conductors in 240.21(C)(2) and the Notes to Tables 450.3 have been in the Code for some time. Correlating language needs to be here in 408.36 to help the Code be "user friendly."

Changes are proposed to improve the existing sentence in Exception No. 1 to 408.36 both technically and grammatically. A single fuse or set of fuses need to be in a switch to be openable. The phrase "motion of the hand" begs improvement as one then asks, "What kind of a motion of the hand?" Finally, these overcurrent devices may supply a single load or many loads such as a multioutlet lighting or receptacle branch circuit or a feeder to a panelboard that has several branch circuit overcurrent devices.

Since the language relating to six operations for disconnecting means relates to more than just service equipment, it needs to be located where it clearly relates to the entire section.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle in Part

Accept the principle of the suggested changes in Exception No. 1 regarding disconnection through the reference to 230.71. Reject the proposed additional exceptions covering panelboards supplied from transformers.

Panel Statement: The intent of the revisions in 408.36 have been accomplished through the action on Comment 9-70, because the text now points to 230.71 instead of imperfectly restating those rules in this location.

The changes with respect to correlating the 240.21(C) rules with this section have not been previously considered because the second page of the proposal as submitted did not come to the panel and did not have public review. However, CMP 9 notes that wiring what used to be a power panelboard without individual protection to a transformer secondary would not be permitted under the revisions being made in this cycle, because all such panels will be required to have individual protection for the first time. The only permitted arrangement for making such will be when the same effect is achieved through the winding arrangements in the transformer, as covered in what will be 408.36(B).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-69 Log #1835 NEC-P09 **Final Action: Reject**
(408.36)

Submitter: Michael Walls, American Chemistry Council

Comment on Proposal No: 9-117

Recommendation: In the new Exception 2, add the words "(Split Bus type panelboard)" after the word "fuses".

Substantiation: Clarifies that Exception 2 is referring to a split bus type panelboard. This term is used in the panel statement._____

Panel Meeting Action: Reject

Panel Statement: This description is not required within the NEC text. The panel statement was necessarily descriptive, since it was making a thorough explanation of what was being done.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-70 Log #2268 NEC-P09 **Final Action: Accept in Principle**
(408.36)

Submitter: James Wiseman, Schneider Electric / Square D

Comment on Proposal No: 9-117

Recommendation: Proposal 9-117 should continue to be Accepted in Principle, but the Exceptions need revisions. 408.36 should be revised as follows:

408.36 Overcurrent Protection. In addition to the requirements of 408.30, a panelboard shall be protected by an overcurrent protective device having a rating not greater than that of the panelboard. This overcurrent protective device shall be located within or at any point on the supply side of the panelboard.

Exception No. 1: Individual protection shall not be required for a panelboard used as service equipment with multiple disconnecting means in accordance with 230.71. ~~and containing not more than six overcurrent devices. For the purposes of this exception, the term "overcurrent device" means a single or a multipole circuit breaker, or a single fuse or set of fuses, operable or disconnectable by a single motion of the hand and that supplies a single load.~~ Each circuit breaker or fused switch that is a part of the disconnecting means, and which protects a circuit having a grounded conductor, shall be rated greater than 30 amperes. In panelboards protected by three or more main circuit breakers or sets of fuses, the circuit breakers or sets of fuses shall not feed a second bus structure within the same panelboard assembly.

Exception No. 2: Individual protection shall not be required for a panelboard ~~individually~~ protected on its supply side by ~~not more than~~ two main circuit breakers or two sets of fuses having a combined rating not greater than that of the panelboard. A panelboard constructed or wired under this exception shall not contain more than 42 overcurrent devices. For the purposes of ~~this exception~~ determining the maximum of 42 overcurrent devices, a 2-pole or a 3- pole circuit breaker shall be considered as two or three overcurrent devices, respectively.

~~Exception No. 3: For existing panelboards, individual protection shall not be required for a panelboard used as service equipment for an individual residential occupancy.~~

Substantiation: The text of the main rule is acceptable as worded in the Panel Action.

Exception No. 1 - The first sentence of the proposed exception should return to wording similar to the original Exception to 408.36(B), in order to regain proper tie to the requirements of 230.71. This gives the proper rules for the disconnects and removes the need to attempt clarification of overcurrent protection requirements. (These are Service Equipment panelboards, in which the overcurrent protection is achieved through rules for loading,)

Eliminating the lighting and appliance panelboard rules has inadvertently resulted in permitting service disconnects to be rated 30 ampere or less in a multiple-disconnect service panelboard. Exception 1 as written in the ROP would permit, for example, a service of (6) – 20A single pole circuit breakers

(disconnects) without a main. The rules in 408.34 presently prohibit that, and there has been no substantiation presented to convey the impact of permitting multiple 30A or less devices serving loads. Therefore, the second sentence of this comment suggests that a device must be rated greater than 30A in this application – to more closely align it with the present rules and reduce the impact from this change.

The requirement at the end of Exception 1 that requires each overcurrent device to serve a "single load" is unclear, at best. This would seem to prohibit the overcurrent devices being used in a six-disconnect application to feed other panelboards. We believe the intent was to disallow feeding other bus splits within the panelboard. The proposed new third sentence addresses that more clearly.

Exception No. 2 - Deleting the words "individually" and "not more than" makes the wording of this exception better fit with the rest of the revised Section. Adding the words "constructed or" acknowledges the fact that panelboards normally will be built in this manner – not wired into the configuration. Changes to the last sentence are to make the "definition" for overcurrent devices apply only to the maximum count. As written, the definition would also apply to mains, in the first sentence, resulting in a single 2-pole main being the most that is permitted.

Exception No. 3 - This exception is no longer necessary. It was added to the NEC a number of years ago, to help clarify changes to the rules that previously permitted split-bus service panelboards having more than two mains. It has outlived its purpose.

Panel Meeting Action: Accept in Principle

Delete the second sentence of exception 1 in Comment 9-70. Exception 3 is to be retained. The final language is to read as follows:

408.36 Overcurrent Protection. In addition to the requirements of 408.30, a panelboard shall be protected by an overcurrent protective device having a rating not greater than that of the panelboard. This overcurrent protective device shall be located within or at any point on the supply side of the panelboard.

Exception No. 1: Individual protection shall not be required for a panelboard used as service equipment with multiple disconnecting means in accordance with 230.71. In panelboards protected by three or more main circuit breakers or sets of fuses, the circuit breakers or sets of fuses shall not supply a second bus structure within the same panelboard assembly.

Exception No. 2: Individual protection shall not be required for a panelboard protected on its supply side by two main circuit breakers or two sets of fuses having a combined rating not greater than that of the panelboard. A panelboard constructed or wired under this exception shall not contain more than 42 overcurrent devices. For the purposes of determining the maximum of 42 overcurrent devices, a 2-pole or a 3- pole circuit breaker shall be considered as two or three overcurrent devices, respectively.

Exception No. 3. For existing panelboards, individual protection shall not be required for a panelboard used as service equipment for an individual residential occupancy.

Panel Statement: The changes retain concepts from the 2005 NEC that were not addressed in either the original proposal or the panel action at the ROP meeting. The comment introduced new material because there was also no indication of intent to remove Exception No. 3 that could have been considered for public comment.

CMP 9 has broadened the present 408.36(B) Exception (Exception No. 1 in the new language) to apply to all panels in these limited service applications where greater inspectional supervision is normally expected. This action appropriately follows from the policy decision to remove the distinction between lighting and appliance branch circuit panelboards and power panelboards.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-71 Log #701 NEC-P09 **Final Action: Accept in Principle**
(408.36 Exception No. 1)

Submitter: Michael J. Johnston, Plano, TX

Comment on Proposal No: 9-117

Recommendation: Revise as follows:

Exception No. 1: Individual protection shall not be required for a panelboard used as service equipment that contains not more than six circuit breakers or six disconnects in accordance with 230.71.

Substantiation: The exception, as proposed introduces the concept of motions of the hand, which may lead to varying differences in application in the field. The exception should refer to the equipment and characteristics of the equipment or installation rather than how many moves of the hand it takes to operate a service disconnect or multiple service disconnects grouped together in the same enclosure.

Panel Meeting Action: Accept in Principle

Refer to the panel action and statement on Proposal 9-70, which address the submitter's concern.

Panel Statement: CMP 9 takes this opportunity to note that 230.71(B) specifically refers to motions of the hand.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-72 Log #971 NEC-P09 **Final Action: Accept in Principle**
(408.36(B))

Submitter: Mark C. Ode, Underwriters Laboratories Inc.

Comment on Proposal No: 9-121

Recommendation: Change the last sentence "…..and the neutral conductor~~,~~ ~~that~~ with the voltage being less that the nominal voltage between the ungrounded conductors."

408.36(B) Power Panelboard Protection. In addition to the requirements of 408.30, a power panelboard with supply conductors that include a neutral conductor, and having more than 10 percent of its overcurrent devices protecting branch circuits rated 30 amperes or less, shall be protected by an overcurrent protective device having a rating not greater than that of the panelboard. This overcurrent protective device shall be located within or at any point on the supply side of the panelboard. To qualify for this classification, the panelboard shall be supplied by no fewer than two ungrounded conductors that have an equal nominal voltage between them and the neutral conductor~~, that~~ with the voltage being less that the nominal voltage between the ungrounded conductors.

Substantiation: This change provides corrected text for the added final sentence.

Panel Meeting Action: Accept in Principle

Make no changes other than those incorporated in the panel action on Proposal 9-70.

Panel Statement: The comment addresses a provision that is being removed through the acceptance of Proposal 9-117 and Comment 9-70.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-73 Log #1507 NEC-P09 **Final Action: Accept in Principle**
(408.36(B))

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc.

Comment on Proposal No: 9-121

Recommendation: If action to delete text that uses the term "neutral" is not accepted then use the wording accepted by the Panel.

Substantiation: This comment was developed by the Technical Correlating Committee (TCC) Task Group (TG) on the definition of "Neutral Conductor." Task Group members were: Jeffrey Boksiner (Chair) (CMP 5, TCC), Paul Dobrowsky (CMP 5), Walter Skuggevig (CMP 5), Doug White (CMP 5), Michael Toman (CMP 2, TCC), Bob Wilkinson (CMP2), Jim Daly (CMP 6, CMP 7, TCC), Bill Laidler (CMP 6), and Oran Post (CMP 6). The TCC directed that the action on this proposal be sent to the TG for review and comment.

The TG takes no position on proposal 9-117, however TG concurs with the proposed wording if CMP 9 chooses to retain 408.36(B).

Panel Meeting Action: Accept in Principle

Make no changes other than those incorporated in the panel action on Proposal 9-70.

Panel Statement: The comment addresses a provision that is being removed through the acceptance of Proposal 9-117 and Comment 9-70.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

11-1 Log #2325 NEC-P11 **Final Action: Accept**
(409.104(B))

Submitter: David Fisher, Rockwell Automation

Comment on Proposal No: 11-8

Recommendation: Revise text to read as follows:

409.104 Wiring Space in Industrial Control Panels.

(B) Wire Bending Space. ~~Wire bending space for the main supply terminals shall be in accordance with the requirements in 312.6.~~ Wire bending space within industrial control panels for ~~other~~ field wiring terminals shall be in accordance with the requirements in 430.10(B). ~~The gutter space shall comply with 312.8.~~

Substantiation: The proposal should have been accepted in principle for the following reasons:

1. 312.6 offers two wire bending options with a number of exceptions. The options necessitate the knowledge of where the field connected conductors will enter the enclosure. This is seldom known at the time of the placement of the components in an industrial control panel unless it is field assembled at the installation site. A panel assembler remote from the installation could comply with the requirements of 312.6 by placing the components in a panel suitable for conductor entry at 90º to the component terminals, effectively allowing

only about one half the space required for a "straight in" entry that might be needed at the installation. Such a misapplication can't happen with the wire bending space according to Table 430.10(B) since its spacing requirements account for the worst case installation. Further, the panel statement indicating that 312.6 provides "increased wire bending space for supply terminals" seems to imply an advantage, but that would only be true if there was evidence that the spacings required in Table 430.10(B) did not provide adequate wire bending space for supply terminals. The spacings shown in Table 430.10(B) have been unchanged for years and have been applied for all types of field connected terminals and there was no proposal to change them during this code cycle.

2. The existing text in the second sentence "for other terminals" is ambiguous as to whether these "terminals" are for field connection or those that are interconnected with other components in the panel during its assembly and wiring. The changing to the revised text "for field wiring terminals" mitigates this problem.

3. The last sentence should have been eliminated from 409.104(B), as proposed, since the gutter requirements in 312.8 are essentially part of the 409.104(A) existing text.

Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-2 Log #2320 NEC-P11 **Final Action: Accept in Part**
(409.106)

Submitter: Jay Tamblingson, Rockwell Automation
Comment on Proposal No: 11-9
Recommendation: Revise text to read as follows:
409.106 Spacings. Spacings between live bare metal parts in feeder circuits shall not be less than specified in Table 430.97.

Exception: Spacings ~~The distance~~ shall be permitted to be less than those ~~that~~ specified in Table 430.97 at circuit breakers and switches and as otherwise permitted in listed ~~components installed in~~ industrial control panels.
Substantiation: The UL508A Industrial Control Panel standard provides requirements for minimum spacing of components in feeder circuits. The present wording of the exception in proposal 11-9 could potentially conflict with those requirements in that it could permit use of listed components in feeder circuits with smaller spacings than those required of UL508A, as well as prevent use of components in feeder circuits that would be otherwise be acceptable. The changes submitted would help ensure consistency of permitted spacings within field built and listed industrial control panels. In addition, the term "The distance" in the exception should be revised to "Spacings" to align with the requirement text.
Panel Meeting Action: Accept in Part

Change 409.106 to read as follows:

409.106 Spacings. Spacings between live bare metal parts in feeder circuits shall not be less than specified in Table 430.97.

Exception: Spacings shall be permitted to be less than those specified in Table 430.97 at circuit breakers and switches and in listed components installed in industrial control panels.
Panel Statement: The panel accepts the change in terminology from "distance" to "spacing" and from "that" to "those".

The panel rejects the second part of the submitter's exception. The panel's intent is to allow for "listed parts" installed in industrial control panels to be permitted a smaller spacing if that particular part was listed with a smaller spacing due to its particular construction. The spacing requirements in UL 508A are consistent with the spacing requirements in Table 430.97.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 410 — LUMINAIRES (LIGHTING FIXTURES), LAMPHOLDERS, AND LAMPS

18-59 Log #2106 NEC-P18 **Final Action: Accept in Principle**
(410)

Submitter: Michael S. O'Boyle, Lightolier Division of the Genlyte Group, LLC
Comment on Proposal No: 18-40a
Recommendation: Revise text to read as follows:

410.xx Listing Required. All luminaires and~~,~~ lampholders~~, and lighting assemblies~~ shall be listed.

Restore the word "listed" where now proposed for deletion in 410.27(B), 410.27(C), 410.30(C)(1), and 410.30(C)(1)(2)c.
Substantiation: The term "lighting assemblies" is not defined and there are no listed "lighting assemblies". Accordingly, having a general requirement for listing of lighting assemblies may result in a variety of interpretations. The descriptive uses of "listed lighting assemblies" in 410.27(B), 410.27(C), 410.30(C)(1), and 410.30(C)(1)(2)c. are in context and explanatory.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 18-65.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-60 Log #217 NEC-P18 **Final Action: Accept**
(410.2)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 18-48
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal and correlate with the action taken on Proposal 18-43. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Delete 410.2 in the 2005 NEC. This action also deletes 410.3 and its associated table as accepted in Proposal 18-43.
Panel Statement: The panel has reconsidered their action on Proposals 18-43, 18-48 and 18-49 and concludes that in this section it is not necessary to have any cross-references to other articles in the NEC.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-61 Log #218 NEC-P18 **Final Action: Accept**
(410.2)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 18-49
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal and correlate with the action taken on Proposal 18-43. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See the panel action and statement on Comment 18-60.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-62 Log #1943 NEC-P18 **Final Action: Reject**
(410.2)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 18-48
Recommendation: Reject the proposal, at least for the next cycle.
Substantiation: This provision has been in the NEC since the 1940s, and it would seem that more care should be taken before removing it. Early on, there was a rule about separating these lamps from combustible surfaces, and then the rules simply pointed to Article 710. CMP 18 should more carefully substantiate whether there are any practical instances of this equipment still in use. It is harmless in its present form, so there is no downside risk to retaining it for now.
Panel Meeting Action: Reject
Panel Statement: The commentor has not submitted any data to substantiate his belief that there may still be practical installations of this equipment in use. Without such data, holding this proposal until the next code cycle serves no purpose. As stated in the substantiation to Proposal 18-48, Article 490 makes no mention of arc lamps used on constant current systems; therefore, the reference in 410.2 is not valid and is not needed.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-63 Log #592 NEC-P18 **Final Action: Reject**
(410.4(D))

Submitter: Henry A. Jenkins, Wake County, Inspections Development / Rep. N.C. Ellis Cannady Chapter of I.A.E.I
Comment on Proposal No: 18-51
Recommendation: We support the proposal.
Substantiation: None given.
Panel Meeting Action: Reject
Panel Statement: The comment is rejected because it fails to comply with Section 4.4.5(d) of the Regulations Governing Committee Projects since there is no substantiation offered to support the comment. The panel notes that the

action on this comment does not change their accept action on Proposal 18-51.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-64 Log #1211 NEC-P18 **Final Action: Reject**
(410.4(D))

Submitter: James W. Carpenter, International Association of Electrical Inspectors
Comment on Proposal No: 18-51
Recommendation: We support the panel's action in Accepting this Proposal as written.
Substantiation: None.
Panel Meeting Action: Reject
Panel Statement: The comment is rejected because it fails to comply with Section 4.4.5(d) of the Regulations Governing Committee Projects since there is no substantiation offered to support the comment. The panel notes that the action on this comment does not change their accept action on Proposal 18-51.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
OWENS, T.: I think the appropriate action on this comment is accept. CMP-18 should have accepted the kudos for a job well-done and moved on. The effort spent on pointing out that no justification for the congratulations was provided is not time well-spent by the panel.

18-65 Log #2188 NEC-P18 **Final Action: Accept in Principle**
(410.6, 410.27(B) & (C), 410.30(C), and 410.30(C)(1)(2)(c))

Submitter: Frederick L. Carpenter, Lithonia Lighting
Comment on Proposal No: 18-40a
Recommendation: Change the proposed text to read as follows:
410.xx Listing Required. All luminaires~~,~~ and lampholders~~, and lighting assemblies~~ shall be listed.
Additionally, the text of 410.27(B), 410.27(C), 410.30(C)(1), and 410.30(C)(1)(2)(c) should be modified by adding the word "listed" back into the sections as shown below:
410.27(B) Size Unless part of listed decorative lighting assemblies, pendant conductors shall not be smaller than 14 AWG for mogul-base or medium-base screw-shell lampholders or smaller than 18 AWG for intermediate or candelabra-base lampholders.
410.27(C) Twisted or Cabled Pendant conductors longer than 900 mm (3 ft) shall be twisted together where not cabled in a listed ~~lighting~~ assembly.
410.30(C)(1) Cord-Connected Installation. A listed ~~lighting~~ assembly shall be permitted to be cord connected if the following conditions apply:
410.30(C)(1)(2)(c) Is terminated in a grounding-type attachment plug cap or busway plug, or is a part of a listed ~~lighting~~ assembly incorporating a manufactured wiring system connector in accordance with 604.6(C), or has a luminaire (fixture) assembly with a strain relief and canopy.
Substantiation: The term "lighting assemblies" is undefined, vague, and likely to lead to a variety of interpretations from different authorities having jurisdiction. Will optional parts that are normally shipped separately from a luminaire be considered to be lighting assemblies which must carry a listing mark? (For instance, visors or vandal guards). Are poles lighting assemblies? To address this problem, the term "lighting assemblies" should be removed from this proposed general listing requirement, and the requirement for listing should be added back into the appropriate specific sections that previously referenced "listed assemblies".
Panel Meeting Action: Accept in Principle
Accept the recommendation as submitted with the following revision to 410.30(C)(1).
(1) Cord-Connected Installation. A luminaire or a listed assembly shall be permitted to be cord connected if the following conditions apply: (remainder of 410.30(C)(1) to remain as is in the 2005 NEC)
Panel Statement: The panel accepts the recommendation with the addition of the words "luminaire or" to 410.30(C)(1) to restore the text to that of the 2005 NEC. The panel notes that "fixture" will be removed throughout the NEC based on the TCC direction.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-66 Log #1407 NEC-P18 **Final Action: Accept in Principle**
(410.8(B)(3) (New))

Submitter: Lee Ward, Ardee Lighting Inc.
Comment on Proposal No: 18-56
Recommendation: This Proposal should be Accepted.
410.8 Luminaries (Fixtures) in Clothes Closets.
(B) Luminaire (Fixture) Types Permitted. Listed luminaries (fixture) of the following types shall be permitted to be installed in a closet:
(1) A surface-mounted or recessed incandescent luminaire (fixture) with a completely enclosed lamp.
(2) A surface-mounted or recessed fluorescent luminaire (fixture).
(3) A listed surface-mounted or wall-mounted clothes rod luminaire installed in accordance with the manufacturer's installation instructions.
Substantiation: This luminaire or fixture is intended to supply supplemental low voltage or fluorescent lighting to areas of the closet that cannot be reached by conventional fixtures.
The panel statement in the Report on Proposal 18-56 mentioned that "There currently are no tests in the luminaire standard, ANSI/UL 1598, that determine the suitability of a luminaire for use in a clothes closet". Panel Rejected the Proposal.
Since receiving the ROP, an independent test lab tested the clothes rod luminaire in an IC test box built to simulate a worse case situation in the storage area of a clothes closet. All external surfaces are less than 90°C which is a requirement in UL 1598. These tests were witnessed by UL. We feel that the clothes rod luminaire listed Type IC should be permitted for use in the storage area of a clothes closet.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept in Principle
Revise 410.8 by adding the following:
410.8(B)(3) Surface mounted fluorescent or LED luminaires identified as suitable for installation within the storage area.
410.8(D)(5) Surface mounted fluorescent or LED luminaires shall be permitted to be installed within the storage space where identified for this use.
Panel Statement: The panel action allows for the use of listed luminaires that can be installed within the storage area of a clothes closet.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-67 Log #2220 NEC-P18 **Final Action: Accept**
(410.10(D))

Submitter: Jeff Fitzloff, State of Idaho Division of Building Safety
Comment on Proposal No: 18-40a,
Recommendation: Revise text to read as follows:
(D) Bathtub and Shower Areas. No parts of cord connected luminaires, chain-, cable-, or cord-suspended luminaires, lighting track, pendants, or ceiling-suspended (paddle) fans shall be located within a zone measured 900 mm (3 ft) horizontally and 2.5 m (8 ft) vertically from the top of the bathtub rim or shower stall threshold. This zone is all encompassing and includes the space directly over the tub or shower stall. Luminaires located within the actual outside dimension of the bathtub or shower to a height of 2.5 m (8 ft) vertically from the top of the bathtub rim or shower threshold shall be marked for damp locations, or marked for wet locations where subject to shower spray. [ROP 18-40a, 18-50a]
Substantiation: This change helps to clearly identify the location and the requirements for lights in showers and bath tubs.
Panel Meeting Action: Accept
Panel Statement: The panel notes that the correct proposal references shown in the recommendation should be18-40a and 18-51, not 18-40a and 18-50a.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-68 Log #416 NEC-P18 **Final Action: Reject**
(410.14(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-66
Recommendation: Accept proposal.
Substantiation: The definition of "concealed" in Article 100 is rendered inaccessible. 314.29 requires boxes to be accessible. The requirements of this section provide for access. How can a box be inaccessible (concealed) when access is provided?
Panel Meeting Action: Reject
Panel Statement: The panel reiterates that 314.29 requires "Boxes … shall be installed so that the wiring contained in them can be rendered accessible without removing any part of the building." Clearly the box may be concealed whereas the wiring must be accessible. The intent of 410.14(B) is to render the wiring in the box accessible without the removal of an independently (not to the box) supported electric discharge luminaire.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-69 Log #273 NEC-P18 **Final Action: Reject**
(410.18(B) Exception No. 2)

Submitter: Dennis Downer, Morrisville, VT
Comment on Proposal No: 18-41
Recommendation: Delete Exception No. 2 of 410.18(B).
410.18 Exposed Luminaire (Fixture) Parts.
(B) Made of Insulating Material Luminaires (fixtures) directly wired or attached to outlets supplied by a wiring method that does not provide a ready means for grounding shall be made of insulating material and shall have no exposed conductive parts.
~~Exception No. 2: Where no equipment grounding conductor exists at the outlet, replacement luminaires (fixtures) that are GFCI protected shall not be required to be connected to an equipment grounding conductor.~~
Substantiation: This was added to the 2005 NEC and as noted in NEC handbooks and Code update presentation as similar protection as provided for receptacles. This is not the same, receptacles are installed in the wall were no live parts are exposed to the general public, but a Luminarie could have ground fault by means of a nicked wire in the fixture box and because there is no grounding conductor the fixture could become energized and sit there waiting for the first person to come along and touch the fixture and have to receive a shock in order to trip the GFCI protecting the fixture. Also, the person could be on an aluminum ladder and receive this shock and jump also introducing a fall hazard. Yes, I know this provides a least some protection, but I believe it should be installed according to the main text or Exception No. 1, but not allow Exception 2.
Panel Meeting Action: Reject
Panel Statement: In accordance with 4-4.6 of the Regulations Governing Committee Projects, the panel is to consider and act on all comments that are directly related to the substantive content of the Report on Proposals. Since there were no proposals on Section 410.18(B) Exception No. 2, the panel is rejecting this comment. Proposal 18-41 was simply a reorganization of Article 410 and did not address any technical issues.
The panel rejects the substantiation for deleting Exception No. 2 to 410.18(B). In response to this substantiation, a luminaire installed to a box without an equipment grounding conductor is not any different than a luminaire plugged into a receptacle without an equipment grounding conductor. Both cases require GFCI protection and provide the same level of protection.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-70 Log #1977 NEC-P18 **Final Action: Reject**
(410.30(C)(1)(2)(c))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 18-78
Recommendation: This Proposal should have been Rejected.
Substantiation: While the proposal may address the prohibition of running a cord through a hole in a ceiling by installing it in a raceway, it does not address other potential conflicts and will still be seen as a code violation by many AHJs. For example, 400.8 also prohibits the cord being above the suspended or dropped ceiling and from being used as a substitute for fixed wiring. In addition, it prohibits the installation of cord in a raceway. Admittedly, this proposal would overcome that prohibition by specifically permitting it. However, other aspects of the installation are not addressed by the proposal: (1) The wording implies that the raceway is for attachment to an outlet box above the ceiling, but that is not clear. (2) If the cord is to emerge from the raceway, how is this transition made, and how is the cord protected? A better solution would be to devise a box that could be installed over the grid member, or to use a flexible raceway or cable for the connection, so that the provisions of 400.8 do not have to be violated.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 18-77. Proposal 18-78 requires that the raceway be attached to an outlet box above the ceiling. The cord would emerge from the raceway into the outlet box and be totally enclosed and protected.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-71 Log #2185 NEC-P18 **Final Action: Accept**
(410.31)

Submitter: Frederick L. Carpenter, Lithonia Lighting
Comment on Proposal No: 18-40a
Recommendation: Return the text of 410.31 to the text in the 2005 NEC by adding the word “listed” as shown below:
410.31 Luminaires as Raceways. Luminaires shall not be used as a raceway for circuit conductors unless listed and marked for use as a raceway.
Substantiation: The use of the word “listed” in 410.31 is necessary to indicate that the products being discussed need to be listed for a specific requirement, in addition to the general requirements for listed luminaires. The word “listed” needs to remain in this section to clearly identify that listing as a raceway is required. When the panel removed the word “listed” from this section because they added a general requirement for listing luminaires elsewhere in the article, the intent of this section lost clarity.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-72 Log #2186 NEC-P18 **Final Action: Accept**
(410.32)

Submitter: Frederick L. Carpenter, Lithonia Lighting
Comment on Proposal No: 18-40a
Recommendation: Return the text of 410.32 to the text in the 2005 NEC by adding the word “listed” as shown below:
410.32 Wiring Supplying Luminaires Connected Together. Luminaires designed for end-to-end connection to form a continuous assembly, or luminaires connected together by recognized wiring methods, shall be permitted to contain the conductors of a 2-wire branch circuit, or one multiwire branch circuit, supplying the connected luminaires and need not be listed ~~marked~~ as a raceway. One additional 2-wire branch circuit separately supplying one or more of the connected luminaires shall also be perm
itted.
Substantiation: The use of the word “listed” in 410.32 is necessary to indicate that the products being discussed need to be listed for a specific requirement, in addition to the general requirements for listed luminaires. The word “listed” needs to remain in this section to clearly identify that listing as a raceway is required. When the panel removed the word “listed” from this section because they added a general requirement for listing luminaires elsewhere in the article, the intent of this section lost clarity.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-73 Log #440 NEC-P18 **Final Action: Reject**
(410.33)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 18-79
Recommendation: Revise panel action:
Feeder and branch circuit conductors within 75 mm (3 in.) of a ballast shall have a temperature rating not lower than marked on the ballast or luminaire (fixture) and not lower than 90°C (194°F) unless supplying a ballast or luminaire (fixture) listed and marked for a ~~different~~ lower temperature.
Substantiation: Definition of luminaire indicates it is a complete unit (singular) that may contain a ballast. Where the ballast is remote the luminaire may have a temperature marking lower than 90°C. Literal wording does not permit a feeder or branch circuit which does NOT supply a luminaire with lower temperature rating requirements to be less than 90°C and permits a lower than 90°C rating if the marking is for a HIGHER (different) than 90°C rating.
Panel Meeting Action: Reject
Panel Statement: The temperature limit on the enclosure of a listed Class P ballast is 90 C. Some ballast manufacturers mark electronic ballasts with a maximum temperature limit that is less than 90C for warranty purposes. This is a ballast manufacturer declared value and is not related to the testing performed for safety certification.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-74 Log #2187 NEC-P18 **Final Action: Reject**
(410.35)

Submitter: Frederick L. Carpenter, Lithonia Lighting
Comment on Proposal No: 18-79a
Recommendation: Proposal 18-79a should be Rejected and the text should be returned to the text of 410.35 of the 2005 NEC if Proposal 18-40a is Rejected.
Substantiation: The substantiation for eliminating the minimum letter height of this marking because the visibility requirements are already addressed in the listing standard is only valid if all luminaires are required to be listed. Currently, the codes does not require listing of all luminaires. If Proposal 18-40a becomes accepted throughout the code revision process, then this Proposal (18-79a) would be acceptable. However, if Proposal 18-40a is rejected, Proposal 18-79a should be rejected by the panel and the text should revert to the text of 410.35 in the 2005 NEC.
Panel Meeting Action: Reject
Panel Statement: The action taken by the panel on Comment 18-65 addresses the commentor’s concerns with Proposal 18-40a. Therefore, since Proposal 18-40a is being accepted, the concerns raised in this comment have been addressed.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-75 Log #1124 NEC-P18 **Final Action: Reject**
(410.35(A))

Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 18-80
Recommendation: Please reconsider this proposal.
Substantiation: This proposal is concerned with branch circuit wiring in old homes. Evidently, the Panel feels that a luminaire that requires conductor insulation to be rated for a potential temperature of 194 degrees Fahrenheit is OK - Just read the label.
Panel Meeting Action: Reject
Panel Statement: The panel understands that the NEC applies to new installations versus existing older wiring. However, the panel does not agree that markings on luminaires are ineffective. The only way to insure proper installation of a luminaire is through the markings and installation instructions. The panel will not create specialized language to assuage those installers who refuse to follow the directions provided by manufacturers.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-76 Log #1125 NEC-P18 **Final Action: Reject**
(410.36)

Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 18-82
Recommendation: See comment for Proposal 18-80.
Substantiation: The Panel claims that "substantial changes have been made to the safety standards over the past 60 years" BUT WE STILL SEE THE LABEL RESTRICTING THE BRANCH CIRCUIT CONDUCTORS TO 75/90C! The Panel comments on new wiring but THE CONCERN IS WITH THE 60 YEAR OLD WIRING.
Panel Meeting Action: Reject
Panel Statement: The panel understands that many existing wiring installations contain the older 60° C rated conductors. It also understands that most new luminaires are marked for 75°/90° C conductors only. The installer of a new luminaire on an older wiring installation must make provisions to upgrade the connections or the wiring to meet the new luminaire marking. Again, the panel will not create specialized language to assuage those installers who refuse to follow the directions provided by manufacturers.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-77 Log #905 NEC-P18 **Final Action: Reject**
(410.62(C)(2)(c))

Submitter: Michael Lenherr, Pendant Systems
Comment on Proposal No: 18-78
Recommendation: Delete the following text:
~~having a maximum 152 mm (6 in.) long section of raceway for attachment to an outlet box above a suspended ceiling.~~
Substantiation: There clearly exists alternatives to produce the inline look of the feed end side suspension on the T-bar of the indirect fluorescent lighting systems in today's lighting market place. I have provided product information from Pendant Systems, Fnelite and Lite Control showing code compliant installations within the workings of 400.8. The typical wiring system that we have seen in the past is the use of a 1/2 in. offset nipple with a bushing on the front of the canopy into a 1900 box mounted sideways on to suspended ceiling grid attached to a IDS type clip. (see photo). This type of installation does not provide strain relief at the canopy location as with the canopy over the junction box at the ceiling level and relies on the contractor to us a UL knot in the 1900 box above the ceiling. It would also be easier for the AHJ to verify cord strain relief at the canopy level as there is the possibility that these fixture may be height adjusted at a later time as the cable suspension systems utilized today are adjustable. Exempting Article 400 for this use would most likely lead to an abuse of cord connected devices through a drop ceiling which is not the intent here.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: Examples presented by the commentor would be supported by the proposal. Two of the examples have integrally formed raceways that allow for passage of a flexible cord above the ceiling line.

The proposal requires strain relief. A knot tied in the flexible cord bearing against a smooth surface is considered a suitable strain relief means by the product standard. One of the examples that the commentor presented relies on a knot tied in the cord for stain relief. Since the outlet box is accessible, the strain relief means can be inspected. If there is a height adjustment, a knot can be tied in the cord to accommodate the change. The box shown in the photograph, identified by the commentor as a "1900" box, illustrates a knot tied in individual conductors rather than in a flexible cord, this is not a suitable strain relief means.

From the material the commentor presented regarding the junction box for drop ceiling applications, the method used to bond the ceiling grid member to ground is not clear. Since the ceiling grid member is typically an accessible dead metal part with a portion passing through an electrical enclosure, the panel reminds the commentor that it should be bonded to ground.

The proposed language does not exempt Article 400 but rather permits a specific construction as allowed by 400.8.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-78 Log #1538 NEC-P18 **Final Action: Accept**
(410.73)

Submitter: Colette Keslin, Juno Lighting Group, Inc., Fishers Facility / Rep. NEMA
Comment on Proposal No: 18-90b
Recommendation: On behalf of Juno Lighting Group, Inc., Fishers Facility, I would like to express our support of Proposal 18-90b, based on the fact that all reported incidents involve linear fluorescents, highly due to the ease of ballast access. There are no reported incidents to our knowledge, involving compact fluorescent luminaires, thus we deem it unnecessary to include CFLs in the requirement for ballast disconnects.
Substantiation: See previous comment.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-79 Log #2091 NEC-P18 **Final Action: Accept in Principle**
(410.73(G))

Submitter: Frederick L. Carpenter, Lithonia Lighting
Comment on Proposal No: 18-90b
Recommendation: Change the word "assorted" in the first sentence to "associated". Also, in the first sentence, change the words "double ended" to "double-ended" and the word "ballast" to "ballast(s)". In the second sentence, change the word "disconnect" to "disconnecting means". Section 410.73(G) would read as follows:

(G) Disconnecting Means. In indoor locations, other than dwellings and ~~assorted~~ associated accessory structures, fluorescent luminaires that utilize ~~double ended~~ double-ended lamps and contain ballast(s) that can be services in place shall have a disconnecting means either internal or external to each luminaire. When connected to multiwire branch circuits, the disconnecting means shall simultaneously break all the supply conductors of the ballast, including the grounded conductor. The line side terminals of the disconnecting means shall be guarded. The disconnecting means shall be located so as to be accessible to qualified persons before servicing or maintaining the ballast. Where the disconnecting means is external to the luminaire, it shall be a single device, located in sight of the luminaire.

Existing five exceptions to remain as written in the 2005 NEC.
Substantiation: The word "associated" was inadvertently changed to "assorted" by the panel. The words "double ended" should be change to "double-ended", and the word "ballast" should be changed to "ballast(s)" to remain consistent with the previous code language and to clarify that a luminaire may contain more than one ballast. In the second sentence, the word "disconnect" should be changed to "disconnecting means" to use a term that is defined in Article 100 and to remain consistent with the rest of the section.

The panel should continue to limit the scope of this section to fluorescent luminaires that utilize double-ended lamps and contain ballasts that can be serviced in place, since the anecdotal incidents that have been reported to the panel, and the data collected by the Electrical Safety Authority in Ontario, Canada, indicate that the shock incidents are limited to individuals working on this subset of products while not following the appropriate safety precautions and regulations.
Panel Meeting Action: Accept in Principle
Revise 410.73(G) to read:

(G) Disconnecting Means.

(1) General. In indoor locations, other than dwellings and associated accessory structures, fluorescent luminaires that utilize double-ended lamps and contain ballast(s) that can be serviced in place shall have a disconnecting means either internal or external to each luminaire. The line side terminals of the disconnecting means shall be guarded.

Exception No. 1: A disconnecting means shall not be required for luminaires installed in hazardous (classified) location(s).

Exception No. 2: A disconnecting means shall not be required for emergency illumination required in 700.16.

Exception No. 3: For cord-and-plug-connected luminaires, an accessible separable connector or an accessible plug and receptacle shall be permitted to serve as the disconnecting means.

Exception No. 4: A disconnecting means shall not be required in industrial establishments with restricted public access where conditions of maintenance and supervision ensure that only qualified persons service the installation by written procedures.

Exception No. 5: Where more than one luminaire is installed and supplied by other than a multiwire branch circuit, a disconnecting means shall not be required for every luminaire when the design of the installation includes

disconnecting means such that the illuminated space cannot be left in total darkness.

(2) Multiwire Branch Circuits. When connected to multiwire branch circuits, the disconnecting means shall simultaneously break all the supply conductors to the ballast, including the grounded circuit conductor.

(3) Location. The disconnecting means shall be located so as to be accessible to qualified persons before servicing or maintaining the ballast. Where the disconnecting means is external to the luminaire, it shall be a single device, and shall be attached to the luminaire or the luminaire shall be located within sight of the disconnecting means.

Panel Statement: The panel has revised the last sentence of the recommendation regarding the location of the luminaire disconnecting means to clarify that an external disconnecting means is either required to be attached to the luminaire (could be attached to the luminaire and located above an accessible ceiling area) or that the luminaire is required to be located within sight of the disconnecting means. In addition this section has been reorganized in order to place multiple requirements into separate subdivisions. This action also aids the user in understanding the application of the exceptions.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

O'BOYLE, M.: I would like to emphasize that this requirement was promulgated because of reports of unsafe work practice by personnel during their servicing of double ended lamp luminaires. Since no safety device can protect against all of the possible hazards involved in servicing electrical equipment, all personnel involved in such service operations must be cognizant of the fact that the disconnects required by this section should not be relied upon as the primary means of assuring service personnel protection.

Proper servicing techniques, including the de-energizing the branch circuit and or the use of appropriate protective equipment, must be observed by service personnel to ensure safety. These basic safety tenets must continue to be the foundation of training, supervision and work methods employed by those involved with servicing luminaires.

18-80 Log #2108 NEC-P18 **Final Action: Accept in Part**
(410.73(G))

Submitter: Michael S. O'Boyle, Lightolier Division of the Genlyte Group, LLC

Comment on Proposal No: 18-94

Recommendation: Revise text to read as follows:

(G) Disconnecting Means. In indoor locations, other than dwellings and ~~assorted~~ associated accessory structures, fluorescent luminaires that utilize double ended lamps and contain ballast that can be serviced in place, supplied by branch circuits with voltage exceeding 150-volts to ground, shall have a disconnecting means either internal or external to each luminaire. When connected to multiwire branch circuits, the disconnect shall simultaneously break all the supply conductors of the ballast, including the grounded conductor. The line side terminals of the disconnecting means shall be guarded. The disconnecting means shall be located so as to be accessible to qualified persons before servicing or maintaining the ballast. Where the disconnecting means is external to the luminaire it shall be a single device, located in sight of the luminaire. Existing five exceptions to remain as written in the 2005 NEC.

(Base language is from Proposal 18-90b).

Substantiation: As a function of magnitude, voltages below 150-volts present a lower level of risk than those exceeding 150-volts. 210.5(B) and 210.5(C) recognize this by allowing ordinary screwshell lampholders with accessible live parts on circuits of 120-volts between conductors while prohibiting them on 277-volt circuits. The Canadian Electric Code requires a disconnect when a luminaire is supplied by a circuit exceeding 150-volts; the 150 V level is based on the incident data collected by the Canadian Electrical Safety Authority. No empirical data has been presented in either the US or Canada to substantiate requiring a disconnect for ballast connected to circuits of less than 150 V.

Panel Meeting Action: Accept in Part

The panel accepts only the editorial revision of "assorted" to "associated". The panel rejects the remainder of the recommendation.

Panel Statement: The panel does not accept the argument that the replacement of 120-volt ballasts when energized is any less of a safety hazard than higher voltages. The electrical shock and corresponding startle reaction received from this voltage level can still result in serious injury.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12 Negative: 1

Explanation of Negative:

CARPENTER, F.: No incident data has been supplied that supports requiring a disconnecting means for luminaires installed on circuits that are less than 150 volts-to-ground. The only data collected suggests that shock incidents have been limited to higher voltage applications.

18-81 Log #2144 NEC-P18 **Final Action: Reject**
(410.73(G))

Submitter: Gary Martin, Brite Electric

Comment on Proposal No: 18-90b

Recommendation: Revise text to read as follows:

~~Fluorescent~~ Luminaires that ~~utilize double ended lamps and~~ contain ballast that can be serviced in place.

Substantiation: This is a serious problem, not only on luminaires with double ended lamps, but on all luminaires where the ballast can be serviced in place.

Panel Meeting Action: Reject

Panel Statement: The commenter has provided no data to substantiate his claim that the unsafe work practice of replacing ballasts without first disconnecting power is a serious problem on all luminaire types where the ballast can be serviced in place.

The provisions of 410.73(G) were adopted to address an unsafe work practice that involved people performing maintenance on linear fluorescent luminaires without first disconnecting power or using the appropriate personal protective equipment. It is hoped that the requirements of 410.73(G) will minimize the number of shock incidents associated with this unsafe work practice, but the requirements are not intended to circumvent the need to wear the appropriate personal protective equipment or to disconnect power before servicing live electrical equipment.

Extending the requirements of 410.73(G) to luminaires other than linear fluorescent luminaires would expose the workers to greater risks from additional shock hazards since other types of electric-discharge lighting systems are more likely to have exposed live electrical parts located within the electrical enclosure, such as exposed capacitor terminals, core & coil (open-coil) ballasts, open-coil relays, open-board starters, etc.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

18-82 Log #2145 NEC-P18 **Final Action: Reject**
(410.73(G))

Submitter: Steve Egyed, H & G Services

Comment on Proposal No: 18-92

Recommendation: Delete the following text:

~~And installed on branch circuits with voltages exceeding 150 volts to ground~~

Substantiation: Luminaires operating at 120 volts to ground are just as hazardous as those of higher voltages as they produce a hold current that prevents one from letting go of.

Panel Meeting Action: Reject

Panel Statement: The panel did not accept that part of Proposal 18-92 limiting the disconnecting means requirement to luminaires installed on circuits over 150 volts. See the panel action on Comment 18-80.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

18-83 Log #2303 NEC-P18 **Final Action: Accept in Principle**
(410.73(G))

Submitter: Edward Yandek, GE Lighting

Comment on Proposal No: 18-90b

Recommendation: I support this proposal as written and recommend it be adopted.

Substantiation: This proposal improves previously identified technical issues with the requirements in 410.73(G). It would make the requirements more practical to implement. It also properly limits application of the requirements to luminaire types for which there are incident reports.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 18-79.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

18-84 Log #2306 NEC-P18 **Final Action: Reject**
(410.73(G))

Submitter: Edward Yandek, GE Lighting

Comment on Proposal No: 18-40a

Recommendation: Reject adoption of this Proposal.

Substantiation: The term 'lighting assembly' is not defined. Without a sufficient definition this term has no inherently clear or consistent meaning. Adoption would present an unacceptable situation for manufacturers and installers since it would lead to inconsistent interpretations on what equipment parts or components or 'assemblies' might be considered to be covered by this term by various Authorities Having Jurisdiction.

Panel Meeting Action: Reject
Panel Statement: The issues raised by the commenter have been addressed by the panel action and panel statement on Comment 18-65. The panel notes that the section (410.73(G)) referenced in the comment is incorrect.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-85 Log #2308 NEC-P18 **Final Action: Reject**
(410.73(G))

Submitter: Edward Yandek, GE Lighting
Comment on Proposal No: 18-92
Recommendation: This proposal would limit requirements to luminaires greater than 150 volts-to-ground. This limitation should be adopted.
Substantiation: Incident data presented previously by the Electrical Safety Authority of Canada would support limiting provisions to luminaires that are greater than 150 volts-to-ground. This would also harmonize requirements in the NEC with requirements in the Canadian Electrical Code, which would result in a more practical ability of manufacturers to develop consistent product implementation schemes.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-80.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
CARPENTER, F.: See my explanation of negative vote on Comment 18-80.

18-86 Log #2309 NEC-P18 **Final Action: Reject**
(410.73(G))

Submitter: Edward Yandek, GE Lighting
Comment on Proposal No: 18-94
Recommendation: This proposal would limit the requirements to luminaires greater than 150 volts-to-ground. This limitation should be adopted.
Substantiation: Incident data presented previously by the Electrical Safety Authority of Canada would support limiting provisions to luminaires that are greater than 150 volts-to-ground. This would also harmonize requirements in the NEC with requirements in the Canadian Electrical Code, which would result in a more practical ability for manufacturers to develop consistent product implementation schemes.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 18-80.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
CARPENTER, F.: See my explanation of negative vote on Comment 18-80.

18-87 Log #786 NEC-P18 **Final Action: Reject**
(410.73(G), [410.120(G)])

Submitter: Michael J. Johnston, Plano, TX
Comment on Proposal No: 18-90b
Recommendation: Accept in Principle the proposed text in 18-91 and revise the proposed last sentence of 410.73(G) as follows:
Where the disconnecting means is external to the luminaire, it shall be readily accessible from the luminaire.
Substantiation: Proposal 18-91 (Log #489) is an effort to clarify the external disconnecting means location while at the same time maintaining the spirit and objective of the original rule accepted in the 2005 NEC cycle, which is worker safety. The substantiation provided with proposals 18-92 (Log #1780) and 18-93 (Log #3421) in the 2004 ROP indicated the need for a means of disconnect for worker safety. The location of such disconnecting means is an important part of this requirement to achieve the primary objective of the original requirement. The action on Proposal 18-90b actually results in lessening the requirements gained in 410.73(G) of the 2005 NEC. Perhaps this is what CMP-18 intends. Based on the actions and resulting requirements in the 2005 NEC, CMP-18 inserted requirements that would provide workers a ready means for disconnecting power to ballasts during service operations that would reduce the risks that are currently being taken by workers in the field faced with these decisions. While it was clear that CMP-18 does not condone unsafe work practices, the requirements in 410.73(G) have been reduced as a result of inserting the concept of location a disconnect "in sight" of the luminaire in this section. By definition, this allows the disconnect to be visible from and up to 50 ft away from the luminaire which invites the risks that the original rule was intended to reduce. The general requirements of this section should be geared toward providing a ready means to establish an electrically safe work condition for workers on ladders, lifts, and so forth, and the exceptions to this rule should relax the requirement under specific alternatives that offer equal and effective means for providing equivalent safety objectives. Consider the proposed adjustment or reject the original proposal to revert back to the 2005 language.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree that the action taken on Proposal 18-90b lessens the requirements of 410.73(G). The revisions in Proposal 18-90b and Comment 18-79 now require the disconnecting means to be either attached to the luminaire or that the luminaire is within sight of the disconnecting means. In accordance with the 2005 NEC the disconnecting means could have been located anywhere in the building. Locating an external disconnecting means within sight accomplishes the objective of allowing the luminaire that needs to be serviced to be disconnected from the branch circuit without rendering the entire space dark. The panel did not intend that the disconnecting means has to be readily accessible from the luminaire in those case where a luminaire is within sight of a local switch used as the disconnecting means. See the panel action on Comment 18-79.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-88 Log #977 NEC-P18 **Final Action: Accept in Principle**
(410.101(B))

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 18-65
Recommendation: Replace the word "fixtures" with "luminaires" in the newly added Fine Print Note as follows:
410.101 Installation.
(B) Connected Load. The connected load on lighting track shall not exceed the rating of the track. Lighting track shall be supplied by a branch circuit having a rating not more than that of the track.
FPN: The load calculation in 220.43(B) is not intended to limit the number of feet of track on a single branch circuit nor is it intended to limit the number of fixtures on an individual track.
Substantiation: The word "fixtures" was replaced with "luminaires" to make it consistent with the remainder of the NEC.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel action on Comment 18-89 addresses the recommendation.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-89 Log #1944 NEC-P18 **Final Action: Accept**
(410.101(B), FPN)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 18-65
Recommendation: Revise as follows:
FPN: The load calculation in 220.43(B) does not limit the length of track on a single branch circuit, and it does not limit the number of luminaires on single track.
Substantiation: This rewording omits statements of intent, changes "fixtures" to "luminaires", and by using "length" instead of "number of feet" avoids a metrication problem.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-90 Log #474 NEC-P18 **Final Action: Hold**
(410.130(G))

Submitter: Gregory J. Steinman, Thomas & Betts Corporation
Comment on Proposal No: 18-90b
Recommendation: Revise as follows:
(G) Disconnecting Means. In indoor locations, other than dwellings and associated accessory structures, fluorescent luminaires that utilize double-ended lamps and contain ballast(s) that can be serviced in place shall have a disconnecting means either internal or external to each luminaire. For existing installed luminaires without disconnecting means, at the time a ballast is replaced, a disconnecting means shall be installed. When connected to multiwire branch circuits, the disconnect shall simultaneously break all the supply conductors of the ballast, including the grounded conductor. The line side terminals of the disconnecting means shall be guarded. The disconnecting means shall be located so as to be accessible to qualified persons before servicing or maintaining the ballast. Where the disconnecting means is external to the luminaire, it shall be a single device, ~~located in sight of~~ adjacent to the luminaire.
Substantiation: Disconnecting means provide a safe working environment for the electrician. It can be added easily at the time a ballast is replaced and will provide a safer installation of the next ballast replacement. There are several ballast disconnecting components available that can be easily installed during ballast replacement. Per Article 100, the words "in sight of" mean within 50 feet. This is too far for a safe replacement. The disconnecting means shall be easily accessible to the electrician.
Panel Meeting Action: Hold
Panel Statement: In accordance with 4.4.6.2.2 and 4.4.6.2.3 of the Regulations Governing Committee Projects, this comment is being held because it introduces new material that has not had adequate public review.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 411 — LIGHTING SYSTEMS OPERATING AT 30 VOLTS OR LESS

18-91 Log #974 NEC-P18 **Final Action: Accept in Principle**
(411.2)

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 18-105
Recommendation: Delete "shall each be" and replace with the word "are" to read as follows:
Lighting Systems Operating at 30 Volts or Less. A lighting system consisting of an isolating power supply, the low voltage luminaires (lighting fixtures), and associated equipment, all identified for the use. The output circuits of the power supply are ~~shall each be~~ rated for not more than 25 amperes and operate at 30 volts (42.4 volts peak) or less under all load conditions.
Substantiation: The NEC Style Manual does not permit mandatory text in a definition so the mandatory text is being replaced with the word "are."
Panel Meeting Action: Accept in Principle
Revise 411.2 to read:
Lighting Systems Operating at 30 Volts or Less. A lighting system consisting of an isolating power supply, the low voltage luminaires, and associated equipment, that are all identified for the use. The output circuits of the power supply are ~~shall each be~~ rated for not more than 25 amperes and operate at 30 volts (42.4 volts peak) or less under all load conditions.
Panel Statement: The panel has made an editorial revision in the first sentence and has also deleted the term (lighting fixture).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-92 Log #219 NEC-P18 **Final Action: Accept**
(411.3)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 18-106
Recommendation: The Technical Correlating Committee directs that the Panel reconsider the proposal and add headings to (A) and (B). This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Make the following revisions to 411.3:
Listing Required. Lighting systems operating at 30 volts or less shall comply with 411.3(A) or 411.3(B)
(A) Listed System. Lighting systems operating at 30 volts or less shall be listed as a complete system. The luminaires, power supply and luminaire fittings (including the exposed bare conductors) of an exposed bare conductor lighting system shall be listed for the use as part of the same identified lighting system.
(B) Assembly of Listed Parts. A lighting system assembled from the following listed parts shall be permitted.
Retain existing list items (1) through (6)
Panel Statement: The panel has added headings as directed and has also revised and reorganized the text to clarify application.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-93 Log #1876 NEC-P18 **Final Action: Reject**
(411.4)

Submitter: Steven D. Holmes, Underwriters Laboratories Inc.
Comment on Proposal No: 18-107
Recommendation: Accept 411.4(B) as proposed.
Substantiation:
This proposal should be ACCEPTED IN PRINCIPLE. We agree with the Panel action except for the rejection of the proposed text of 411.4(B). The panel concluded the proposed text of 411.4(B) was in conflict with, and less stringent than, the requirements of Section 680.22(B). Regrettably, the NFPA panel did not identify in the panel statement which of the multiple requirements that make up 680.22(B) of the 2005 NEC were more stringent than, or in conflict with, the requirements of proposed 411.4(B).
Proposed 411.4(B) required the following:

A) Power supply shall be GFCI protected if less than 10 ft horizontal from pool.
B) All system components less than 5 ft horizontal shall be minimum 12 ft above water.

The following table compares proposed 411.4(B) with each sub-section of 680.22(B).

(Table shown below)

Subsection and scope of 680.22(B) requirements for luminaires near permanent pools	**Key required parameters of 680.22(B) requirements for luminaires near permanent pools**	Proposed 411.4(B) **GFCI protected if < 10 ft horiz. 12 ft or more vert. if < 5 ft horiz.**	
		Does proposed 411.4(B) conflict with 680.22(B)( )?	Is proposed 411.4(B) less stringent than 680.22(B)( )?
680.22(B)(1) New Outdoor Installation Clearances	If luminaire above pool or < 5 ft horiz., Req = 12 ft or more vert.	No	No
680.22(B)(2) Indoor Clearances	Same as outdoor, except a totally enclosed luminaire is permitted closer to pool than outdoor if GFCI protected and 7 ft 6 in. or more vert.	No	No
680.22(B)(3) Existing Installations (of luminaires)	If luminaire < 5 ft horiz., Req = 5 ft or more vert., GFCI protected, and attached to structure	No	No
680.22(B)(4) GFCI Protection in Adjacent Areas	If luminaire 5 ft to 10 ft horiz., Req. = GFCI protected or (5 ft or more vert. and attached to structure)	No	No
680.22(B)(5) Cord-and-Plug-Connected Luminaires	If luminaire < 16 ft radially, Req. = comply with 680.7. 680.7 Req. = Cord <3 ft, 12+ AWG grounding conductor, and grounding-type attachment plug	No	No

Proposed requirement 411.4(B) is at least as stringent as all of the multiple requirements in 680.22(B).

Existing 411.4(B) and Article 680, together, (a) permit luminaires as near as 1.5 m (5 ft) from permanent swimming pools, spas, hot tubs, and similar locations and (b) require luminaires to be no less than 3.0 m (10 ft) from storable pools, fountains, and similar locations. This difference in required minimum distance causes confusion and, as a result, inconsistent minimum installation distances being required in the field.

If the panel continues to find proposed 411.4(B) to be in conflict with, or less stringent than requirements of Article 680, submitter asks panel to:

A) Modify proposed 411.4(B) to remove the conflict or make more stringent as needed, and

B) Resolve the significant problem that prompted this proposal and revise 411.4(B) to permit installation distance for storable pools, fountains, and similar locations to be the same as required for permanent pools, spas, hot tubs, and similar locations. If the panel concludes the difference must remain, the submitter asks the panel to identify in a panel statement the safety-based rationale for requiring this difference.

Panel Meeting Action: Reject

Panel Statement: The panel reiterates that the requirements for luminaires adjacent to pools, fountains, spas, hot tubs and similar locations belong in Article 680. The submitter is directed to submit future proposals for changes concerning luminaires and pools to CMP 17 for their action. See action and statement on Comment 18-94.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

18-94 Log #304 NEC-P18 **Final Action: Accept**
(411.4(B))

TCC Action: The Technical Correlating Committee directs that the text be revised to read as follows:

"(B) Pools, Spas, Fountains, and Similar Locations. Lighting systems shall not be installed less than 3 m (10 ft) horizontally from the nearest edge of the water unless permitted by Article 680."

The Technical Correlating Committee revised the wording so that the text will comply with the NEC Style Manual.

Submitter: Code-Making Panel 17

Comment on Proposal No: 18-107

Recommendation: CMP-17 accepts the changes shown in the proposal for the title of 411.4 and section 411.4(A). CMP-17 has modified 411.4(B) to read as follows:

"(B) Pools, Spas, Fountains, and Similar Locations. Lighting systems shall be installed no closer than a minimum of 3 m (10 ft) horizontally from the nearest edge of the water. Unless permitted by Article 680."

Substantiation: Actions of CMP-18. Furthermore, we believe that referring the user to Article 680 provides the user with a more detailed explanation of the requirements.

This comment has been balloted through CMP-17 with the following ballot results:

16 eligible to Vote
13 Affirmative
1 Negative
1 Abstention
1 Not Returned (B. Hanthorn)

Mr. T. Blewitt voted negatively stating: "The changes in headings are an improvement and are supported. The Panel's proposed new text for 411.4(B) only restates the existing requirement in different sentence structure and is not supported. It does not clarify the requirement. In addition, the Panel comment ("...more detailed explanation of the requirements.") is not supported. The submitter sought to clearly state the requirements in 411.4(B) so that they did not need to be explained. Such explanation becomes necessary due to the general reference to "Article 680," a seeming noncompliance with 4.1.1 of the NEC Style Manual."

Mr. R. Sweigart abstained from voting stating: "Since I am also a member of CMP-18, I do not want my vote to influence the collective vote of CMP-17."

Mr. R. Yasenchak voted affirmatively stating: "We agree with the modifications set forth in this comment. The substantiation for this comment, however, is in conflict with the suggested action, by agreeing with the panel action on 18-107 and promoting no change. We believe that the substantiation should agree only with the intent of the panel action on Proposal 18-107, and endorse the suggested modification."

Panel Meeting Action: Accept

Panel Statement: The panel notes that the requirement is a single sentence that reads: "(B) Pools, Spas, Fountains, and Similar Locations. Lighting systems shall be installed no closer than a minimum of 3 m (10 ft) horizontally from the nearest edge of the water unless permitted by Article 680."

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

18-95 Log #2224 NEC-P18 **Final Action: Reject**
(411.4(B))

Submitter: James Durkin, MDL Corporation

Comment on Proposal No: 18-107

Recommendation: As a manufacturer of Listed power supplies (transformers) for the low voltage landscape lighting industry we would like to make a suggestion to clarify the section of the NEC that deals with the spacing around pools, spas and fountains. To read as follows:

Low voltage power supplies (transformers) must be connected to a GFCI and be mounted no closer than 10 ft (3.05 m) of pools, spas, fountains or similar locations. Low voltage landscape fixtures should not be mounted closer than 5 ft (1.52 m) of pools, spas, fountains or similar locations and must be connected to a listed isolation type transformer.

Substantiation: We believe that this will help end some of the confusion and conflict and will add to the safe use of electrical equipment around pools.

Panel Meeting Action: Reject

Panel Statement: See the panel actions on Comments 18-93 and 18-94 and the panel statement on Comment 18-93.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

17-5 Log #1979 NEC-P17 **Final Action: Reject**
(422.12, FPN (New))

Submitter: Noel Williams, Herriman, UT

Comment on Proposal No: 17-10

Recommendation: This Proposal should have been Accepted.

Substantiation: The proposed FPN was intended only to remind users that the exceptions do not alter the requirements of 210.23 which specify permissible loads. Contrary to the panel objection to the proposal being inadequate, a FPN could not say what is or is not permitted to be supplied - such prescriptive language must be in the code itself, as it is in 422.12. The second part of the panel statement that the FPN as proposed could be misleading to users is interesting in light of the completely inaccurate substantiation for this proposal for the 2005 NEC. That proposal and the panel's acceptance of the proposal left many users (especially those who read the ROP and ROC for assistance in interpretation) to be misled that this new exception was actually likely to be usable or that the loads being non-coincident had anything to do with making the exception usable. Article 422 cannot modify Article 210 so the branch circuits covered by Article 422 must also comply with Article 210. Both Exceptions to 422.12 permit the circuit in question to be other than an individual branch circuit, but limit the other loads that may be supplied and, therefore, answer the question as to what may or may not be supplied.

Exception No. 1 is often usable because the other permitted loads are very small. Exception No. 2 is more difficult to use because the sum of the loads cannot exceed the branch circuit rating. In addition, many fixed central heating appliances have ratings that exceed 50 percent of the smallest permitted branch circuit and do not leave enough for permanently connected AC equipment. The proposed FPN is intended only to remind users that the requirements of 210.23 still apply.

Panel Meeting Action: Reject

Panel Statement: Branch circuits should be sized in accordance with the requirements of Articles 210, 220, 424, and 440. The addition of an FPN that just refers to 210.23 could mislead the user to believe that additional undefined loads could be added to the circuit dedicated to central heating.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Gill, C.

ARTICLE 422 — APPLIANCES

17-6 Log #454 NEC-P17 **Final Action: Reject**
(422.12 Exception No. 2)

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 17-9

Recommendation: Accept proposal as modified:
~~Permanently Connected~~. Air conditioning equipment and central heating equipment shall be permitted to be connected to the same branch circuit where means are provided to prevent simultaneous operation.

Substantiation: There doesn't seem to be a safety reason (or practical reason) why a cord-and-plug connected room air conditioner should not be permitted. A circuit could supply an air conditioner receptacle and baseboard heating in the same room (baseboard heaters are not central heating). Means should be provided to prevent simultaneous outage. Older or infirm persons may suffer severe consequences if reliability is compromised. Simultaneous operation whether cord or permanently connected can be easily prevented with a selector switch.

Panel Meeting Action: Reject

Panel Statement: Cord- and plug-connected air conditioners require a receptacle that can accept other loads. Means to prevent simultaneous operation would compromise the assured power intended for central heating equipment.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Gill, C.

17-7 Log #1981 NEC-P17 **Final Action: Accept**
(422.13)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 17-12
Recommendation: This Proposal should have been Accepted.
Substantiation: The panel statement is not responsive to the proposal. Certainly, the sizing of branch circuits is already covered by the code. It is also covered by 422.3 as the FPN that follows 422.13 states. That is not the point. The point is that this language prior to 2005 was only about the branch circuit, the new language in 2005 extended this to feeders and services without substantiation, and the new language is inconsistent with other code rules, including other code rules under the jurisdiction of Panel 17 and other proposals accepted by panel 17. 424.3 applies the continuous load language to branch circuits only, which is consistent with 220.51 since 220.51 applies only to the feeder. As worded in 422.13, a water heater is a continuous load at all stages, so the continuous load language applies in 215.2, 215.3, and 230.42 in addition to the branch circuit requirements of 210.19 and 210.20. Yet, 220.53 permits a demand factor to be applied to appliances fastened in place and does not exclude water heaters. The previous language of 422.13 applied only to branch circuits, and nothing in the substantiation for the change in 2005 supported the expansion of this requirement beyond the branch circuit. All that was asked in the proposal for 2005 was to clarify if the 125 percent language was intended to imply that the branch circuit load was to be treated as a continuous load or not. Panel 17 accepted the proposal without apparent regard for the other unsubstantiated change that was being made. The proposal and this comment are intended to repair that problem.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gill, C.

17-8 Log #425 NEC-P17 **Final Action: Reject**
(422.16(B)(4)(5))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-18
Recommendation: Accept proposal.
Substantiation: Individual branch circuit is to provide for a possible equipment replacement although 90.1(A)(b) indicates the code relates to safety, not future expansion. There was no valid substantiation in Proposal 17-21 in the 2004 ROP for an individual circuit. An individual circuit is not required for a permanently connected (hard wired) range hood; these may also be replaced. This requirement does not correlate with the definition of Branch Circuit. Appliance, which permits more than one appliance on a circuit.
Panel Meeting Action: Reject
Panel Statement: The panel accepted the original substantiation for accepting 422.16(B)(4)(5) in the 2005 NEC. Section 90.1(B) is a warning to installers to let them know that meeting the minimum requirements of the NEC may not allow for future expansion of the installation; it is not a limitation on the Code for establishing minimum requirements for installations.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gill, C.

17-9 Log #1050 NEC-P17 **Final Action: Accept**
(422.16(B)(5))

Submitter: Richard J. Cripps, Association of Home Appliance Manufacturers
Comment on Proposal No: 17-13
Recommendation: Reject proposal.
Substantiation: I am taking this opportunity to enlarge on an issue which I raised in Item 4 of my Explanation of Negative on the Panel Vote.

I draw attention to a Power Point Presentation entitled "Fires Starting With Electrical Distribution Equipment" prepared for the NFPA by Dr. John Hall, Jr., in May, 2005. Slide 14 is entitled "U.S. Cord or Plug Structure Fires, 1980 to 2002." It depicts an incident rate declining at a fairly uniform rate from 15,000 per year in 1980 to 4,300 in 2002.

This substantial and sustained trend, I suggest, is the long term result of improvements to power cord specification already adopted by manufacturers for appliances including room air heaters prior to and during the period under review. The progressive decline reflects the aging and taking out of service and replacement of appliances manufactured prior to each successive specification enhancement; that is, the greater the proportion of appliances to post-enhancement specification in the overall population, the lower will be the number of incidents.

This trend will continue, particularly as further improvements to power cords for heaters are being investigated by UL as the Panel has been informed. The imposition of additional protective equipment at this time is, therefore, not justified. The final rejection of this proposal as required by the written ballot at the ROP stage should be upheld.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept
Panel Statement: Currently, UL is in the process of revising the product safety standards (UL 1278, Movable and Wall or Ceiling Hung Electric Room Heaters, and UL 1042, Electric Baseboard Heaters) to upgrade the power supply cords in lieu of adding protective devices. The revisions are expected to be adopted in 2007.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:

ROCK, B.: NEMA affirms its support for AFCI and LCDI technology to prevent cord fires. The significant amount of cord fires attributed to portable electric heaters, combined with high probability of these products being operated unattended, further attests to the need for these technologies to reduce cord fires.

The comment rationale relies heavily on a recent NFPA study that utilizes a new reporting system over the previous reports and is suspect as to whether the reduction of fires is a result of product improvements or flaws by the change in the reporting system. We base this on the statements made by the author of this study, Dr. John Hall, as cited below:

- Estimates of fire incidents and nonfatal injuries after 1998 are not yet reliable.
- Rapid, deep declines that seem to relate to unresolved analysis problems rather than reality.
- We're still working on this.
- Problems do not affect deaths or loss as much.

These key issues were omitted from the comment's substantiation by extracting only a page from the entire report. Of particular note, the number of reported deaths is not declining as rapid as the reported fire data.

Fires are resulting from damaged cords and can be prevented by incorporating the safety devices recommended in Comment 17-11 (Log #2133) by a proven technology as evaluated by UL for this very purpose.

Comment on Affirmative:

BLEWITT, T.: Revisions have been submitted for comment to the Standards Technical Panel (STP1042) responsible for the product safety standards (UL 1278, Movable and Wall or Ceiling Hung Electric Room Heaters, and UL 1042, Electric Baseboard Heaters). Comments from the STP are due by January 31, 2007 after which the proposed revisions will be balloted for adoption.

HIRSCH, B.: It is the Edison Electric Institute's position that the requirements for end-use electrical devices that are **not** installed as part of the permanent premises wiring system are best covered by appropriate product standards. It is not the National Electrical Code's intent or scope to set requirements for end-use electrical devices that would typically be purchased by the after market consumer.

Work done by the Panel 17 Task Group on Protective Devices Integral with Electric Appliance Power Supply Cords revealed that there is no one solution that will provide complete protection in all cases. Thus, for the NEC to attempt to legislate a particular protection scheme makes no sense. The EEI/EL&P Companies recognizes that a Joint Task group on Power Supply Cord Safety, set up by UL and others, is currently in operation. A preliminary report was issued by the Task Group in 2006 which calls for performance based requirements for electric fans and electric room heaters. This approach allows manufacturers an option of meeting safety criteria in a number of ways. The EEI/EL&P Companies supports this approach.

The Edison Electric Institute supports the entire electrical safety system that integrates product standards, installation standards, product testing and evaluation, electrical inspection, manufacturer's products, qualified electrical installation and maintenance, electric supply system characteristics, and the owner's use and operation. Covering product standards in the National Electrical Code could negate the responsibility of the appropriate product standard and adversely impact the entire process.

The integrity of the electrical safety system is anchored in the systematic integration of the National Electrical Code, installation inspection, product safety standards and product testing. If non-premises end-use product safety issues are usurped by the National Electrical Code, the product safety standard process will be weakened resulting in the entire process being weakened. In addition, since non-premises end-use products are not normally in place during the inspection process, enforcement of such a requirement under the NEC would be impossible

17-10 Log #1367 NEC-P17 **Final Action: Accept**
(422.16(B)(5))

Submitter: Wayne E. Morris, AHAM
Comment on Proposal No: 17-13
Recommendation: The Code Panel should Reject the original Proposal 17-13.
Substantiation: The CMP 17 should reject the original proposal 17-13 for the following reasons:

1. The original proposal used as substantiation newspaper clippings of supposed fires on portable electric air heaters. The information is based on inadequate support and poor information AHAM hired one of the preeminent safety statistics firms to report on the numbers of accidents that might be caused by power supply cords of heaters. The maker of the code proposal states

the "most" of the portable heater fires are caused by power supply cords. According to Heiden Associates, an independent research firm, less than 2 percent of any portable heater fires are due to power supply cords.

2. The use of AFCIs and/or LCDIs on Room Air Conditioners since mid-2005 have been very problematic, and there is no indication that they have reduced fires. The addition of AFCI/LCDIs to power cords of room air conditioners have resulted in numerous nuisance tripping incidents. This has caused owners to cut off the devices, rewire attachment plugs and potentially diminish the safety and operation of the products.

3. Efforts are underway with the US Safety Standards for Portable Electric heaters to improve the safety of not only the power cord but other elements of the heater as well. The UL Standards Technical Panel (the committee responsible for the standards) has endorsed a number of standards changes to advance the safety of the products. These will include changes to the power cord to address some of the issues that have been raised by the Code Making Panel. The direction of the STP is to address the actual root causes of the problem, not add an unproven and inadequate component. The UL STP is presenting a detailed report within a few weeks to request comment on proposals to address this situation. This will result in changes to address this issue in a much more rapid and thorough manner than the NEC proposal.

4. Testing with LCDIs and AFCIs have shown that the two devices are not equivalent and do not provide equal electrical safety protection. They should have never been included in a proposal as implying they provide similar electrical protection. Power cord AFCIs have been shown to have little or no effect on series arcs. There are even questions whether they will prevent problems in parallel areas. LCDIs have no effects on arcs inside the product. Neither power cord AFCIs nor LCDIs have any effect on arcing in receptacles or extension cords.

5. The National Electrical Code panel responsible for circuit breakers has advanced a proposal in the 2008 NEC to require AFCI breakers on all household circuits. This will protect all the house circuits on new construction from the panel box through the receptacle. As has been shown most of the home electrical fires are not due to portable electric fans but rather to home wiring, receptacles or even extension cords. AFCI breakers on all household circuits is a much more effective way of reducing home fires.

6. The UL Working Group, representing many stakeholders including a manufacturer of cord mounted AFCIs and LCDIs has suggested an alternate course of action. This course of action. This course of action should be given preference and allowed to further the safety of these products through the changes to the UL standards.

Panel Meeting Action: Accept

Panel Statement: The panel accepts that documentation does exist of issues relating to power supply cords with portable electric heaters. The panel observes that item 5 of the submitter's substantiation does not address existing dwellings. Refer to panel action and statement for Comment 17-9.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Gill, C.

Explanation of Negative:

ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050).

Comment on Affirmative:

HIRSCH, B.: See my Comment under Comment 17-9.

17-11 Log #2133 NEC-P17 **Final Action: Reject**
(422.16(B)(5))

Submitter: Edward A. Schiff, Technology Research Corp.

Comment on Proposal No: 17-13

Recommendation: New text as originally submitted in Proposal, deleting the following from the panels' recommendation:

~~or other listed protection equal to or exceeding that of an LCDI or AFCI.~~

Substantiation: The submitter wishes to sincerely thank the Panel for their consideration and input. This substantiation is to address he comments made by the panel members.

The revised text is intended to allow for other new technologies that might be developed to prevent cord fires that might be developed. New classification will take a long time to have standards developed and would likely be qualified under UL 1699 which currently covers AFCI and LCDI cords. It is impossible to predict if any such technologies will be developed and they can be added to this article through the normal Code development process.

The UL Standards Technical Panel is dominated by the manufactures of appliances and does not have the balance nor the self interests of the NEC Code Member Panel. As cited in the original substantiation, there are a tremendous number of precedents for incorporation into the NEC which leads to a change in the product standard. The proposed changes do not address the damage that can and has occurred to cords on portable products of this nature that include pinching crushing, and overheating which will lead to series and parallel faults within the cord, the type of fault that the AFCI and LCDI cords will prevent.

The suggestion that there are serious technical issues is without any substantiation. UL has done extensive testing on these devices, developed appropriate standards and the products have been in service for over a decade.

The concern over the plug head leading to the use of plug strips is interesting. Our history with this sort of device in the plug head (GFCIs, ALCIs, IDCIs, ELCIs, LCDIs, etc.) is that they are plugged into the lower outlet to allow for use of the upper outlet. This would make it impossible to plug two heaters into the same outlet, which would reduce the risk of overloading the branch circuit, since these devices are typically rated for 12 Amps. In the scenario of plugging in the heaters to a plug strip, there would be a 15A breaker providing short circuit and overload protection. This type of device has a long history of use in the field with a great track record for reliability and a mature standard for performance. There is no history known to the submitter of modification of the cord. This is a low cost product that if damaged, would far more likely be replaced as opposed to modified.

Heater cord is a foreseeable problem that has and will continue to lead to electrical fires which the purpose of the NEC is to prevent foreseeable problems.

Panel Meeting Action: Reject

Panel Statement: Proposal 17-13 has been rejected by the action on Comment 17-9, and this comment is therefore not applicable.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Gill, C.

Explanation of Negative:

ROCK, B.: NEMA continues to support the protection of cords through the use of technology that has a proven history. The proposed solution (of AFCI or LCDI technology) by the commentor would address fires resulting from damaged appliance cords as determined by the UL standard to evaluate this technology (UL 1699). Due to the facts that noted data sources indicate that fires are occurring due to damaged cords supplying portable heaters, there is no reason not to require a known technology that will eliminate or prevent this hazard.

Comment on Affirmative:

BLEWITT, T.: The commentor stated: "The UL Standards Technical Panel is dominated by the manufactures (sic) of appliances and does not have the balance nor the self interests of the NEC Code Member Panel." STPs are governed by standards development regulations complying with ANSI Essential Requirements as accredited by the American National Standards Institute (ANSI).

HIRSCH, B.: See my Comment under Comment 17-9.

17-18 Log #1102 NEC-P17 **Final Action: Accept**
(422.16(B)(5) (New))

Submitter: Wayne Myrick, Mahwah, NJ

Comment on Proposal No: 7-13

Recommendation: Support the code making panel's recommendation to Reject the original Proposal.

Substantiation: The NEC is not the proper place for portable product requirements. While this may be within the jurisdiction of the NEC and there is precedent for doing so, it is better to include end product requirements in the applicable product safety standards. End product requirements in the NEC are generally unenforceable by AHJs. The statistics cited by the proposer may not reflect safety improvements required by current editions of the product safety standards. Addition of an AFCI or LCDI will reduce the overall reliability of the product and may lead to consumers cutting the LCDI or AFCI off of the cord or making unsafe cord modifications or repairs. A UL task group has been looking into cord failures and may come up with better alternatives to deal with the root cause rather than electronic bandaids that attempt to detect and respond to particular failures.

Panel Meeting Action: Accept

Panel Statement: Also refer to the panel action and statement on Comment 17-9.

The panel does not agree with the submitter's substantiation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Gill, C.

Explanation of Negative:

ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050). Note: Comment 17-18 (Log #1102) was incorrectly transcribed to be associated with Proposal 7-13 (Log #198) rather than Proposal 17-13 (Log #3563) and is consequently misreferenced on the ballot.

Comment on Affirmative:

HIRSCH, B.: See my Comment under Comment 17-9.

17-20 Log #1159 NEC-P17 **Final Action: Accept**
(422.16(B)(5), 422.52 (New))

Submitter: Stephen T. Pastor, The Kirby Company

Comment on Proposal No: 17-29

Recommendation: The code panel should reject Proposals 17-29 and 17-13.

Substantiation: An AFCI and LCDI cannot detect a problem upstream of the protective device. Protection at the panel box will detect problems throughout the circuit including any issues with any appliances. Regulation should be focused at upgrading all home panel boxes to obtain the greatest benefit at the least expense.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comments 17-9 and 17-17.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050) and Comment 17-17 (Log #1051).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-21 Log #1160 NEC-P17 **Final Action: Accept**
(422.16(B)(5), 422.52 (New))

Submitter: John N. Balough, The Hoover Company
Comment on Proposal No: 17-13
Recommendation: The code panel should reject Proposals 17-13 and 17-29.
Substantiation: The dependability of the LCDIs and AFCIs has not been proven and may lead to increased user involvement with the function of the equipment.
Changes to cord construction and design should be investigated before adding an additional component to the product cord, which the consumer could and most likely will remove if it becomes intermittent.
It is my belief there are better alternatives to improve product safety.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comments 17-9 and 17-17.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050) and Comment 17-17 (Log #1051).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9

17-22 Log #1166 NEC-P17 **Final Action: Accept**
(422.16(B)(5), 422.52 (New))

Submitter: Ramona Saar, AHAM
Comment on Proposal No: 17-13
Recommendation: The Code Panel should reject Proposals 17-13 and 17-29.
Substantiation: The statistics upon which the proposals are (1) based are anecdotal in nature, not on research, and (2) do not take into account improvements made to the UL safety standards for fans and heaters.
The devices (AFCI/LCDI) have not been proven to be reliable and the addition of these devices will (1) add additional possible sources of failure to the appliances and (2) lead to possible consumer tampering with devices - creating unsafe conditions.
UL's Task Group on power cord safety advocates strengthening the safety tests for power cords - not mandating AFCIs and LDCIs. The recommendations of the technical experts that make up the UL Task Group should take precedence.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comments 17-9 and 17-17.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050) and Comment 17-17 (Log #1051).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-24 Log #1174 NEC-P17 **Final Action: Accept**
(422.16(B)(5))

Submitter: Larry Albert, Black & Decker
Comment on Proposal No: 17-13
Recommendation: The code Panel should reject Proposal 17-13.
Substantiation: The submitter's intent is to prohibit the use of the messenger from ever being a current carrying conductor. Sections 250.32(B)(1) and 250.32(B)(2) in the 2005 NEC clearly set forth the rules for when this conductor can be a grounding conductor and when it can be a grounded conductor. Acceptance of this proposal would negate these applicable requirements when this wiring method is used. Article 396 should be used to determine the use, installation, and construction specifications for messenger supported wiring. Article 250 should be used to determine the grounding requirements. No evidence is offered that any of the incidents cited by the submitter is, or has been corrected by the application of insulated neutrals. No evidence is offered that using the messenger as a current carrying conductor is a hazard.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-9.
The substantiation does not reflect the proposal for the code change. It is clearly based on some other proposal and not on Proposal 17-13.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-25 Log #1292 NEC-P17 **Final Action: Accept**
(422.16(B)(5), 422.52 (New))

Submitter: Stephen T. Pastor, The Kirby Company
Comment on Proposal No: 17-13
Recommendation: The code panel should reject Proposals 17-13 and 17-29.
Substantiation: An AFCI and LCDI cannot detect a problem upstream of the protective device. Protection at the panel box will detect problems throughout the circuit including any issues with any appliances. Regulation should be focused at upgrading all home panel boxes to obtain the greatest benefit at the least expense.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comments 17-9 and 17-17.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050) and Comment 17-17 (Log #1051).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-26 Log #1353 NEC-P17 **Final Action: Accept**
(422.16(B)(5))

Submitter: John N. Balough, The Hoover Company
Comment on Proposal No: 17-13
Recommendation: The Code Panel should Reject Proposal 17-13.
Substantiation: The dependability of the LCDIs and AFCIs has not been proven and may lead to increased user involvement with the function of the equipment.
Changes to cord construction and design should be investigated before adding an additional component to the product cord, which the consumer could and most likely will remove if it becomes intermittent.
There are better solutions such as making the changes in the appropriate end-product UL Standard.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-9.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-29 Log #1368 NEC-P17 **Final Action: Accept**
(422.16(B)(5))

Submitter: Lawrence Wethje, Association of Home Appliance Manufacturers
Comment on Proposal No: 17-13
Recommendation: The Code Panel should Reject Proposal 17-13.
Substantiation: The proposal is based on anecdotal incident data from newspaper clippings, which is not dependable. The proposed AFCI/LCDI devices have not been proven to be reliable in this application. There have been many problems associated with the use of these devices in a similar application with room air conditioners. The addition of these devices will result in increased sources of failure of the appliances in the field and lead to consumer tampering which will create unsafe conditions. Furthermore, the proposal does not take into account improvements that are being made to the UL safety standard for these products. UL's Task Group on power cord safety is strengthening the requirements for power cords, which will be more effective in improving safety than adding AFCIs or LCDIs.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-9.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-31 Log #1430 NEC-P17 **Final Action: Accept**
(422.16(B)(5), 422.52 (New))

Submitter: Walter G. Birdsell, Kaz, Incorporated
Comment on Proposal No: 17-13
Recommendation: The Code Panel should Reject Proposals 17-13 and 17-29.
Substantiation: ● The NEC is not the most appropriate vehicle for mandating requirements to consumer portable products. While this may be within the jurisdiction of the NEC, it would be better to use the applicable safety standards, which can be better enforced on products, let UL make the appropriate recommendations with support from the appliance industry, consumer groups, and the CPSC. UL has better knowledge of the appliance usages in the field.

● The Code Panel action in January 2006 confused the issue, is inappropriate, and would cause interpretation problems for test agencies and authorities having jurisdiction (AHJs - i.e., electrical inspectors). [Note the panel action was to include the words, "422.52 single phase cord-and plug-connected electric fans shall be provided with factory-installed LCDI, AFCI, or other listed protection equal to or exceeding that of an LCDI or AFCI. The protection shall be an integral part of the attachment plug or located in the power supply cord within 300 mm (12 in.) of the attachment plug."] The members noted that the addition of this language would make this section impossible to administer. The statement is open ended, thus needs to be better defined, this statement interjects the mandate of any technology that can be marketed, but not properly evaluated.

● UL has had, for the past 2 years, a Task Group dedicated to investigating power supply cord issues and will be unveiling its second report in a few weeks. This report will make recommendations for changes to address the root cause of the issue, not add a component onto the product. This is a better way to address the issue and a better way to enforce the changes. The recommendation expands beyond appliances, suggests that extension cords should be enhanced to the same tough standards as portable appliances. Extension cords per the NFPA Fire Stats 0505 report by Dr. John R. Hall, Jr., are indicated as a greater cause of fires than end appliances.

● There have been many problems identified in applying AFCIs and/or LCD's to room air conditioners. These are only slowly coming to light and have not completely been resolved. Consumers/users are cutting the devices off cords or returning the products due to false tripping or nuisance activation. When these devices were added, the fault tree compounded due to the complexity of going from a standard power cord plug to an electronic device that has a complex circuit that can fail due to power surges, or mishandling of the power cord. The devices are heavy, loose wall outlets compound the failure mode, depending on how the receptacle is installed; ground pin located on the top or bottom. Receptacles, per the NFPA Fire Stats 0505 report by Dr. John R. Hall, Jr., are a greater cause of fires than the end appliance.

● The dependability of the LCDIs and AFCIs have not been conclusively proven. The code panel seems to overlook this important aspect of component mandates. There are many different types of products in the market that need to interact with these potential mandated components, the component manufactures are not interested in the end product application or usage, only that their sales numbers will explode if these proposals pass. For example: the shield of the LCDIs makes the power cord very stiff, their current design will not pass the current standards for oscillation products. The new proposals to enhance power cords will make this test more rigorous. The code panel is not taking into consideration the specific tests that are required for these applications. The charts and the table I have provided show how AFCI/LCDI are not the do all protectors for different types of failures.

● The use of the recommended AFCIs or LCDIs may lead to increased user interference with the equipment.

● Limited testing with AFCIs has shown that in many cases, the device will not open the circuit when encountering an arcing condition in the product. In addition, most AFCIs will not open circuit when encountering a series arc failure. LCDIs must have a fault only in the power cord. They do not work on arcs in the product. Neither of these can detect problems upstream in the receptacle.

● According to NFPA, receptacle, extension cord, power outlet strip, and house wiring electrical fires far outweigh any of the statistics from proven power supply cord issues. Little has been done to improve the safety of these other important areas. There are greater sales in outlets or receptacles (with price points from well under a dollar to just over ten dollars) and extension cords (varying size styles and proposed applications or usages) in the market than portable appliances (heater, fans, or air conditioners). Extension cords or receptacles could be used for a specific designed purpose or the wrong application unknown to the manufacture. This uncertainty of application by the end consumer causes serious events as the charts, I have provided show. Any combination of a loose receptacle, extension cord and a high current drawing appliance is a dangerous combination that adding an AFCI or LCDI device on a fan or heater will not overcome a serious event. The devices will not see upstream.

● AFCIs and LCDIs are not the same and should not be looked upon as a solution to the issues that have been raised. There are many other ways to improve the safety other than adding an unproven component to the product.

● Changes to the UL standards for Heaters (UL 1278) were made in the early 1990's and the statistics cited by the maker of the code proposal may not reflect these improvements. In addition, the UL standards for fans and heaters have recently made changes to improve wiring for oscillating products to address many of these power supply cord issues. These changes need time to be reflected in the statistics.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comments 17-9 and 17-17.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050) and Comment 17-17 (Log #1051).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-34 Log #1720 NEC-P17 **Final Action: Accept**
(422.16(B)(5) (New))

Submitter: J.B. Hoyt, Whirlpool Corporation
Comment on Proposal No: 17-13
Recommendation: The Code Panel should Reject Proposal 17-13.
Substantiation: ● As a major manufacturer of Room Air Conditioners, Whirlpool Corporation has firsthand experience with the real world application of AFCI's and LCDI's. There have been many problems identified in applying these devices to room air conditioners.

● The dependability/reliability of the AFCIs and LCDIs have not been conclusively proven.

● Consumers/users are cutting the devices off cords or returning the products due to nuisance tripping problems.

● Nuisance tripping has also led to increased consumer complaints and service calls.

● The reliability of an AFCI or LCDI is less than a traditional plug and could lead to premature failures and to consumers making ill-advised or inappropriate repairs.

● According to NFPA, receptacle, extension cord, power outlet strip, and house wiring electrical fires far outweigh any of the statistics from proven power supply cord issues. This would be a more impactful area of focus, rather than on the products which may be plugged into such devices.

● Underwriters Laboratories has had a Task Group dedicated to investigating power supply cord issues and will be producing its second report shortly. This report is expected to make recommendations for changes to address the root cause of the issue, not add a component onto the product. This is a better way to address the issue and a better way to enforce the changes.

● The NEC often drives requirements that are included in product safety standards of UL or CSA, but without the benefit of manufacturing experience from a broad range of interested parties. Additionally, the enforcement of the NEC may not be as complete as it would be by following the UL or CSA

standards making and certification process. The use of this process should be preferred and allowed to progress as these processes have the ability to enforce safety requirements directly on the products for the entire USA market in a manner that best achieves the objective.

● Limited testing with AFCI's has shown that in many cases, the device will not open the circuit when encountering an arcing condition in the product. In addition, most AFCI's will not open circuit when encountering a series arc failure. LCDI's must have a fault only in the power cord. They do not work on arcs in the product.

● Neither, the AFCI nor the LCDI can detect problems upstream in an extension cord or in the receptacle, which, according to NFPA data is a much bigger problem that, therefore, would not be addressed.

● AFCI's and LCDI's are not the same and should not be looked upon as a solution to the issues that have been raised. There are many other ways to improve the safety other than adding an unproven component to the product.

● AFCI and LCDI devices are electronic devices with a complexity that exhibits the potential of typical electronics failures such as arc track and component overheating or burnout etc. In comparison, these failure modes do not exist with power plugs. Bad material choices and manufacturing issues have been observed. The question whether the increased risk and number of failures outweighs the alleged number of failures has not been answered satisfactorily. Meaning, are these devices really a safety improvement, especially considering reports of cut of devices, etc., in order to avoid nuisance tripping.

Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-9.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-35 Log #1921 NEC-P17 **Final Action: Accept**
(422.16(B)(5))

Submitter: Ralph Hudnall, Euro-Pro
Comment on Proposal No: 17-13
Recommendation: The Code Panel should Reject Proposal 17-13.
Substantiation: The proposed devices are not designed to provide the level of protection required of the consumer. They do not accurately sense the problems that cause fires in consumer products. More research is needed to devise a best practice in this case.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-9.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-37 Log #1927 NEC-P17 **Final Action: Accept**
(422.16(B)(5))

Submitter: David Lindahl, Opelika, AL
Comment on Proposal No: 17-13
Recommendation: Panel should reject the indicated Proposal.
Substantiation: The problem should be addressed by making manufacturing of upstream AFCIs and LCDIs fix these products for reliability. With this proposal all that is being done is bandaiding the problem not correcting it.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-9.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-40 Log #1936 NEC-P17 **Final Action: Accept**
(422.16(B)(5))

Submitter: Patricia Gilmore, Auburn, AL
Comment on Proposal No: 17-13
Recommendation: The Code Panel should Reject Proposal 17-13.
Substantiation: The NEC is not the most appropriate vehicle for mandating requirements to consumer portable products. While this may be within the jurisdiction of the NEC, it would be better to use the applicable safety standards, which can be better enforced on products.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-9.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-41 Log #1937 NEC-P17 **Final Action: Accept**
(422.16(B)(5), 422.52 (New))

Submitter: Laura Hudnall, Opelika, AL
Comment on Proposal No: 17-13
Recommendation: The Code Panel should Reject Proposal 17-13.
Substantiation: AFCIs and LCDIs are not the same and should not be looked upon as a solution to the issues that have been raised. There are many other ways to improve the safety other than adding an unproven component to the product.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-9.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050) and Comment 1-17 (Log #1051).

Note: Comment 17-41 (Log #1937) is incorrectly referenced by the commentor to "422.52(New)", which is associated with Proposal 17-29 (Log #3301) rather than Proposal 17-13 (Log #3563) cited by the commentor (Proposal 17-13 is associated with "422.16(B)(5)"), and is consequently misreferenced on the ballot.

Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-44 Log #2112 NEC-P17 **Final Action: Accept**
(422.16(B)(5) (New))

Submitter: Mathew Hudnall, Opelitea, AL
Comment on Proposal No: 17-13
Recommendation: The code panel should Reject Proposal 17-13.
Substantiation: There are other ways to improve safety other than adding an unproven component to the product.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-9.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-12 Log #451 NEC-P17 **Final Action: Reject**
(422.16(B)(5)(7))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-19
Recommendation: Accept proposal with additional (7):
(7) The cord shall be hard usage type and comply with any temperature rating marked on the water heater.
Substantiation: Panel statement reference to 400.8(1) is irrelevant; a water heater is an appliance not a structure. Many jurisdictions in California accept cord-and-plug connections for furnaces; exhaust hoods are permitted to be cord-and-plug connected; how often are they replaced? Many electric water heaters are direct connected with NM cable which is looped without support within 12 in. of termination.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its orginal substantiation for rejecting Proposal 17-19. No substantiation has been provided for new Item (7).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gill, C.

17-13 Log #1983 NEC-P17 **Final Action: Accept**
(422.33(A))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 17-23
Recommendation: This Proposal should have been Rejected.
Substantiation: The proposal said it was only editorial in nature ("Edit"), but it actually results in a significant and onerous change. This rule will require the receptacle for a refrigerator to be located in a space other than behind the refrigerator. Since a refrigerator in most existing installations and in common practice usually has to be pulled out a bit to access its receptacle outlet, the outlet is not readily accessible and another disconnect would be required. Similarly, a receptacle for a dishwasher or range that is accessible by pulling the appliance out from the wall would no longer qualify as a disconnect for that appliance. No substantiation was provided for these drastic changes in the requirements for appliance disconnects.
The substantiation is also incorrect in stating that a receptacle "cannot be ' not accessible' (closed in by building finish)...". This statement is based on the definition of accessible as applied to wiring methods. Receptacles are not "wiring methods" and are not covered by Chapter 3, they are a type of "Equipment for General Use" covered by Chapter 4. The definition of accessible that should be applied to receptacles is Accessible (as applied to equipment): "Admitting close approach; not guarded by locked doors, elevation, or other effective means."
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gill, C.

17-14 Log #407 NEC-P17 **Final Action: Reject**
(422.45)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-25
Recommendation: Accept.
Substantiation: This requirement is virtually impossible to enforce. It puts an obligation on the builder or electrical contractor which has never, to my knowledge, been enforced. At time of final inspection there may be no occupant; are follow-up inspections intended to enforce compliance? Such a requirement is more appropriate in manufacturer literature or instructions. How can it be ascertained if a portable smoothing iron is ever to be provided.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any new substantiation to delete the text.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
HIRSCH, B.: The proposer makes the point that this is impossible to enforce. The EEI/ELEP Companies agrees with this comment. The EEI also believes this is an appliance requirement and as such does not belong in the Code. It is the Edison Electric Institute's position that the requirements for end-use electrical devices that are **not** installed as part of the permanent premises wiring system are best covered by appropriate product standards. It is not the National Electrical Code's intent or scope to set requirements for end-use electrical devices that would typically be purchased by the after market consumer.
The Edison Electric Institute supports the entire electrical safety system that integrates product standards, installation standards, product testing and evaluation, electrical inspection, manufacturer's products, qualified electrical installation and maintenance, electric supply system characteristics, and the owner's use and operation. Covering product standards in the National Electrical Code could negate the responsibility of the appropriate product standard and adversely impact the entire process.
The integrity of the electrical safety system is anchored in the systematic integration of the National Electrical Code, installation inspection, product safety standards and product testing. If non-premises end-use product safety issues are usurped by the National Electrical Code, the product safety standard process will be weakened resulting in the entire process being weakened. In addition, since non-premises end-use products are not normally in place during the inspection process, enforcement of such a requirement under the NEC would be impossible.

17-15 Log #463 NEC-P17 **Final Action: Accept in Principle**
(422.52 (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-28
Recommendation: Accept proposal revised:
Electric drinking fountains shall be provided with ground-fault circuit-interrupter protection.
Substantiation: The submitter has proposed a good safety requirement.
Panel Meeting Action: Accept in Principle
Add new 422.52 to read as follows:
422.52 Electric Drinking Fountains. Electric drinking fountains shall be protected with ground-fault circuit-interrupter protection.
Panel Statement: The panel accepts the submitter's recommendation but has added a title and used the word "protected" rather than "provided" for clarity. It has been brought to the attention of the panel that there have been documented fatalities that have been attributed to this kind of installation.
This requirement is not intended to apply to bottled water coolers.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gill, C.
Comment on Affirmative:
BLEWITT, T.: A single incident was described to the panel though two were reported to have occurred. The described incident involved a water fountain where the factory-supplied grounding pin of the attachment plug cap was removed.

17-16 Log #1029 NEC-P17 **Final Action: Accept**
(422.52 (New))

Submitter: Larry Johnson, National Presto Industries Inc.
Comment on Proposal No: 17-29
Recommendation: The code panel should reject Proposal 17-29.
Substantiation: UL has had, for the past 2 years, a task group (I am a member of the group) dedicated to investigating power supply cord issues and will be unveiling its second report in a few weeks. This report will make recommendations for changes to address the root cause of the issue, not add a component onto the product. This is a better way to address the issue and a better way to enforce the changes.
Panel Meeting Action: Accept
Panel Statement: Also refer to panel action and statement on Comment 17-17.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-17 (Log #1051).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-17 Log #1051 NEC-P17 **Final Action: Accept**
(422.52 (New))

Submitter: Richard J. Cripps, Association of Home Appliance Manufacturers
Comment on Proposal No: 17-29
Recommendation: Reject proposal.
Substantiation: I am taking this opportunity to enlarge on an issue which I raised in Item 4 of my Explanation of Negative on the Panel Vote.
I draw attention to a Power Point Presentation entitled "Fires Starting With Electrical Distribution Equipment" prepared for the NFPA by Dr. John Hall, Jr., in May, 2005. Slide 14 is entitled "U.S. Cord or Plug Structure Fires, 1980 to 2002." It depicts an incident rate declining at a fairly uniform rate from 15,000 per year in 1980 to 4,300 in 2002.
This substantial and sustained trend, I suggest, is the long term result of improvements to power cord specification progressively adopted by manufacturers for appliances generally prior to and during the period reviewed. The decline which has been maintained reflects the aging, taking out of

service and replacement of appliances manufactured prior to each successive specification enhancement; that is, the greater the proportion of appliances to post-enhancement specification in the overall population, the lower will be the number of incidents.

This trend will continue, particularly as further improvements to power cords for fans are being investigated by UL as the Panel has been informed. The imposition of additional protective equipment at this time is, therefore, not justified. The final rejection of this proposal as required by the written ballot at the ROP stage should be upheld.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept

Panel Statement: Currently, UL

is in the process of revising the product safety standard (UL 507, Electric Fans) to upgrade the power supply cords in lieu of adding protective devices. The revisions are expected to be adopted in 2007.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Gill, C.

Explanation of Negative:

ROCK, B.: NEMA affirms its support for AFCI and LCDI technology to prevent cord fires. The significant amount of cord fires attributed to portable electric fans, combined with high probability of these products being operated and unattended, further attests to the need for these technologies to reduce cord fires.

The comment rationale relies heavily on a recent NFPA study that utilizes a new reporting system over the previous reports and is suspect as to whether the reduction of fires is a result of product improvements or flaws by the change in the reporting system. We base this on the statements made by the author of this study, Dr. John Hall, as cited below:

- Estimates of fire incidents and nonfatal injuries after 1998 are not yet reliable.
- Rapid, deep declines that seem to relate to unresolved analysis problems rather than reality.
- We're still working on this.
- Problems do not affect deaths or loss as much.

These key issues were omitted from the comment's substantiation by extracting only a page from the entire report. Of particular note, the number of reported deaths is not declining as rapid as the reported fire data.

Fires are resulting from damaged cords and can be prevented by incorporating the safety devices recommended in Comment 17-46 (Log #2234) by a proven technology as evaluated by UL for this very purpose.

Comment on Affirmative:

BLEWITT, T.: Revisions have been submitted for comment to the Standards Technical Panel (STP507) responsible for the product safety standard (UL 507, Electric Fans). Comments from the STP are due by January 19, 2007 after which the proposed revisions will be balloted for adoption.

HIRSCH, B.: See my Comment under Comment 17-9.

17-19 Log #1103 NEC-P17 **Final Action: Accept**
(422.52 (New))

Submitter: Wayne Myrick, Mahwah, NJ

Comment on Proposal No: 17-29

Recommendation: Support the code making panels recommendation to Reject the original Proposal.

Substantiation: The NEC is not the proper place for portable product requirements. While this may be within the jurisdiction of the NEC and there is precedent for doing so, it is better to include end product requirements in the applicable product safety standards. End product requirements in the NEC are generally unenforceable by AHJs. The statistics cited by the proposer may not reflect safety improvements required by current editions of the product safety standards. Addition of an AFCI or LCDI will reduce the overall reliability of the product and may lead to consumers cutting the LCDI or AFCI off of the cord or making unsafe cord modifications or repairs. A UL task group has been looking into cord failures and may come up with better alternatives to deal with the root cause rather than electronic bandaids that attempt to detect and respond to particular failures.

Panel Meeting Action: Accept

Panel Statement: Also refer to the panel action and statement on Comment 17-17.

The panel does not agree with the submitter's substantiation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Gill, C.

Explanation of Negative:

ROCK, B.: See reason for NEMA vote on Comment 17-17 (Log #1051).

Comment on Affirmative:

HIRSCH, B.: See my Comment under Comment 17-9

17-23 Log #1172 NEC-P17 **Final Action: Accept**
(422.52 (New))

Submitter: Larry Albert, Black & Decker

Comment on Proposal No: 17-29

Recommendation: The Code Panel should reject Proposal 17-29.

Substantiation: The proposer covers the safety of a class of end products by addressing the inclusion of a single device. Product safety is best addressed by the development or amendment of a product safety standard. ANSI standards and ANSI standards making bodies already exist for these appliances. Despite the code Panel's previous activities with respect to air conditioners, this is an inappropriate body for appliance safety. The code Panel is unlikely to adequately cover the overall safety of the product by stipulating only one component. The proposers should submit their proposal to the appropriate end product STP.

Panel Meeting Action: Accept

Panel Statement: Also refer to the panel action and statement on Comment 17-17.

The panel does not agree with the submitter's substantiation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Gill, C.

Explanation of Negative:

ROCK, B.: See reason for NEMA vote on Comment 17-17 (Log #1051).

Comment on Affirmative:

HIRSCH, B.: See my Comment under Comment 17-9.

17-27 Log #1354 NEC-P17 **Final Action: Accept**
(422.52 (New))

Submitter: John N. Balough, The Hoover Company

Comment on Proposal No: 17-29

Recommendation: The Code Panel should Reject Proposal 17-29.

Substantiation: The dependability of the LCDIs and AFCIs has not been proven and may lead to increased user involvement with the function of the equipment.

Changes to cord construction and design should be investigated before adding an additional component to the product cord, which the consumer could and most likely will remove if it becomes intermittent.

There are better solutions such as making the changes in the appropriate end-product UL Standard.

Panel Meeting Action: Accept

Panel Statement: Also refer to the panel action and statement on Comment 17-17.

The panel does not agree with the submitter's substantiation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Gill, C.

Explanation of Negative:

ROCK, B.: See reaon for NEMA vote on Comment 17-17 (Log #1051).

Comment on Affirmative:

HIRSCH, B.: See my Comment under Comment 17-9.

17-28 Log #1366 NEC-P17 **Final Action: Accept**
(422.52 (New))

Submitter: Wayne E. Morris, AHAM

Comment on Proposal No: 17-29

Recommendation: The Code Panel should Reject the original Proposal 17-29.

Substantiation: The CMP 17 should reject the original proposal 17-29 for the following reasons:

1. The maker of the Code Proposal 17-29 cites inaccurate statistics regarding incidents involving fire incidents and power cord incidents involving electric fans. AHAM hired one of the preeminent statistics firms in the US to review the statistics. First, their finding was that there are less than 20 percent of the incidents per year alleged by the proposal maker. In addition, far fewer incidents even might be involved with power cords. And, many of these will be addressed by most recent changes to the UL standard. The improper use of statistics by the code proposal maker should not be used to address this issue.

2. The use of AFCIs and/or LCDIs on Room Air Conditioners since mid-2005 have been very problematic, and there is no indication that they have reduced fires. The addition of AFCI/LCDIs to power cords of room air conditioners have resulted in numerous nuisance tripping incidents. This has caused owners to cut off the devices, rewire attachment plugs and potentially diminish the safety and operation of the products.

3. Efforts are underway with the US Safety Standards for Portable Electric Fans to improve the safety of not only the power cord but other elements of the fan as well. The Standards Technical Panel (the committee responsible for the standards) has endorsed a number of standards changes to advance the safety of the products. These will include changes to the power cord to address some of

the issues that have been raised by the Code Making Panel. The direction of the STP is to address the actual root causes of the problem, not add an unproven and inadequate component. The UL STP is presenting a detailed report within a few weeks to request comment on proposals to address this situation. This will result in changes to address this issue in a much more rapid and thorough manner than the NEC proposal.

4. Testing with LCDIs and AFCIs have shown that the two devices are not equivalent and do not provide equal electrical safety protection. They should have never been included in a proposal as implying they provide similar electrical protection. Power cord AFCIs have been shown to have little or no effect on series arcs. There are even questions whether they will prevent problems in parallel areas. LCDI's have no effects on arcs inside the product. Neither power cord AFCIs nor LCDIs have any effect on arcing in receptacles or extension cords.

5. The National Electrical Code panel responsible for circuit breakers has advanced a proposal in the 2008 NEC to require AFCI breakers on all household circuits. This will protect all the house circuits on new construction from the panel box through the receptacle. As has been shown most of the home electrical fires are not due to portable electric fans but rather to home wiring, receptacles or even extension cords. AFCI breakers on all household circuits is a much more effective way of reducing home fires.

6. The UL STP has made several changes to improve safety of electric fans by increasing requirements for oscillating fan cords. This will improve safety and address one of the main sources of issues presented in CPSC incident reports.

7. The UL Working Group, representing many stakeholders including a manufacturer of cord mounted AFCIs and LCDIs has suggested an alternate course of action. This course of action should be given preference and allowed to further the safety of these products through the changes to the UL standards.

Panel Meeting Action: Accept

Panel Statement: The panel accepts that documentation does exist of issues relating to power supply cords with portable electric fans. The panel observes that item 5 of the submitter's substantiation does not address existing dwellings. Refer to panel action and statement on Comment 17-17.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Gill, C.

Explanation of Negative:

ROCK, B.: See reason for NEMA vote on Comment 17-17(Log #1051).

Comment on Affirmative:

HIRSCH, B.: See my Comment under Comment 17-9.

17-30 Log #1369 NEC-P17 **Final Action: Accept**
(422.52 (New))

Submitter: Lawrence Wethje, Association of Home Appliance Manufacturers
Comment on Proposal No: 17-29
Recommendation: The Code Panel should Reject Proposal 17-29.
Substantiation: The proposal is based on anecdotal incident data from newspaper clippings, which is not dependable. The proposed AFCI/LCDI devices have not been proven to be reliable in this application. There have been many problems associated with the use of these devices in a similar application with room air conditioners. The addition of these devices will result in increased sources of failure of the appliances in the field and lead to consumer tampering which will create unsafe conditions. Furthermore, the proposal does not take into account improvements that are being made to the UL safety standard for these products. UL's Task Group on power cord safety is strengthening the requirements for power cords, which will be more effective in improving safety than adding AFCIs or LCDIs.

Panel Meeting Action: Accept

Panel Statement: Also refer to the panel action and statement on Comment 17-17.

The panel does not agree with the submitter's substantiation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Gill, C.

Explanation of Negative:

ROCK, B.: See reason for NEMA vote on Comment 17-17 (Log #1051).

Comment on Affirmative:

HIRSCH, B.: See my Comment under Comment 17-9.

17-32 Log #1487 NEC-P17 **Final Action: Accept**
(422.52 (New))

Submitter: Cyral M. Walsh, BSH Home Appliances Corp.
Comment on Proposal No: 17-29
Recommendation: The code Panel should reject Proposal 17-29.
Substantiation: 1. The requirements for end use electrical devices that are not installed as part of the permanent premises should be covered by the appropriate product standard.

a. This is especially true where the appliances are consumer "carry home" units, most of which are produced off shore.

b. Built in, cord connected fans, such as range hoods, can have characteristics that are incompatible with existing LCDI/AFCI devices.

2. There are serious technical issues with the overall reliability of LCDI/AFCI devices and their ability to respond dependably to the fault conditions against which they are intended to protect.

3. LCDI/AFCI devices would have a reliability less than that of a simple attachment plug. A failure of the device, or nuisance tripping, would lead to either return of a properly operating unit or consumer modification of the cord (e.g. cutting off the LCDI/AFCI device and replacing it with an after market plug which may or may not be properly attached or grounded.

4. The phrase "...protection equal to or exceeding that of an LCDI or AFCI" is ambiguous and open to misinterpretation. LCDI and AFCI devices operate differently and are not comparable to one another, let alone to some undeveloped technology. It would be impossible for manufacturers, code authorities, authorities having jurisdiction and certification organizations to consistently interpret that requirement.

Panel Meeting Action: Accept

Panel Statement: Also refer to the panel action and statement on Comment 17-17.

The panel does not agree with the submitter's substantiation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Gill, C.

Explanation of Negative:

ROCK, B.: See reason for NEMA vote on Comment 17-17 (Log #1051).

Comment on Affirmative:

HIRSCH, B.: See my Comment under Comment 17-9.

17-33 Log #1719 NEC-P17 **Final Action: Accept**
(422.52 (New))

Submitter: J.B. Hoyt, Whirlpool Corporation
Comment on Proposal No: 17-29
Recommendation: The Code Panel should Reject Proposal 17-29.
Substantiation: ● As a major manufacturer of Room Air Conditioners, Whirlpool Corporation has firsthand experience with the real world application of AFCIs and LCDIs. There have been many problems identified in applying these devices to room air conditioners.

● The dependability/reliability of the AFCIs and LCDIs have not been conclusively proven.

● Consumers/users are cutting the devices off cords or returning the products due to nuisance tripping problems.

● Nuisance tripping has also led to increased consumer complaints and service calls.

● The reliability of an AFCI or LCDI is less than a traditional plug and could lead to premature failures and to consumers making ill-advised or inappropriate repairs.

● According to NFPA, receptacle, extension cord, power outlet strip, and house wiring electrical fires far outweigh any of the statistics from proven power supply cord issues. This would be a more impactful area of focus, rather than on the products which may be plugged into such devices.

● Underwriters Laboratories has had a Task Group dedicated to investigating power supply cord issues and will be producing its second report shortly. This report is expected to make recommendations for changes to address the root cause of the issue, not add a component onto the product. This is a better way to address the issue and a better way to enforce the changes.

● The NEC often drives requirements that are included in product safety standards of UL or CSA, but without the benefit of manufacturing experience from a broad range of interested parties. Additionally, the enforcement of the NEC may not be as complete as it would be by following the UL or CSA standards making and certification process. The use of this process should be preferred and allowed to progress as these processes have the ability to enforce safety requirements directly on the products for the entire USA market in a manner that best achieves the objective.

● Limited testing with AFCI's has shown that in many cases, the device will not open the circuit when encountering an arcing condition in the product. In addition, most AFCI's will not open circuit when encountering a series arc failure. LCDI's must have a fault only in the power cord. They do not work on arcs in the product.

● Neither, the AFCI nor the LCDI can detect problems upstream in an extension cord or in the receptacle, which, according to NFPA data is a much bigger problem that, therefore, would not be addressed.

● AFCI's and LCDI's are not the same and should not be looked upon as a solution to the issues that have been raised. There are many other ways to improve the safety other than adding an unproven component to the product.

● AFCI and LCDI devices are electronic devices with a complexity that exhibits the potential of typical electronics failures such as arc track and component overheating or burnout etc. In comparison, these failure modes do not exist with power plugs. Bad material choices and manufacturing issues have been observed. The question whether the increased risk and number of failures outweighs the alleged number of failures has not been answered

satisfactorily. Meaning, are these devices really a safety improvement, especially considering reports of cut of devices, etc., in order to avoid nuisance tripping.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-17.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-17 (Log #1051).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-36 Log #1924 NEC-P17 **Final Action: Accept**
(422.52 (New))

Submitter: Ralph Hudnall, Euro-Pro
Comment on Proposal No: 17-29
Recommendation: The Code Panel should Reject Proposal 17-29.
Substantiation: AFCIs and LCDIs are not presently devices to provide the protection needed. Adding them will unnecessarily add cost to the product and provide the consumer with a false sense of security.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-17.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-17 (Log #1051).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-38 Log #1933 NEC-P17 **Final Action: Accept**
(422.52 (New))

Submitter: David Lindahl, Opelika, AL
Comment on Proposal No: 17-29
Recommendation: Panel should Reject the indicated Proposal.
Substantiation: The problem should be addressed by making manufacturing of upstream AFCIs and LCDIs fix these products for reliability. With this proposal all that is being done is bandaiding the problem not correcting it.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-17.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-17 (Log #1051).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-39 Log #1935 NEC-P17 **Final Action: Accept**
(422.52 (New))

Submitter: Patricia Gilmore, Auburn, AL
Comment on Proposal No: 17-29
Recommendation: The Code Panel should Reject Proposal 17-29.
Substantiation: The dependability of the LCDIs and AFCIs nave not been conclusively proven.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-17.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-17 (Log #1051).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-42 Log #1938 NEC-P17 **Final Action: Accept**
(422.52 (New))

Submitter: Laura Hudnall, Opelika, AL
Comment on Proposal No: 17-29
Recommendation: The Code Panel should Reject Proposal 17-29.
Substantiation: The dependability of the LCDIs and AFCIs have not been conclusively proven.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-17.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-17 (Log #1051).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-43 Log #2111 NEC-P17 **Final Action: Accept**
(422.52 (New))

Submitter: Mathew Hudnall, Opelitea, AL
Comment on Proposal No: 17-29
Recommendation: Proposal 17-29 should be Rejected by the code panel.
Substantiation: There are other ways to improve safety other than adding an unproven component to the product.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-17.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-17 (Log #1051).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-45 Log #2190 NEC-P17 **Final Action: Reject**
(422.52 (New))

Submitter: Gary Beideman, Lasko Products, Inc.
Comment on Proposal No: 17-29
Recommendation: Revise text to read as follows:
422.52 Cord-and-Plug-Connected Electric Fans. Single-Phase cord-and plug connected electric fans shall be provided with a listed factory-installed Over Current Protective Device, LCDI or AFCI, ~~or other listed protection equal to or exceeding that of an LCDI or AFCI.~~ The protection shall be an integral part of the attachment plug or be located in the power supply cord within 152 mm (6 in.) ~~300 mm (12 in.)~~ of the attachment plug.
Substantiation: AFCIs and LCDIs are both current limiting devices. They function differently and have limitations as to the type of failures they react to. The goal I see, no matter how robust the cord, is to limit the current, i.e., available energy when a failure occurs. The comment line (or other listed protection equal to or exceeding that of an LCDI or AFCI) is misleading and will be open to interpretations where no other device can be considered because AFCIs and LCDIs operate on different principles. Alternate devices can meet the current (energy) limiting goal and in many ways exceed the performance of AFCIs and LCDIs. The addition of the wording "LISTED" and "OVERCURRENT PROTECTION DEVICE" will allow for new and presently existing technology to be considered and not limit choices to only two devices. I have submitted a study performed by ARAI (Accident Reconstruction Analysis) which details the benefit of existing fuse technology by limiting available energy to ignite surrounding combustibles.) (Earl W. Roberts is a former presenter to the NEC Code Panel 17 Working Group. In his published book, "Under Currents and Over Currents". On pages 6 and 7 of this book, he details the simplicity, long reliable history and indigenous ability of a fuse to quickly clear and current-limit a fault condition.)
The (300 mm, 12 in.) length of cord stated from the plug to the device is not constant with existing UL codes for other devices. The 12 in. length will expose excessive cord that is unprotected. The amount of unprotected cord should be kept to a minimum. Changing the length to (152 mm, 6 in.) is consistent with experience gained in other UL standards, i.e., the standard for Christmas Tree lighting (UL Standard 588, paragraph 7.3).
Lasko Products Inc. has 13,000,000 fan products in the field which utilized a Listed Design, Molded Fuse into the plug and have received no reports of cord set fires associated with these products.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: Proposal 17-29 has been rejected by the action on Comment 17-17 and this comment is therefore not applicable.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-17 (Log #1051).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-46 Log #2234 NEC-P17 **Final Action: Reject**
(422.52 (New))

Submitter: Aaron B. Chase, Leviton Mfg. Co. Inc.
Comment on Proposal No: 17-29
Recommendation: Accept the original Proposal as submitted.
Substantiation: The submitter has provided adequate data to justify the use of this technology.
Panel Meeting Action: Reject
Panel Statement: Refer to the panel action and statement on Comment 17-17. No additional substantiation was provided by the submitter.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: NEMA continues to support the protection of cords through the use of technology that has a proven history. The proposed solution (of AFCI or LCDI technology) by the commentor would address fires resulting from damaged appliance cords as determined by the UL standard to evaluate this technology (UL 1699). Due to the facts that noted data sources indicate that fires are occurring due to damaged cords supplying portable fans, there is no reason not to require a known technology that will eliminate or prevent this hazard.
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-47 Log #1028 NEC-P17 **Final Action: Accept**
(422.53)

Submitter: Larry Johnson, National Presto Industries Inc.
Comment on Proposal No: 17-13
Recommendation: The code panel should reject Proposal 17-13.
Substantiation: UL has had, for the past 2 years, a task group (I am a member of the group) dedicated to investigating power supply cord issues and will be unveiling its second report in a few weeks. This report will make recommendations for changes to address the root cause of the issue, not add a component onto the product. This is a better way to address the issue and a better way to enforce the changes.
Panel Meeting Action: Accept
Panel Statement: Also refer to the panel action and statement on Comment 17-9.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: See reason for NEMA vote on Comment 17-9 (Log #1050).
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

17-48 Log #2088 NEC-P17 **Final Action: Reject**
(422.53)

Submitter: Gary Beideman, Lasko Products, Inc.
Comment on Proposal No: 17-13
Recommendation: Revise text to read as follows:
422.53 Room Air Heaters. Single-Phase cord-and plug connected room air heaters shall be provided with a listed factory-installed Over Current Protective Device, LCDI or AFCI, ~~or other listed protection equal to or exceeding that of an LCDI or AFCI.~~ The protection shall be an integral part of the attachment plug or be located in the power supply cord within 152 mm (6 in.) ~~300 mm (12 in.)~~ of the attachment plug.
Substantiation: AFCIs and LCDIs are both current limiting devices. They function differently and have limitations as to the type of failures they react to. The goal I see, no matter how robust the cord, is to limit the current, i.e., available energy when a failure occurs. The comment line (or other listed protection equal to or exceeding that of an LCDI or AFCI) is misleading and will be open to interpretations where no other device can be considered because AFCIs and LCDIs operate on different principles. Alternate devices can meet the current (energy) limiting goal and in many ways exceed the performance of AFCIs and LCDIs. The addition of the wording "LISTED" and "OVERCURRENT PROTECTION DEVICE" will allow for new and presently existing technology to be considered and not limit choices to only two devices. (Earl W. Roberts is a former presenter to the NEC Code Panel 17 Working Group. In his published book, "Under Currents and Over Currents", on pages 6 and 7 of this book, he details the simplicity, long reliable history and indigenous ability of a fuse to quickly clear and current-limit a fault condition.)
The (300 mm, 12 in.) length of cord stated from the plug to the device is not constant with existing UL codes for other devices. The 12 in. length will expose excessive cord that is unprotected. The amount of unprotected cord should be kept to a minimum. Changing the length to (152 mm, 6 in.) is consistent with experience gained in other UL standards, i.e., the standard for Christmas Tree lighting (UL Standard 588, paragraph 7.3).
Panel Meeting Action: Reject
Panel Statement: Proposal 17-13 has been rejected by the action on Comment 17-9, and this comment is therefore not applicable.
The panel does not agree with the submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gill, C.
Comment on Affirmative:
HIRSCH, B.: See my Comment under Comment 17-9.

ARTICLE 424 — FIXED ELECTRIC S PACE-HEATING EQUIPMENT

17-49 Log #384 NEC-P17 **Final Action: Accept**
(424.19)

Submitter: Bryan P. Holland, City of North Port
Comment on Proposal No: 17-31
Recommendation: I continue to support this proposal and the revision made by the panel.
Substantiation: The disconnecting means rating should match that of 424.3(B) and be calculated at 125% as revised by the panel.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12
Ballot Not Returned: 1 Gill, C.

17-50 Log #464 NEC-P17 **Final Action: Accept in Principle**
(424.19)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-32
Recommendation: Accept proposal revised:
An approved means shall be provided ~~to~~ that simultaneously disconnects all ungrounded conductors of the circuit for the heater, motor controller(s), and supplementary overcurrent device(s) from all fixed electric space heating equipment ~~from all ungrounded conductors~~.
Substantiation: Since the panel declined to limit disconnecting means to switches and circuit breakers, they should be specifically required to be approved. Lugs, terminals, and wire connectors are means of disconnection which may not be suitable. Ungrounded conductors should be specifically required to be simultaneously disconnected, as required in many code sections.
Panel Meeting Action: Accept in Principle
Revise the first sentence of 424.19 to read as follows:
Means shall be provided to simultaneously disconnect the heater, motor controller(s), and supplementary overcurrent protective device(s) of all fixed electric space-heating equipment from all ungrounded conductors.
Panel Statement: The revised language more clearly presents the requirement and meets the intent of the submitter.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12
Ballot Not Returned: 1 Gill, C.

ARTICLE 426 — FIXED OUTDOOR ELECTRIC DEICING AND SNOW-MELTING EQUIPMENT

17-51 Log #764 NEC-P17 **Final Action: Reject**
(426.32 Exception)

Submitter: Neal Fenster, Thermo Systems Technology, Inc.
Comment on Proposal No: 17-46
Recommendation: We propose to add the revised exception to read:
Where conditions of maintenance and supervision ensure that only qualified personnel will service and maintain the impedance heating elements, and the maximum voltage of the impedance heating elements shall not exceed 80 volts where protected by a ground fault protector set to trip at a value not greater than 30 ma above the inherent leakage of the impedance heating elements, and access to the impedance heating elements is restricted by either of the following conditions.
- The impedance heated system is located behind locked enclosures.
- Access to the impedance heating system is restricted by fencing or elevation.

Substantiation: The revised text is proposed to address the Panel's concern by specifying the maximum voltage rise and ma leakage current based upon system design. It, furthermore, spells out the personnel and physical access restrictions.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided substantiation for using GFPE versus GFCI protection for personnel.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Gill, C.

17-52 Log #504 NEC-P17 **Final Action: Accept in Principle**
(426.50(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-47
Recommendation: Accept as revised:
All fixed outdoor deicing and snow melting equipment shall be provided with ~~a~~ an approved means for simultaneous disconnection ~~from~~ of all ungrounded supply conductors. Where readily accessible to the user of the equipment the branch circuit switch or circuit breaker shall be permitted to serve as the disconnecting means. ~~Switches or circuit breakers used as the~~ The disconnecting means shall be ~~of the indicating type~~ indicate a closed or open position and be provided with a positive lockout provision in the "off" position.
Substantiation: Since the proposal to provide a switch or circuit breaker was rejected, it should be specifically required to be approved, since wire connectors, lugs, links, relays, etc., are also disconnecting means. Disconnection should be simultaneous for ungrounded conductors of the circuit. The disconnecting means of 427.55(A) and 427.56(A) require positive lockout provisions and should be required for these disconnecting means which may be remote from the equipment. The proposal specifies what "indicating type" is. The last sentence should apply to all disconnecting means not just switches and circuit breakers.
Panel Meeting Action: Accept in Principle
Revise 426.50(A) to read as follows:
(A) Disconnection. All fixed outdoor deicing and snow-melting equipment shall be provided with a means for simultaneous disconnection from all ungrounded conductors. Where readily accessible to the user of the equipment, the branch-circuit switch or circuit breaker shall be permitted to serve as the disconnecting means. The disconnecting means shall be of the indicating type and be provided with a positive lockout in the "off" position.
Panel Statement: The revised text more clearly presents the requirements and meets the intent of the submitter.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Gill, C.

17-53 Log #210 NEC-P17 **Final Action: Accept**
(426.52)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 17-49
Recommendation: It is the action of the Technical Correlating Committee that the panel reconsider the proposal and clarify that branch circuit sizing does not provide overcurrent protection. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation to reconsider. See the panel action and statement on Comment 17-54.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Gill, C.

17-54 Log #978 NEC-P17 **Final Action: Accept in Principle**
(426.52)

Submitter: Mark C. Ode, Underwriters Laboratories Inc.
Comment on Proposal No: 17-49
Recommendation: Revise as follows:
426.52 Overcurrent Protection.
Fixed outdoor electric de-icing and snow melting equipment shall be connected to a ~~protected against overcurrent by~~ a branch circuit rated not less than 125 percent of the load and protected by an overcurrent protective device rated at 125% of the load.
Substantiation: It is not the branch circuit that is providing the overcurrent protection as would have been the case in the rewrite of the text by the proposal. It is the intent to size the branch circuit and the branch circuit overcurrent protective device at 125%.
Panel Meeting Action: Accept in Principle
Delete 426.52.
Panel Statement: The elimination of 426.52 meets the intent of the submitter because the sizing of the overcurrent protection devices is to be accomplished in accordance with other articles that address sizing for continuous loads. Section 426.4 was revised in 2005 to specify that all fixed outdoor electric deicing and snow melting equipment are continuous loads.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Gill, C.

ARTICLE 427 — FIXED ELECTRIC HEATING EQUIPMENT

17-55 Log #713 NEC-P17 **Final Action: Reject**
(427.5)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 17-50
Recommendation: The action should be to Reject.
Substantiation: The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. Code Making Panel 17 should Reject this proposal to coordinate with the other technical committees in the NEC project and with 90.1(C). A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). In the action to reject proposal 8-3, one technical committee member promotes NECA standards as "….a tool to assist untrained electricians to make safer and better installations." The TCC should intervene, uphold the provisions of 90.1(C) and prohibit these types of Fine Print Notes. CMP 17 should reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Reject
Panel Statement: The ANSI standards referenced in the FPN of the panel action on Proposal 17-50 are not requirements but provide insight for users of the Code.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: NEMA supports this comment to oppose the portion of the panel action and panel statement to revise 427.1 FPN. NEMA continues its position that this reference should not be included in the NEC since the NEC is not a design, installation or maintenance manual. NEC 90.1(C) specifically states: "This code is not intended as a design specification or an instruction manual for untrained persons."

17-56 Log #880 NEC-P17 **Final Action: Reject**
(427.5)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 17-50
Recommendation: The panel is encouraged to continue to Reject Proposal 17-50.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 17-55.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 10 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
ROCK, B.: NEMA supports this comment to oppose the portion of the panel action and panel statement to revise 427.1 FPN. NEMA continues its position that this reference should not be included in the NEC since the NEC is not a design, installation or maintenance manual. NEC 90.1(C) specifically states: "This code is not intended as a design specification or an instruction manual for untrained persons."

17-57 Log #765 NEC-P17 **Final Action: Reject**
(427.27)

Submitter: Neal Fenster, Thermo Systems Technology, Inc.
Comment on Proposal No: 17-55
Recommendation: We propose to add the revised exception to read:
Where conditions of maintenance and supervision ensure that only qualified personnel will service and maintain the impedance heating elements, and the maximum voltage of the impedance heating elements shall not exceed 80 volts where protected by a ground fault protector set to trip at a value not greater than 30 ma above the inherent leakage of the impedance heating elements, and access to the impedance heating elements is restricted by either of the following conditions.
● The impedance heated system is located behind locked enclosures.
● Access to the impedance heating system is restricted by fencing or elevation.
Substantiation: The revised text is proposed to address the Panel's concern by specifying the maximum voltage rise and ma leakage current based upon system design. It, furthermore, spells out the personnel and physical access restrictions.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided substantiation for using GFPE versus GFCI protection for personnel.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Gill, C.

17-58 Log #420 NEC-P17 **Final Action: Accept in Principle**
(427.55)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-57
Recommendation: Accept revised:
Means shall be provided to simultaneously disconnect all ungrounded conductors of the branch circuit(s) supplying fixed electric pipeline heating equipment. ~~from all ungrounded conductors.~~ The branch circuit switch or circuit breaker shall be permitted as the disconnecting means. The disconnecting means shall ~~be of the indicating type~~ indicate the open (off) and closed (on) positions and be provided with a positive lockout means for locking in the open (off) position, that is identified for the purpose.
Substantiation: The disconnecting means should be specified to simultaneously disconnect all ungrounded conductors and specify the conductors as a branch circuit since a feeder or service disconnect complies with the literal wording of the first sentence. Indication of open (off) and closed (on) is more specific than "indicating type". The lockout provisions should be identified for the purpose to preclude makeshift means.
Panel Meeting Action: Accept in Principle
Revise 427.55(A) to read as follows:
(A) Switch or Circuit Breaker. Means shall be provided to simutaneously disconnect all fixed electric pipeline or vessel heating equipment from all ungrounded conductors. The branch-circuit switch or circuit breaker, where readily accessible to the user of the equipment, shall be permitted to serve as the disconnecting means. The disconnecting means shall be of the indicating type and shall be provided with a positive lockout in the "off" position.
Panel Statement: The revised text more clearly presents the requirement and meets the intent of the submitter.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11
Ballot Not Returned: 1 Gill, C.

ARTICLE 430 — MOTORS, MOTOR CIRCUITS, AND CONTROLLERS

11-3 Log #610 NEC-P11 **Final Action: Accept in Principle**
(430.2)

Submitter: Paul Guidry, Fluor Enterprises, Inc.
Comment on Proposal No: 11-17
Recommendation: This is a companion proposal for the addition of valve actuator motors. Companion proposal section numbers are: 430.6(D), 430.22(F), 430.24(B), 430.52(E) and 430.102(A).
Revise text to read as follows:
430.2 Valve Actuator Motor Assemblies. A manufactured assembly consisting of a valve, valve actuator motor, and other components such as controllers, torque switches, limit switches, and overload protection. Valve actuator motor assemblies are also commonly referred to as "motor-operated valves" or "MOVs".
FPN: Valve actuator motors have a unique design that can result in significantly different operating characteristics than NEMA Design B motors. Continuous duty motors, such as NEMA Design B motors, are rated in horsepower, which implies a constant torque. Valve actuator motors are neither continuous duty nor constant torque at rated speed. They can be characterized as short duty time, high starting torque motors.
FPN material is from IEEE Std. 1290-1996. Copyright © 1996 IEEE. All rights reserved.
Substantiation: This comment is based on proposal 11-17. It was my understanding in the proposal stage that the panel felt like Valve Actuator Motors (VAMs) should be covered by Article 430 (see panel comment on proposal 11-81). However, instead of adding a new Part XI, it was suggested that the current structure of the Code be modified for any rules regarding VAMs. Adding this definition (directly from IEEE Std. 1290) to 430.2 should satisfy the panel's concern that the requirements for VAMs won't be confused with valve modulating motors.
Users in the industrial/petrochemical have tried for years to apply Article 430 to valve actuator motors without success. These motors do not fit into any of the present rules that are in Article 430. I believe they need their own special rules in some areas.
Panel Meeting Action: Accept in Principle
Panel Statement: The submitter's concerns are addressed by the action on Comment 11-4. See action and statement on Comment 11-4.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-4 Log #814 NEC-P11 **Final Action: Accept in Principle in Part**
(430.2)

Submitter: Paul Guidry, Fluor Enterprises, Inc.
Comment on Proposal No: 11-17
Recommendation: This is not a duplicate comment. A previous comment has been made on this proposal (Log #610) It was brought to my attention during the comment stage that copyrighted material may be an issue with publishing it in the NEC should this comment be accepted.
This comment rewrites the text in the FPN found in the previous comment (Log #610) so the IEEE copyrights shouldn't be an issue.
This is a companion proposal for the addition of valve actuator motors. Companion proposal section numbers are: 430.6(D), 430.22(F), 430.24(B), 430.52(E) and 430.102(A).
Add text to read as follows:
430.2 Valve Actuator Motor Assemblies (VAMs). A manufactured assembly consisting of a valve, valve actuator motor, and other components such as controllers, torque switches, limit switches, and overload protection. Valve actuator motor assemblies are also commonly referred to as "motor-operated valves" or "MOVs".
FPN: Valve actuator motors have considerable differences in operating characteristics as compared to NEMA Design B motors due to the VAMs unique design. NEMA Design B motors are continuous duty and rated in horsepower, which implies a constant torque. Valve actuator motors are usually characterized as short duty time, high starting torque motors and are neither continuous duty or constant torque motors.
Substantiation: Users in the industrial/petrochemical have tried for years to apply Article 430 to valve actuator motors without success. These motors do not fit into any of the present rules that are in Article 430. I believe they need their own special rules in some areas. This comment along with the others identified as companion proposals address this need.
This comment is based on proposal 11-17. It was my understanding in the proposal stage that the panel felt like Valve Actuator Motors (VAMs) should be covered by Article 430 (see panel comment on proposal 11-81). However, instead of adding a new Part XI, it was suggested that the current structure of the Code be modified for any rules regarding VAMs. Adding this definition to 430.2 should satisfy the panel's concern that the requirements for VAMs won't be confused with valve modulating motors.
Panel Meeting Action: Accept in Principle in Part
Add a new definiton to 430.2 to read as follows:
"430.2 Valve Actuator Motor (VAM) Assemblies. A manufactured assembly used to operate a valve consisting of an actuator motor, and other components such as controllers, torque switches, limit switches, and overload protection.
FPN: VAMs typically have short-time duty and high torque characteristics.
Sequence in alpabetical order with existing definitions."
Panel Statement: The panel rejects the part of the definition pertaining to the valve and the reference to motor-operated valves (MOVs). The panel also rejects the part of the submitter's FPN that pertains to NEMA Design B motors.
The panel edits the definiton and FPN for clarity.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

1-108 Log #69 NEC-P01 **Final Action: Hold**
(430.2)

TCC Action: The Technical Correlating Committee understands that Proposal 11-16a from Code-making Panel 11, Comment 1-109 from Code-Making Panel 3, Comment 1-110 from Code-Making Panel 14, Comment 1-111 from Code-Making Panel 6, Comment 1-112 from Code-Making Panel 2, and Comment 1-113 from Code-Making Panel 10 are reported as "Hold" for review during the 2011 NEC revision cycle.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 11-16a
Recommendation: The Technical Correlating Committee Rejects the panel action to add a new definition for "Engineering Supervision" to Article 430. The term is used throughout the NEC and if a definition is needed it should be under the purview of Code-Making Panel 1. The Technical Correlating Committee directs that this proposal be sent to Code-Making Panel 1 for consideration of action in Article 100 during the comment phase. This action will be considered by Code-Making Panel 1 as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the Technical Correlating Committee to consider the recommendation contained in Proposal 11-16a for inclusion in Article 100. The panel has considered this proposal and Comment 1-109 from Code-Making Panel 3, Comment 1-110 from Code-Making Panel 14, Comment 1-111 from Code-Making Panel 6, Comment 1-112 from Code-Making Panel 2, and Comment 1-113 from Code-Making Panel 10. The panel concludes that Proposal 11-16a and these Comments be reported as "Hold" for review in the 2011 NEC revision cycle as no consensus presently exists and the issue cannot be resolved in this Code cycle. It requests the Technical Correlating Committee to appoint a Task Group having representation from those panels where the term "Engineering Supervision" has application, to determine if a definition of the term appropriate for general application in Article 100 can be developed.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
ANTHONY, M.: The issue is complex and subtle and we are in agreement that the issue should be tabled. NEC code panels have difficulty defining utility, neutral, bedroom and no doubt a universal "engineering supervision" definition will be difficult as the comments suggest. If an Article 100 definition is possible, the definition should take into account the professional registration regulations for each state. For example, some states issue a general professional engineering license; other state grant licenses in established disciplines.

1-109 Log #289 NEC-P01 **Final Action: Hold**
(430.2)

TCC Action:The Technical Correlating Committee understands that Proposal 11-16a from Code-making Panel 11, Comment 1-109 from Code-Making Panel 3, Comment 1-110 from Code-Making Panel 14, Comment 1-111 from Code-Making Panel 6, Comment 1-112 from Code-Making Panel 2, and Comment 1-113 from Code-Making Panel 10 are reported as "Hold" for review during the 2011 NEC revision cycle.
Submitter: Code-Making Panel 3,
Comment on Proposal No: 11-16a
Recommendation: CMP-3 recommends adding the proposed definition of "Engineering Supervision" to Article 100.
Substantiation: There are approximately 28 references to engineering supervision in various locations throughout the NEC. Although none of these references occur within Articles under the jurisdiction of CMP-3, this definition, inserted into Article 100 and placed under the jurisdiction of CMP-1 should be adequately defined, and placing it within Article 100 would provide a convenient location for this general definition.
This comment has been balloted through CMP-3 with the following results:
13 Eligible to Vote
9 Affirmative
3 Negative
1 Not Returned (J. sleights)
Mr. L. Easter voted negatively stating: "This proposal should be Rejected. The phrase "engineering supervision" is found 58 times in various articles of the NEC. As such, a definition does not belong in Article 430, where it would apply to only Article 430. If it were to be included as a definition in the NEC, it would more appropriately be placed in Article 100. However, the development of a definition of "Engineering Supervision" in Article 100 must consider the context and use of this term in each of the 58 locations of this term in the NEC."
Mr. D. Pace voted negatively stating: "A definition of the term "Engineering Supervision" should not be added to Article 100. the term needs to be defined specifically for the intended need. One definition cannot accurately cover all of the uses that are currently in the NEC. Also, the definition, as written, does not provide criteria for determining qualifications "supervision" and specifying an "Electrical Engineer" is too restrictive and is not feasible or necessary in some cases."
Mr. M. Sanders voted negatively stating: "The basis for Proposal 11-16a and Proposals 11-34 and 11-45 which did not receive the necessary consensus, and, therefore have been rejected by the Technical Correlating Committee. The negative comments on proposals by Mr. Hamer and Mr. Wright should have been taken into account, along with the comment of the Code-Making Panel 3 Task Group in Item 5.
The proposed text considered for inclusion into Article 100 is specific to Article 430 applications, and the apparent text has been adapted from the present 240.86(A), which is specific to field selected and installed series component overcurrent protection assemblies and is restricted to existing, not new, installations. The Code-Making Panel 3 Task Group states there are 28 instances where variations on this proposed text is employed. In order for this definition to be considered for inclusion into Article 100, each of those instances should be reviewed for the proposed text applicability.
This proposed text should be held for further review by all the affected Code-Making Panels and report back to the 2011 NEC cycle. This is too important to handle within the limited time of a Comment period."
Panel Meeting Action: Hold
Panel Statement: See the panel statement on Comment 1-108.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
ANTHONY, M.: See my explanation of affirmative vote on Comment 1-108.

1-110 Log #301 NEC-P01 **Final Action: Hold**
(430.2)

TCC Action: The Technical Correlating Committee understands that Proposal 11-16a from Code-making Panel 11, Comment 1-109 from Code-Making Panel 3, Comment 1-110 from Code-Making Panel 14, Comment 1-111 from Code-Making Panel 6, Comment 1-112 from Code-Making Panel 2, and Comment 1-113 from Code-Making Panel 10 are reported as "Hold" for review during the 2011 NEC revision cycle.
Submitter: Code-Making Panel 14,
Comment on Proposal No: 11-16a
Recommendation: a) Not support Technical Correlating Committee action to include a general definition as the issue is not applicable to CMP-14 texts.
A) Delete the word "engineering" from sections 501.140 and 505.17.
B) CMP-14 does not support the inclusion of the proposed definition of "engineering supervision" in Article 100.
Substantiation: A) This action makes these sections consistent with terms used in some 13 other places within CMP-14 texts and ensures that any action taken by CMP-1 on Proposal 11-16a will not impact installations under the responsibility of CMP-14.
B) Adding the proposed definition of "engineering supervision" within Article 100 would be too restrictive. Some engineering functions within the responsibility of CMP-14 could be better accomplished by persons with chemical, mechanical, process engineering backgrounds. The responsibility to determine specific qualifications for specific functions required in various areas within the NEC should remain with the Code-Making Panel that includes those qualifications. A general term cannot adequately cover all applications.
This comment was balloted through CMP-14 with the following ballot results:
14 Eligible to Vote
13 Affirmative
1 Negative (J. Kuczka)
Mr. Kuczka voted negatively stating: "NEMA agrees with not including a definition of engineering supervision, but does not agree with sending a comment to CMP-1 to delete wording in articles outside their jurisdiction. Furthermore, the deletion of the word "engineering" in 501 and 505 would be considered new material."
Mr. D. Cook voted affirmatively stating: "While I agree the engineering judgment required for electrical installations in hazardous (classified) locations may, and in some cases should, be addressed by engineers with other than an electrical background, I believe a definition in Article 100 would be useful for the general requirements in the NEC, providing the proposed definition in Article 100 would require the Code-Making Panel's responsible for Chapters 5, 6, and 7 to review the use of the term and determine if those "special" occupancies, equipment, and conditions require the use of a different term. At this point in the 2008 NEC Cycle, that does not seem possible."
Mr. M. O'Meara voted affirmatively stating: "Adding a definition of "Engineering Supervision" clarifies the level of responsibility the phrase is intended to require and will be helpful throughout the code in determining the proper level of supervision necessary."
Panel Meeting Action: Hold
Panel Statement: See the panel statement on Comment 1-108.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
ANTHONY, M.: See my explanation of affirmative vote on Comment 1-108.

1-111 Log #316 NEC-P01 **Final Action: Hold**
(430.2)

TCC Action: The Technical Correlating Committee understands that Proposal 11-16a from Code-making Panel 11, Comment 1-109 from Code-Making Panel 3, Comment 1-110 from Code-Making Panel 14, Comment 1-111 from Code-Making Panel 6, Comment 1-112 from Code-Making Panel 2, and Comment 1-113 from Code-Making Panel 10 are reported as "Hold" for review during the 2011 NEC revision cycle.
Submitter: Code-Making Panel 6,
Comment on Proposal No: 11-16a
Recommendation: This definition should not be incorporated in Article 100.

Substantiation: The application of specific formulas does not necessarily require the general expertise of an electrical engineer. For instance, a mathematical proof of conditions under application of 310.15(C) might be judged by the AHJ (who may be an electrical engineer doing plan checking) as acceptable although not done by an electrical engineer. Other engineers and other trained personnel may be fully qualified.

"Engineering supervision" alone provides a definition as clear as required.

This comment was balloted through CMP-6 with the following ballot results:

11 Eligible to Vote

11 Affirmative

Panel Meeting Action: Hold
Panel Statement: See the panel statement on Comment 1-108.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

ANTHONY, M.: See my explanation of affirmative vote on Comment 1-108.

1-112 Log #321 NEC-P01 **Final Action: Hold**
(430.2)

TCC Action: The Technical Correlating Committee understands that Proposal 11-16a from Code-making Panel 11, Comment 1-109 from Code-Making Panel 3, Comment 1-110 from Code-Making Panel 14, Comment 1-111 from Code-Making Panel 6, Comment 1-112 from Code-Making Panel 2, and Comment 1-113 from Code-Making Panel 10 are reported as "Hold" for review during the 2011 NEC revision cycle.
Submitter: Code-Making Panel 2
Comment on Proposal No: 11-16a
Recommendation: Reject the proposal.
Substantiation: The Task Group recommends to reject this proposal. The Task Group agrees that this definition is under the scope of CMP-1. The extent that "engineering supervision" is used throughout the code may have many different implications. The term given in the proposal of "electrical engineer" may conflict with other terms in the code using licensed professional engineers under engineering supervision. It appears that anytime the term "engineering supervision" or "maintenance and supervision" are used, they are always used in the connotation of relaxing the requirements of the code. The CMP-2 Task Group recommends that this be covered by a multi-panel Task Group during the next code cycle.

This comment was balloted through CMP-2 with the following ballot results:

12 Eligible to Vote

11 Affirmative

1 Not returned (B. Nenninger)

Mr. J. Pauley voted affirmatively stating: "For clarity, item 3 of the comment form should have the "deleted text" box checked and should state "CMP-2 recommends that CMP-1 Reject the proposal."
Panel Meeting Action: Hold
Panel Statement: See the panel statement on Comment 1-108.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

ANTHONY, M.: See my explanation of affirmative vote on Comment 1-108.

1-113 Log #349 NEC-P01 **Final Action: Hold**
(430.2)

TCC Action: The Technical Correlating Committee understands that Proposal 11-16a from Code-making Panel 11, Comment 1-109 from Code-Making Panel 3, Comment 1-110 from Code-Making Panel 14, Comment 1-111 from Code-Making Panel 6, Comment 1-112 from Code-Making Panel 2, and Comment 1-113 from Code-Making Panel 10 are reported as "Hold" for review in the 2011 NEC.
Submitter: Code-Making Panel 10,
Comment on Proposal No: 11-16a
Recommendation: Reject this proposal.
Substantiation: This comment was developed by a Task Group comprised of the following members of CMP-10: James Dollard, Chair; Charles Blizzard; Dennis Darling; Charles Eldridge; Carl Fredericks; Clive Kimblin; John Kovacik; Frank Ladonne; George Ockuly; Gerald Williams; Alan Manche and Vince Saporita.

The phrase "engineering supervision" is found 58 times in various articles of the NEC. As such, it does not belong in Article 430, where it would apply to only Article 430. If it were to be included as a definition in the NEC, it would more appropriately be placed in Article 100. However, the development of a definition of "Engineering Supervision" in Article 100 must consider the context and use of this term in each of the 58 locations of this term in the NEC.

This comment was balloted through CMP-10 with the following ballot results:

12 Eligible to Vote

11 Affirmative

1 Not Returned (R. Sobel)

Panel Meeting Action: Hold
Panel Statement: See the panel statement on Comment 1-108.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

ANTHONY, M.: See Comment on Comment 1-108

11-5 Log #1035 NEC-P11 **Final Action: Reject**
(430.6(A)(1) and (2))

Submitter: Charles M. Trout, Maron Electric Co. Inc.
Comment on Proposal No: 11-18
Recommendation: This proposal should be Accepted. I am not offering new sub
stantiation but rather I am disagreeing with the Panel Statement. The Panel offers no definitive or technical substantiation that a problem exists with wiring electric motors in accordance with their nameplate full load current. The requirements of 430.6(A) are in direct opposition to the purpose and intent of the Code as stated in 90.1(A) and (C). The Code is not intended as a design specification. The requirements of 430.6(A) mandate electrical design in the branch circuit wiring of electric motors beyond that required by the design of the electric motor. This requirement mandates oversizing motor branch circuit conductors based on the premise of an emergency condition which has not been substantiated. Electric motor replacement entails much more than conductor sizing. Motor mounts, shaft size, and shaft position must be accounted for. Thousands of motors are installed everyday. How many of these electric motors will have an emergency problem where replacement may present a problem that a competent electrician cannot handle.
Substantiation: See above.
Panel Meeting Action: Reject
Panel Statement: The panel rejects the comment.

As specifics of new and replacement motors are often unknown at the time of initial system design or installation, use of the tables provides a consistent source that provides safety over a wide range of motor applications. The AHJ has the authority to accept an installation design based on specific motor data if documentation and substantiation are provided and accepted. Refer to 90.4. Enforcement.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-6 Log #611 NEC-P11 **Final Action: Reject**
(430.6(D))

Submitter: Paul Guidry, Fluor Enterprises, Inc.
Comment on Proposal No: 11-19
Recommendation: This is a companion proposal for the addition of valve actuator motors. Companion proposal section numbers are: 430.2, 430.22(F), 430.24(B), 430.52(E) and 430.102(A).

Add new 430.6(D) as follows:

430.6(D) Valve Actuator Motors. For valve actuator motors, the rated current shall be the nameplate full-load current. This nameplate current shall be used to determine the ampacity of the branch-circuit conductors covered in 430.22 and 430.24, and the ampere rating of the motor branch-circuit short-circuit and ground-fault protective device.

Substantiation: Valve actuator motors are based on a manufacturer motor size-not horsepower like a NEMA Design B, C,D motor. For a given size of VAM, there are 2, 4, 6, and 8 pole motors. The motor sizes are each rated in full-load current and locked rotor current. The conductor size and breaker size should be calculated based on the nameplate full-load current rating. It is impossible to create a table such as 430.250 for full load currents since there are so many variables in the construction of VAMs. And, the VAM assemblies are geared differently for each valve resulting in varying currents for the same size motor.

This comment is based on proposal 11-81. It was my understanding in the proposal stage that the panel felt like Valve Actuator Motors (VAMs) should be covered by Article 430 (see panel comment on proposal 11-81). However, instead of adding a new Part XI, it was suggested that the current structure of the Code be modified for any rules regarding VAMs.
Panel Meeting Action: Reject
Panel Statement: Valve actuator motors (VAMs) are high torque motors and are already covered in 430.6(A)(1).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-7 Log #387 NEC-P11 **Final Action: Reject**
(Table 430.7(B), FPN (New))

Submitter: Paul Schwartz, FLUOR
Comment on Proposal No: 11-20
Recommendation: Add a FPN below Table 430.7(B) as follows:

To convert the Table 430.7(B) values to the ratio of locked rotor amps to full load amps (LRA/FLA), multiply the Code letter values (kVA per HP with locked rotor) by (Rated Power Factor x Rated Efficiency/0.746).
Substantiation: NEMA MG-1 and the NEC require all induction motors to have a locked rotor code Letter stamped on the motor nameplate. This code letter provides a range of values for kVALR per HP from which the starting current under locked rotor condition can be calculated for a given motor. Some power system analysis programs use this Code letter as input data for motor models for motor staring and short circuit calculations. However, other programs use LRA and FLA as input data. The purpose of this FPN addition to Table 430.7(B) is to clarify the relationship between the Code Letter value and the ratio of LRA/FLA.

CONVERSION OF THE MOTOR CODE LETTER VALUE TO THE RATIO OF LRA/FLA

Motor HP = kVAR + *PFR* EFFR/0.746 where the subscript R stands for rated)

The Motor Code Letter = kVALR/HP = kVALR/ (kVAR + PFR* EFFR/0.746)

The Motor Starting Current in per unit of full load current = kVALR/kVAR = (sqrt3 * VR* LRA)/(sqrt 3* VR * FLA) = LRA/FLA

The Motor Code Letter = kVALR/HP = (LRA/FLA) * (0.746/PFR * EFFR)

Therefore, the ratio of LRA/FLA =kVALR/HP) * (PFR * EFFR/0.746)

(Note when PFR * EFFR = 0.746, the Code Letter Value equals the ratio of LRA/FLA)

MEDIUM VOLTAGE INDUCTION MOTOR EXAMPLE

HP = 13,500 HP
kVR = 13,200 V
PFR = 89%
EFFR = 96.5%
FLA = 512.9 A
LRA = 2718.4 A

The LRA/FLA = 2718/512.9 = 5.3

The kVALR/HP = (LRA/FLA) * (0.746/PFR * EFFR) = (5.3 * 0.746)/ (0.89 * 0.965) = 4.6

(Note the 530% motor inrush current is much greater than the 460% motor kVALR/HP).

CODE LETTER APPLICATION SUMMARY

It can be seen from the above that there can be a significant difference in the numerical per unit values of kVALR/HP and LRA/FLA for a given motor. Thus, in modeling motors in a computer program, it is important to determine exactly what the program needs and to validate that the program uses the required data (either kVALR/HP or LRA/FLA) correctly to get the correct motor model in terms of 1/LRA on the motor per unit subtransient reactance.

Note that not all of the US motor standards require the Code letter to be included on the motor nameplate. For example, API-541-2004 and API-546-1997 require the locked rotor amps to be included on the motor nameplate. NEMA C50.41-2000 requires the locked rotor amps to be included on the motor nameplate but notes that, when agreed to between the user and the manufacturer, the locked rotor Code Letter may be used.

Based on the above, it is recommended that the above FPN be added below Table 430.7(B).

Panel Meeting Action: Reject

Panel Statement: The comment is not related to the original proposal; therefore it is not in compliance with 4.4.2 of the NFPA Regulations Governing Committee Projects.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

11-8 Log #587 NEC-P11 **Final Action: Reject**
(430.9(C))

Submitter: Gregory J. Steinman, Thomas & Betts Corporation

Comment on Proposal No: 11-21

Recommendation: The panel should reconsider the action on this proposal and Accept in Principle.

~~C. Torque Requirements. Control circuit devices with screw type pressure terminals used with 14 awg or smaller conductors shall be torqued to a minimum of 0.8 N m (7 lb in.) unless identified for a different torque value.~~ Electrical Connections. Electrical connections at motor terminals and leads shall be made with an identified method of connection. Twist-on wire connectors, soldered, and insulation piercing type connectors shall not be used for this purpose. Connectors shall be insulated with a material that will not support combustion.

Substantiation: Mr. Cartel is correct as the AHJ has limited ability in confirming compliance with this article as written. Safe and reliable connections are needed and are best described in NFPA 79, Electrical Standard for Industrial Machinery, 2002 Edition. The proposed revision is based upon section 14.5.9.2 - 14.5.9.4 from NFPA 79.

Panel Meeting Action: Reject

Panel Statement: The panel reiterates its position on Proposal 11-21.

The submitter has not provided any new or additional substantiation. The recommendation for revised text is new material and changes the subject from control terminals to motor and motor controller terminals. The reason for the change has not been supported with substantiation and is not related to original proposal. Section 110.14 addresses the concerns in regard to types of connectors and their use.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

11-9 Log #1126 NEC-P11 **Final Action: Reject**
(430.9(C))

Submitter: Andre R. Cartal, Princeton Borough Building Dept.

Comment on Proposal No: 11-21

Recommendation: Delete (C) of this section.

Substantiation: This NEC provision is unenforceable by Electrical inspectors: Do I have the properly calibrated equipment? Do I need PPE to perform this inspection? Is it possible I could alter the torque and be subject to liability? This requirement belongs in the product standard, not in the NEC.

Panel Meeting Action: Reject

Panel Statement: This requirement, as presently written, does in fact allow the AHJ to require the installer to verify the correct tightness of these conductors. The present wording allows the AHJ to have the installer prove the connections are tightened to a minimum of 7 lb-in. when there is no torque value given by the manufacturer. Without this requirement, the AHJ has no minimum torque value to enforce, thereby possibly allowing unreliable connections for these conductors.

The current text is consistent with the manner in which terminals of control devices are presently marked.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

BUNCH, R.: I support the action to reject, but add that we should avoid specification requirements in the NEC that belong in product standards or work standards. General torque requirements on fasteners does not belong in the NEC, in my opinion.

11-10 Log #719 NEC-P11 **Final Action: Accept**
(430.19)

Submitter: Robert Kelleher, Paramount Electrical Services

Comment on Proposal No: 11-25

Recommendation: Continue to Reject .

Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of sixteen new Fine Print Notes were proposed to reference NECA standards. ALL were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 11 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the sumitter's comment to reject and upholds its position on Proposal 11-25.

The panel does not agree with all of the submitter's substantiation.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

11-11 Log #613 NEC-P11 **Final Action: Reject**
(430.22(F))

Submitter: Paul Guidry, Fluor Enterprises, Inc.

Comment on Proposal No: 11-81

Recommendation: This is a companion proposal for the addition of valve actuator motors. Companion proposal section numbers are: 430.2, 430.6(D), 430.24(B), 430.52(E) and 430.102(A).

Add new 430.22(F) as follows:

430.22(F) Valve Actuator Motors. Conductors that supply a single VAM shall have an ampacity of not less than 125 percent of the VAM's rated full-load current as determined by 430.6(D).

Substantiation: VAMs are rated differently from valve to valve and manufacturer to manufacturer. Some are rated in horsepower, others in kVA or kW. All are rated in full-load current and locked rotor current. These motors are not constant torque motors and a current table cannot be made for them such as 430.250. They are not continuous duty, however a 125 percent multiplier to the nameplate current is sufficient, yet not excessive.

This comment is based on proposal 11-81. It was my understanding in the proposal stage that the panel felt like Valve Actuator Motors (VAMs) should be covered by Article 430 (see panel comment on proposal 11-81). However, instead of adding a new Part XI, it was suggested that the current structure of the Code be modified for any rules regarding VAMs.

Panel Meeting Action: Reject

Panel Statement: Valve actuator motor (VAM) conductors are already covered in the main rule of 430.22(E) based on the full load current of 430.6(A)(1).

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

11-12 Log #614 NEC-P11 **Final Action: Reject**
(430.24(B))

Submitter: Paul Guidry, Fluor Enterprises, Inc.

Comment on Proposal No: 11-81

Recommendation: This is a companion proposal for the addition of valve actuator motors. Companion proposal section numbers are: 430.2, 430.6(D), 430.22(F), 430.52(E) and 430.102(A).

Make existing text in 430.24 part (A). Add new part (B) as follows:

430.24(B) Valve Actuator Motors. Conductors supplying several VAMs, or a VAM(s) and other load(s) shall have an ampacity not less than 125 percent of the VAM's rated nameplate current plus the sum of the full-load current rating

of the highest rated motor plus the sum of the full-load current ratings of all the other motors in the group, plus the ampacity required for the other loads.
Substantiation: VAMs are rated differently from valve to valve and manufacturer to manufacturer. Some are rated in horsepower, others in kVA or kW. All are rated in full-load current and locked rotor current. These motors are not constant torque motors and a current table cannot be made for them such as 430.250. They are not continuous duty, however a 125 percent multiplier to the nameplate current is sufficient, yet not excessive. The remainder of the text is virtually the same as existing 430.24.

This comment is based on proposal 11-81. It was my understanding in the proposal stage that the panel felt like Valve Actuator Motors (VAMs) should be covered by Article 430 (see panel comment on proposal 11-81). However, instead of adding a new Part XI, it was suggested that the current structure of the Code be modified for any rules regarding VAMs.
Panel Meeting Action: Reject
Panel Statement: The submitter's concerns are addressed in 430.6(A)(1) and 430.24.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-13 Log #2327 NEC-P11 **Final Action: Accept**
(430.28(4))

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 11-34
Recommendation: Reject the Proposal.
Substantiation: The negative commentors are correct and raise substantial issues that make this an unacceptable approach.

This proposal will reduce electrical safety. Overcurrent protection rules in the NEC need to be uniformly applied across application. This revision creates a significant anomaly to that uniformity. The expectation that the system is controlled enough to be able to have such exacting requirements for conductor protection is a flawed expectation.

The current tap rules have served well in a large variety of installations and they are consistent with the engineering and maintenance approaches taken in all installations including large industrial.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-14 Log #615 NEC-P11 **Final Action: Reject**
(430.52(E))

Submitter: Paul Guidry, Fluor Enterprises, Inc.
Comment on Proposal No: 11-81
Recommendation: This is a companion proposal for the addition of valve actuator motors. Companion proposal section numbers are: 430.2, 430.6(D), 430.22(F), 430.24(B), and 430.102(A).

Add new 430.52(E) as follows:
430.52(E) Valve Actuator Motors. Valve actuator motor branch circuits shall be protected at a maximum of 125% of the motor nameplate full-load current rating and in accordance with 240.4(B). Circuit breakers shall be of the inverse time type. Fuses shall be of the dual-element time-delay type. It shall be determined that the branch-circuit short-circuit and ground-fault protective device will not open under the most severe normal conditions of service that may be encountered.
Substantiation: VAMs are completely self-protected and are not dependent on the branch-circuit protective device to protect the VAM. The branch-circuit protective device only protects the conductors in this case. This section has been coordinated with 430.22.

Based on the current Code, instantaneous or type MCP breakers wouldn't be allowed since they're not a part of a listed assembly with the controller. So, it should be made clear that the breakers shall be inverse time type. Because of the high inrush on locked-rotor, fuses should be DETD type.

This comment is based on proposal 11-81. It was my understanding in the proposal stage that the panel felt like Valve Actuator Motors (VAMs) should be covered by Article 430 (see panel comment on proposal 11-81). However, instead of adding a new Part XI, it was suggested that the current structure of the Code be modified for any rules regarding VAMs.
Panel Meeting Action: Reject
Panel Statement: The submitter's concerns are addressed in existing Table 430.52.

The existing Table 430.52 for "single-phase motors" and "AC polyphase motors other than wound-rotor squirrel cage other than Design B energy-efficient" applies to AC valve actuator motor assemblies.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-15 Log #2328 NEC-P11 **Final Action: Accept**
(430.53(D)(4))

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 11-45
Recommendation: Reject the Proposal.
Substantiation: The negative commentors are correct and raise substantial issues that make this an unacceptable approach.

This proposal will reduce electrical safety. Overcurrent protection rules in the NEC need to be uniformly applied across application. This revision creates a significant anomaly to that uniformity. The expectation that the system is controlled enough to be able to have such exacting requirements for conductor protection is a flawed expectation.

The current tap rules have served well in a large variety of installations and they are consistent with the engineering and maintenance approaches taken in all installations including large industrial.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-16 Log #1889 NEC-P11 **Final Action: Reject**
(430.59 (New))

Submitter: Paul S. Hamer, Richmond, CA
Comment on Proposal No: 11-48
Recommendation: This proposal (and its companion Proposals 2-6, 2-88, 2-285 and 11-49 - Comments submitted separately) should be accepted. Add to the end of the proposed wording: This requirement shall become effective January 1, 2011. This aligns with Mr. Weber's Explanation of Negative for Proposal 2-88 regarding the development of new, life-saving concepts and addresses the Panel Statement of Proposal 2-88. The Proposal wording, and its included phrase "shall be permitted," is important so the GFCIS-3Ph is identified as a specific permitted alternative. The Panel Statement, "The panel recognizes that the application of this system is permitted to be used for motor circuits as an added technology," avoids the reality that unless a permitted concept is identified in the NEC, it will not be applied. Adding the delayed effective date would provide the incentive and the necessary time for the Three-Phase Ground-Fault Circuit-Interrupter System (GFCIS-3Ph) to be further developed and commercialized.
Substantiation: The Panel Statement of Proposal 2-88, the base Proposal for the GFCIS-3Ph concept, includes "...The submitter's substantiation notes that the hazard is when unqualified persons work on equipment without taking the appropriate precautions to deenergize the circuit and verify that circuit is disconnected...". There are numerous instances where unqualified persons were electrocuted by faulty or defective equipment (see the supporting material submitted with the proposals), and these people may have been protected from electrocution by the proposed GFCIS-3Ph. The patent applications are pending for the GFCIS-3Ph as of this date, but further field measurements made since the Proposal submittal date indicate that the distributed phase capacitances on an actual installed three-phase 480 volt power system are balanced enough to permit the sensitivity described in the proposals.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any new motor-related substantiation for reconsideration.

Although the panel rejects the submitter's comment, this new technology is an important step forward in the protection of electrical systems and personnel. The panel encourages the submitter to return in the next Code cycle with documentation to the effectiveness, reliability, and availability of this new technology.

Again, the panel recognizes that the application of this system is permitted to be used for motor circuits as an added technology.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:

CACCAMESE, J.: I would encourage the submitter to keep the panel apprised of the availability of this emerging technology through the proposal stage for the next code cycle. The use of 3-phase GFCI device provides a promising step in the right direction for safety.

11-17 Log #1890 NEC-P11 **Final Action: Reject**
(430.64 (New))

Submitter: Paul S. Hamer, Chevron Energy Technology Company
Comment on Proposal No: 11-49
Recommendation: This proposal (and its companion Proposals 2-6, 2-88, 2-285 and 11-48 - Comments submitted separately) should be accepted. Add to the end of the proposed wording: This requirement shall become effective January 1, 2011. This aligns with Mr. Weber's Explanation of Negative for Proposal 2-88 regarding the development of new, life-saving concepts and

addresses the Panel Statement of Proposal 2-88. The Proposal wording, and its included phrase "shall be permitted," is important so the GFCIS-3Ph is identified as a specific permitted alternative. The Panel Statement of Proposal 11-48 (referred to in this Proposal's Panel Statement). "The panel recognizes that the application of this system is permitted to be used for motor circuits as an added technology," avoids the reality that unless a permitted concept is identified in the NEC, it will not be applied. Adding the delayed effective date would provide the incentive and the necessary time for the Three-Phase Ground-Fault Circuit-Interrupter System (GFCIS-3Ph) to be further developed and commercialized.

Substantiation: The Panel Statement of Proposal 2-88, the base Proposal for the GFCIS-3Ph concept, include"...The submitter's substantiation notes that the hazard is when unqualified persons work on equipment without taking the appropriate precautions to deenergize the circuit and verify that circuit is disconnected...". There are numerous instances where unqualified persons were electrocuted by faulty or defective equipment (see the supporting material submitted with the proposals), and these people may have been protected from electrocution by the proposed GFCIS-3Ph. The patent applications are pending for the GFCIS-3Ph as of this date, but further field measurements made since the Proposal submittal date indicate that the distributed phase capacitances on an actual installed three-phase 480 volt power system are balanced enough to permit the sensitivity described in the proposals.

Panel Meeting Action: Reject

Panel Statement: The submitter has not provided any new motor-related substantiation for reconsideration.

Although the panel rejects the submitter's comment, this new technology is an important step forward in the protection of electrical systems and personnel. The panel encourages the submitter to return in the next Code cycle with documentation to the effectiveness, reliability, and availability of this new technology.

Again, the panel recognizes that the application of this system is permitted to be used for motor circuits as an added technology.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

CACCAMESE, J.: See statement to Comment 11-16.

11-18 Log #620 NEC-P11 **Final Action: Reject**
(Table 430.72(B), Note No. 2)

Submitter: Joseph C. Warren, Joseph C. Warren Electrical Consulting Services
Comment on Proposal No: 11-50
Recommendation: Revise text to read:

Notes:

2. 400 percent of value specified in Table 310.16 for 60°C conductors. (Table ~~310.17~~)

Substantiation: Note No. 2 of Table 430.72(B) states 400 percent of value specified in Table 310.17 for 60°C conductors. Since Table 310.17 is for free air ampacities only and Note No. 2 of Table 430.72(B) is given under column B for conductors within enclosures, Table 310.17 should not be used for this situation.

According to Webster's dictionary, "free air is air not affected by local conditions", and "part of the atmosphere that lies above the frictional influence of the earth's surface". This means to me that air circulation is not affected, as it is in an enclosure.

You can liken a motor controller to a safe that has no air circulation when closed.

The panel statement about conductors not bundled in enclosures is not correct because many times they are done like this to keep the conductors neat, and they are often installed in boiler rooms where very hot conditions exist.

I really don't know how else to explain that inside an enclosure is not free air conditions. The panel should have listened to the comments by Mr. Fahey who agreed with me.

Panel Meeting Action: Reject

Panel Statement: The submitter has not provided substantiation that this has been a problem.

Table 430.72(B) is for overcurrent protection and is not used for sizing control circuit conductors.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

11-19 Log #830 NEC-P11 **Final Action: Accept in Principle**
(430.73)

TCC Action: **Due to the panel action of relocating 430.73(B), the Technical Correlating Committee directs that 430.73(A) be combined into a single section with a title and arrangement to read as follows:**

"430.73 Protection of Conductor from Physical Damage. Where damage to a motor control circuit would constitute a hazard, all conductors of such a remote motor…".

Submitter: Paul Dowden, Fluor
Comment on Proposal No: 11-52
Recommendation: The submitter's original proposal should be accepted modified as follows:

Assign 430.75 to the second paragraph of 430.73 and title it as "ELECTRICAL ARRANGEMENT OF CONTROL CIRCUITS", and keep the paragraph as written.

Substantiation: This would provide the most clear arrangement of this section of the code.

Panel Meeting Action: Accept in Principle

Relabel existing 430.74 to 430.75.

Create new 430.74 to read as follows:

"Electrical Arrangement of Control Circuits. Where one side of the motor control circuit is grounded, the motor control circuit shall be arranged so that an accidental ground in the control circuit remote from the motor controller will (1) not start the motor and (2) not bypass manually operated shutdown devices or automatic safety shutdown devices."

Delete the second paragraph of existing 430.73, as it has been moved to new 430.74. The first paragraph of existing 430.73 remains unchanged.

Panel Statement: The change meets the submitter's intent.

The panel chooses to retain the existing section title. The change adds clarity.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

11-20 Log #1319 NEC-P11 **Final Action: Reject**
(430.81(A))

Submitter: Vincent J. Saporita, Cooper Bussmann
Comment on Proposal No: 11-53a
Recommendation: Modify the proposal so that the phrase "protective device" is not removed from the original wording. It should be included with the phrase "disconnecting means" that was added by the panel.

(A) Stationary Motor of 1/8 Horsepower or Less. For a stationary motor rated at 1/8 hp or less that is normally left running and is constructed so that it cannot be damaged by overload or failure to start, such as clock motors and the like, the branch-circuit disconnecting means or protective device shall be permitted to serve as the controller.

Substantiation: Replacing the words "protective device" with "disconnecting means" made a subtle but significant change. It would preclude the application of a 1/8 hp or less stationary motor from being installed where a Type S fuse is protecting the motor and where removal of the fuse would serve as the disconnecting means (430.109(B)). The phrase "protective device" in 430.81(A) has been in the NEC, without reported issues, since at least the 1947 edition. I don't believe that the Panel intended to make this subtle but significant change.

Panel Meeting Action: Reject

Panel Statement: For stationary motors of 1/8 horsepower or less, a fuse may be used as the disconnecting means as permitted in 430.109(B). Because a fuse can be considered as the disconnecting means, it can also be considered the controller.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

SAPORITA, V.: Text from the 1933 NEC through the 2005 NEC specifically allowed the overcurrent protective device to be both the controller (430.81(A)) and the disconnecting means (430.109(B)).

For 2008, 430.109(B) still allows the overcurrent protective device to be the disconnecting means but the proposed text only allows the disconnecting means to be the controller. The wording infers therefore, that the overcurrent protective device can also be the controller. (The overcurrent protective device can be disconnecting means, and disconnecting means can be the controller, therefore, the overcurrent protective device can be the controller.) This two-step process adds confusion, which would not be necessary if the text remained unchanged from the 2005 edition of the NEC.

1-114 Log #70 NEC-P01 **Final Action: Accept**
(Table 430.91)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 11-56
Recommendation: The Technical Correlating Committee directs that this proposal be sent to Code-Making Panel 1 for action. This action will be considered by Code-Making Panel 1 as a Public Comment. The actions taken on Proposals 1-95 and 11-55 relocates Table 430.91 to 110.20.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts this comment and editorially revises the superscript from "2" to "1" on line 3 of the Table "For Outdoor Use" which matches the text already accepted by the panel in proposal 1-95 as published in the A2007 NEC ROP.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

11-21 Log #567 NEC-P11 **Final Action: Reject**
(430.102(A))

Submitter: J. Ron Caccamese, Nathan Alterman Electric Company, Ltd. / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 11-60
Recommendation: Revise as follows:
430.102 Location.
(A) Controller. An individual disconnecting means shall be provided for each controller and shall disconnect the controller. The disconnecting means shall be located in sight and be readily accessible from the controller location.
Substantiation: In addition to the substantiation provided by the submitter of Proposal 11-60 (window as a barrier), there are other obstacles (elevation, fencing, and inaccessible terrain) that would prevent access even though a disconnect is "within sight". The submitter's concern is well founded, and even though 430.7 provides "readily accessible" requirements, further evaluation is warranted due to safety issues associated with controller disconnect accessibility. This is a safety issue regarding the installation of disconnecting means and readily accessible.
Panel Meeting Action: Reject
Panel Statement: The panel reiterates its position on Proposal 11-60.
The disconnecting means for the controller is not always required to be readily accessible from the controller. See 430.107 for readily accessible requirements. Existing Code text requires that at least one of the disconnecting means be readily accessible.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
CACCAMESE, J.: Due to the nature of motorized equipment and the hazards associated with same, allowing a disconnecting means that serves the control to qualify as the disconnect that is "readily accessible", as indicated in 430.107, to also serve as the 'readily accessible" disconnect for the motor itself is a safety concern that distresses this panel member. Further consideration should be given this arrangement and an assured means of access to the both disconnect for the controller and motor be evaluated.
FAHEY, R.: The panel action should have been to accept this comment. Both the submitter of original Proposal 11-60 and the submitter of this comment have provided sufficient substantiation that shows a safety issue exists. To ensure personnel safety, both disconnects required in 430.102(A) for the controller and 430.102(B) for the motor should be readily accessible. Requiring a readily accessible disconnect at both locations would provide a safety measure for the electrician and maintenance personnel. By providing disconnects in sight from and "readily accessible" of the motor controller would solve the safety concerns brought forth in the original proposal.

11-22 Log #771 NEC-P11 **Final Action: Reject**
(430.102(A) Exception No. 1)

Submitter: Louis A. Barrios, Shell Global Solutions
Comment on Proposal No: 11-62
Recommendation: The panel action should have been to "accept" rather than "reject".
Substantiation: The hazards associated with working on a motor controller are equivalent regardless if the motor is rated 600V and below, or above 600V. The actual motor control voltage is typically less than 600V in both cases. Therefore, the location of the controller disconnecting means, as long as the provisions in 430.102(A) Exception No. 1 are met should be equivalent regardless of the motor voltage. The intent of this proposal is similar to Proposal 11-63. Proposal 11-62 is a cleaner code change.
Panel Meeting Action: Reject
Panel Statement: The submitter has provided no new substantiation for the panel to reconsider.
The panel reiterates its position on Proposal 11-62.
Allowing this exception for lower voltages may reduce worker safety. For equipment less than 600 volts, the physical limitations that apply to equipment over 600 volts do not apply.
The required disconnect is for the controller regardless of the control voltage level.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
HAMER, P.: The panel action should be to accept the comment and allow the exception for all voltages. This exception only applies to a controller's disconnect, and would negate the requirement for a redundant controller disconnect in a hostile physical environment (in situations where the motor controller may be out in the plant's operating facility) that could introduce additional hazards to the worker. For most controllers rated 600 volts and below, permitting this exception would have no effect, since the controller's disconnect and the controller are within the same enclosure in the common 600 volt class motor control center.

11-23 Log #612 NEC-P11 **Final Action: Accept in Principle in Part**
(430.102(A) Exception No. 3)

TCC Action: The Technical Correlating Committee directs that the word "Provided" be deleted from the panel action text of 430.102(A), Exception No. 3 (a) so that it reads as follows:
"(a) The valve actuator motor assembly is marked with a warning label giving the location of the disconnecting means."
This corrects an editorial error.
Submitter: Paul Guidry, Fluor Enterprises, Inc.
Comment on Proposal No: 11-81
Recommendation: This is a companion proposal for the addition of valve actuator motors. Companion proposal section numbers are: 430.2, 430.6(D), 430.22(F), 430.24(B), and 430.52(E).
Add new 430.102(A) Exception No. 3 as follows:
Exception No. 3: The disconnecting means shall not be required to be in sight of valve actuator motor assemblies containing the controller under either condition (a) or (b), provided the disconnecting means is capable of being locked in the open position. The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed.
(a) Where such a location of the disconnecting means introduces additional or increased hazards to persons or property
(b) In industrial locations, with written safety procedures, where conditions of maintenance and supervision ensure that only qualified persons service the equipment.
FPN No. 1: An example of increased or additional hazard is where the valve actuator motor is used for a process emergency shutdown and the failure of the disconnecting means near the valve actuator motor containing the controller would prevent the valve from operating.
Substantiation: This comment is based on proposal 11-81. It was my understanding in the proposal stage that the panel felt like Valve Actuator Motors (VAMs) should be covered by Article 430 (panel comment on proposal 11-81), and that it was reasonable in some situations not to require a disconnecting means within sight of the controller. However, instead of adding the new Part XI as proposed, it was suggested that the current structure of the Code be modified for any rules regarding VAMs. This text is based on the existing exception for motor disconnects in 430.102(B).
I believe the existing 430.102(B) applies to VAMs without an integral controller already and doesn't require modification.
Panel Meeting Action: Accept in Principle in Part
Add a new exception to 430.102(A) to read as follows:
Exception No. 3: The disconnecting means shall not be required to be in sight from valve actuator motor (VAM) assemblies containing the controller where such a location introduces additional or increased hazards to persons or property and conditions (a) and (b) are met.
(a) Provided the valve actuator motor assembly is marked with a warning label giving the location of the disconnecting means.
(b) The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed.
Panel Statement: The panel rejects the submitter's part (b) and the FPN. The panel recognizes there could be an increased safety hazard associated with part (b) of the submitter's recommendation. The FPN note is not required because the text of 430.102(A) Exception No. 3 is considered sufficient.
The panel edits the submitter's Exception No. 3 for clarity.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-24 Log #772 NEC-P11 **Final Action: Accept in Principle in Part**
(430.102(A) Exception No. 3)

Submitter: Louis A. Barrios, Shell Global Solutions
Comment on Proposal No: 11-63
Recommendation: The panel action should have been to "accept in principle" rather than "reject" with the proposed changes to the original proposal as shown below:
Exception No. 3: In industrial installations with written safety procedures, where conditions of maintenance and supervision ensure that only qualified persons service the equipment, the controller disconnecting means shall not be required to be in sight from the controller ~~motor and the driven machinery~~ location provided the controller disconnecting means is individually capable of being locked in the open position. The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed.
Substantiation: The proposed modifications to the original proposal clarify that the intent of the proposed Exception No. 3 was to address the controller disconnecting means. As noted in Mr. Glover's negative ballot, "The submitter is specifically requesting an extension to this exception (for motors) to allow the same exception (for controllers) in the case of motor operated valves (MOVs). The question arises as a result of the controller location, which in the case of MOVs is integral with the motor. The 430.102(B) exception exempts the motor disconnecting means from being in sight of the motor if all conditions are met, it does not specifically exempt the controller disconnecting means from being within sight of the controller." An easier method to accomplish the same intent is to accept Proposal 11-62, which proposes to make the controller disconnecting means requirement similar for both motors 600V and below, and above 600V.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: The panel rejects the expansion of the exception to industrial locations. The panel chooses not to expand the exception beyond valve actuator motor (VAM) assemblies.
The submitter's other concerns are addressed by the action on Comment 11-23. See the action and statement on Comment 11-23.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-25 Log #71 NEC-P11 **Final Action: Accept**
(430.102(B))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 11-67
Recommendation: The Technical Correlating Committee directs the panel to review the action on Proposals 11-67 and 11-68 and revise their action to make it clear as to what part of 430.102(B) the Exception is intended to apply. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review and clarify the panel action.

See the panel action and statement on Comment 11-27.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-26 Log #568 NEC-P11 **Final Action: Reject**
(430.102(B))

Submitter: J. Ron Caccamese, Nathan Alterman Electric Company, Ltd. / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 11-64
Recommendation: Revise as follows:

430.102 Location.

(B) Motor. A disconnecting means shall be located in sight and be readily accessible from the motor location and the driven machinery location.

Substantiation: In addition to the substantiation provided by the submitter of Proposal 11-60 (window as a barrier), there are other obstacles (elevation, fencing, and inaccessible terrain) that would prevent access even though a disconnect is "within sight". The submitter's concern is well founded, and even though 430.7 provides "readily accessible" requirements, further evaluation is warranted due to safety issues associated with controller disconnect accessibility. This is a safety issue regarding the installation of disconnecting means and readily accessible.
Panel Meeting Action: Reject
Panel Statement: The panel reiterates its position on Proposal 11-64.

The disconnecting means for the motor is not always required to be readily accessible from the motor. See 430.107 for readily accessible requirements. Existing Code text requires that at least one of the disconnecting means be readily accessible.

In addition, the definition of "in sight from" allows up to 50 feet between the disconnecting means and the motor. The disconnecting means and the motor do not have to be accessible from each other.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

CACCAMESE, J.: See my explanation of negative vote on Comment 11-21.

FAHEY, R.: The panel action should have been to accept this comment. Both the submitter of original Proposal 11-64 and the submitter of this comment have provided sufficient substantiation that shows a safety issue exists. Adding "readily accessible" to this code section would be a very important step forward for worker safety, readily accessible will reiterate the need to have this disconnect available for the service personnel. 430.107 does, in fact, require one of the disconnecting means to be readily accessible, I believe if the panel would have accepted both Comments 11-26 and 11-21, the panel would be making the workplace safer. Providing disconnects at both locations which are readily accessible will provide the personnel who use these devices with a safer workplace. If this disconnect is capable of being reached quickly, without having the obstacle of locked doors with windows (within sight), located between the disconnect and the motor, the personnel will have the ability to use the disconnect. When the disconnect is behind a locked door with a window, the personnel may and sometimes does work the equipment energized due to production concerns or the urgency to keep the process operational. If the disconnect is important enough to be located in sight from, the disconnecting means should then be important enough to be readily accessible.

11-27 Log #792 NEC-P11 **Final Action: Accept**
(430.102(B))

TCC Action: The Technical Correlating Committee directs that the accepted text be revised to read as follows:

"430.102(B) Motor. A disconnecting means shall be provided for a motor in accordance with (1) or (2).

(1) Separate Motor Disconnect. A disconnecting means for the motor shall be located in sight from the motor location and the driven machinery location.

(2) Controller Disconnect. The controller disconnecting means required in accordance with 430.102(A) shall be permitted to serve as the disconnecting means for the motor if it is located in sight from the motor location and the driven machinery location.

Exception to (1) and (2): The disconnecting means for the motor shall not be required under either condition (a) or (b), provided the controller disconnecting means required in accordance with 430.102(A) is individually capable of being locked in the open position. The provision for locking or adding a lock to the controller disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed.

(a) Where such a location of the disconnecting means for the motor is impracticable or introduces additional or increased hazards to persons or property.

(b) In industrial installations, with written safety procedures, where conditions of maintenance and supervision ensure that only qualified persons service the equipment.

FPN No. 1: Some examples of increased or additional hazards include, but are not limited to, motors rated in excess of 100 hp multimotor equipment, submersible motors, motors associated with adjustable speed drives and motors located in hazardous (classified) locations.

FPN No. 2: For information on lockout/tagout procedures, see NFPA 70E- 2004, Standard for Electrical Safety in the Workplace."

This Technical Correlating Committee action adds the appropriate driver language to the main paragraph to make it clear that either (1) or (2) can be used to satisfy the requirement for a motor disconnect. The exception has been relocated to follow both (1) and (2) and has been made clear to apply to both (1) and (2). This revision is necessary because the arrangement of the text from the comment leads the user to assume that (2) would still be applicable even if the exception under (1) was used for compliance. In addition, the Technical Correlating Committee has added titles as required by the NEC Style Manual.

Submitter: Charles A. Goetz, Underwriters Laboratories Inc.
Comment on Proposal No: 11-67
Recommendation: Revise text from 2005 edition as follows:
430.102(B) Motor.
(1) A disconnecting means **for the motor** shall be located in sight from the motor location and the driven machinery location.
*Exception: The disconnecting means **for the motor** shall not be required ~~to be in sight from the motor and the driven machinery location~~ under either condition (a) or (b), provided the **controller** disconnecting means required in accordance with 430.102(A) is individually capable of being locked in the open position. The provision for locking or adding a lock to the **controller** disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed.*
*(a) Where such a location of the disconnecting means **for the motor** is impracticable or introduces additional or increased hazards to persons or property.*
(b) In industrial installations, with written safety procedures, where conditions of maintenance and supervision ensure that only qualified persons service the equipment.
FPN No. 1: Some examples of increased or additional hazards include, but are not limited to, motors rated in excess of 100 hp multimotor equipment, submersible motors, motors associated with adjustable speed drives and motors located in hazardous (classified) locations.

FPN No. 2: For information on lockout/tagout procedures, see NFPA 70E-2004, *Standard for Electrical Safety in the Workplace*.

(2) The **controller** disconnecting means required in accordance with 430.102(A) shall be permitted to serve as the disconnecting means for the motor if it is located in sight from the motor location and the driven machinery location.

Substantiation: Acceptance of proposal 11-67 undoes panel action from the 2005 cycle (2004 ROP, proposal 11-65). Additionally, when taken together with panel action on proposal 11-68, the resulting revision to 430.102(B) seems to allow not only the disconnect in sight of the motor (first sentence) to be absent from a motor installation but also the controller disconnect in sight of the motor (second sentence), covered by section 430.102(A), to be absent from a motor installation. This would create confusion over what is intended by Section 430.102(A), which does not include a similar exception. The proposed revision addresses the submitters concerns in 11-67 by revising section 430.102 (B) to individually number the two sentences, and also continues to revise the exception as accepted by the committee in 11-68.

In the current text, the term "disconnecting means" sometimes refers to the disconnecting means required by 430.102(B) and sometimes refers to the disconnecting means required by 430.102(A). Additional revisions are made to consistently refer to the disconnecting means required by 430.102(B) as the "disconnecting means for the motor" and the disconnecting means required by 430.102(A) as the "controller disconnecting means".
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-28 Log #2201 NEC-P11 **Final Action: Reject**
(430.102(B) Exception)

Submitter: Michael A. Anthony, University of Michigan Business & Finance / Rep. Association of Higher Education Facilities Professionals
Comment on Proposal No: 11-69
Recommendation: This Proposal should be Accepted.
Substantiation: Most colleges and universities have laboratory, hospital and manufacturing facilities at least as complex as any found out in "industry". Space is always at a premium in legacy mechanical rooms and acceptance of this proposal would give some flexibility in designing HVAC renovations that might result in a net gain in overall safety. The term "industrial installation" itself may be an artifact of an earlier era in which manufacturing plants were more complex and better managed than the building systems we see in higher education today.

The education industry represents a large group of knowledgeable users of the NEC. These users are frequently backed up by active OSHA compliance offices that put safety in the workplace above all else. I would estimate that except for the larger manufacturers, even our smaller colleges and universities have safety programs that exceed the safety programs of the more common small and medium-sized manufacturer.

Unfortunately, however, not all colleges and universities operate in jurisdictions where the general purpose clause of 90.4 is exercised even if written procedures are presented to the inspector. Relaxing the motor disconnect exception would permit the use of limited resources to other purposes where permanent staff is well trained.

Panel Meeting Action: Reject

Panel Statement: The panel reiterates its position on Proposal 11-69.

It is the panel's intent to provide the highest level of safety for all facilities; therefore, the expansion of this exception will reduce the level of safety in many other facilities.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

11-29 Log #465 NEC-P11 **Final Action: Reject**
(430.109(A)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-74
Recommendation: Accept proposal.
Substantiation: The proposal provides specifics in addition to HP requirements which alone is not comprehensive and should not be the only criterion. Proposal clarifies suitability as specified in 110.3(A)(1)(7)(8). Switches do not generally have instructions for use per 110.3.
Panel Meeting Action: Reject
Panel Statement: NEC 110.3(A)(1)#(7) provide the information for the motor switch the submitter is requesting. Providing the same requirement in this Code section would be redundant.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-30 Log #1089 NEC-P11 **Final Action: Accept**
(430.110 Exception)

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 11-75
Recommendation: Revise the panel action text by deleting the words "without fuse holders" so that the final text reads:
Exception: A listed unfused motor circuit switch having a horsepower rating not less than the motor horsepower shall be permitted to have an ampere rating less than 115 percent of the full load current rating of the motor.
Substantiation: The wording "unfused" and "without fuse holders" is redundant. I agree with the panel changing from "nonfused" to "unfused", but adding the "without fuse holders" implies that there is an unfused switch with fuse holders. The UL White Book describes switches without fuseholders as "unfused".
I agree with the panel's rejection of the balance of the original proposal. The panel is correct that the intended percentage is 115% and that molded case switches should not be included in the Exception because they should be sized to comply with the main rule.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-31 Log #438 NEC-P11 **Final Action: Reject**
(430.110(C)(2) Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-75
Recommendation: Revise panel action:
Exception: A listed ~~unfused~~ motor circuit switch without fuseholders having a horsepower rating not less than the motor horsepower rating or a listed molded case switch shall be permitted to have an ampere rating not less than ~~115~~ 100 percent of the current rating of the motor.
Substantiation: "Unfused" seems to be superfluous. The phrase "less than 115 percent" does not establish a lower limit; is 90 percent acceptable? Molded case switches are permitted in 430.109(A)(2) and they and motor circuit switches are rated for 100 percent of their ampere rating and such use would comply with 110.3(A)and (B). If not, why not?
Panel Meeting Action: Reject
Panel Statement: The panel notes that the submitter intended to refer to 430.110(A)(1) Exception rather than 430.110(C)(2) Exception.

The panel reiterates its position on Proposal 11-75.

The panel rejects the change "not less than 100 percent." The exception reflects the same percentage value as does the main rule.

Section 430.109(A)(1) requires a motor-circuit switch to be rated in horsepower. In the exception to 430.110(A), the horsepower rating of the switch must equal or exceed the horsepower rating of the controlled motor. Any ampere rating included on the motor circuit switch is not required to comply with the main rule and can be less than the 115 percent.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-32 Log #502 NEC-P11 **Final Action: Reject**
(430.227)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 11-83
Recommendation: Accept revised second sentence:
The provision for locking shall be identified for the purpose ~~or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means~~ and shall remain in place with or without the lock installed.
Substantiation: It is somewhat self-evident the locking means will be at or on the disconnecting means. The provisions should apply to all disconnecting means, not limited to switches and circuit breakers. Locking means should be identified for the purpose.
Panel Meeting Action: Reject
Panel Statement: The revised text from Proposal 11-83 for the second sentence is similar to text found in 430.102(B) Exception for motor installations under 600 volts, thereby creating consistency between similar requirements.

Product standards require testing of products for specific uses that would therefore limit their use to the specific application. Locking means are required by 110.3(B) to be installed in accordance with any listings and/or instructions provided by the manufacturer.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-33 Log #72 NEC-P11 **Final Action: Accept**
(430.242(3))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 11-86
Recommendation: The Technical Correlating Committee directs the panel to clarify the action on this proposal as to whether or not they intend to include references to the other Articles between 500 and 517. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review and clarify the panel action.

See panel action and statement on Comment 11-34.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-34 Log #263 NEC-P11 **Final Action: Accept**
(430.242(3))

Submitter: Stanley J. Folz, Morse Electric, Inc.
Comment on Proposal No: 11-86
Recommendation: Revise text to read:
(3) If in a hazardous (classified) location. ~~As described in 500.5 and 517.60.~~
Substantiation: 500.5 and 517.60 are not the only classified areas that would apply in this case. Rather than create a laundry list of classified locations that would apply, the sentence should be allowed to stand alone in referring to classified locations.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-35 Log #791 NEC-P11 **Final Action: Hold**
(430.243)

TCC Action: The Technical Correlating Committee directs that both this comment and Proposal 11-87 be reported as "hold" and submitted to Code-Making Panel 5 for action in 250.114 during the next cycle.

The revisions made by the panel to 430.243 creates correlation issues with 250.114(2) and 250.114(2), Exception. 250.114(2) continues to only require grounding where the cord and plug connected equipment is operating at over 150V to ground. The exception to 250.114 exempts all motors from grounding where they are guarded.

Submitter: Charles A. Goetz, Underwriters Laboratories Inc.
Comment on Proposal No: 11-87
Recommendation: Revised from 2005 edition as follows:
430.243 Portable Motors. The frames of portable motors supplied by a premises wiring system ~~that~~ and operate at 50 V or more ~~over 150 volts to ground~~ shall be ~~guarded or~~ grounded unless guarded or isolated from contact.

~~FPN No. 1: See 250.114(4) for grounding of portable appliances in other than residential occupancies.~~

FPN ~~No. 2~~: See 250.119(C) for color of equipment grounding conductor.

Exception No. 1: Listed motor operated tools, listed motor operated appliances, and listed motor operated equipment shall not be required to be grounded where protected by a system of double insulation or its equivalent. Double insulated equipment shall be distinctively marked.

Exception No. 2: Listed motor operated tools, listed motor operated appliances, and listed motor operated equipment connected by a cord and attachment plug other than those required to be grounded in accordance with 250.114.

Substantiation: Acceptance of proposal 11-87 during the ROP meeting will require motor frames on all portable motor operated appliances, which must comply with Article 430 as noted in Section 422.3, to be grounded regardless of the use voltage, the intended use or listing for the purpose. By eliminating the voltage requirement, all portable motors are affected including those that operate at 50V or less where the revision imposes a higher level of compliance for motor frames than currently stated in section 430.232 for live parts. The revision to section 430.243 effectively supercedes the current section 250.114 which would otherwise cover cord and plug connected equipment operating at 150V to ground or less. Currently listed motor operated appliances operating at not more than 150V to ground and that do not involve water or use in wet locations may be connected by a two conductor cord and attachment plug. The listing requirements for such appliances operating at 150V or less to ground require leakage currents available at accessible metal parts to be monitored during various operating conditions including, in some cases, high humidity conditions, and to not exceed prescribed limits in the product Standards. The substantiation for proposal 11-87 did not indicate any problems with specific portable motors that necessitated the revision. The requirements in Section 250.114 appropriately cover grounding for residential and non-residential applications of motor operated appliances.

In addition, (portable) equipment, connected by a cord and plug, can be double insulated, which is neither grounded nor guarded, and would not comply with the revised section 430.243. The current section 250.114 permits listed double insulated equipment to be utilized without need for grounding, guarding or isolation.

To address these issues, the recommended text for 430.243 has been revised to (1) include provision to omit grounding for frames of motors rated 50V or less; (2) add exception for listed double insulated equipment similar to the current exception to 250.114; and (3) add exception to refer to section 250.114 for listed motor-operated appliances, and delete Fine Print Note 1.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

GOETZ, C.: During the ROC meeting, the panel agreed to editorially modify the recommended text as follows:

"The frames of portable motors supplied by a premises wiring system and that operate at 50V or more shall be grounded unless guarded or isolated from contact."

ARTICLE 440 — AIR-CONDITIONING AND REFRIGERATING EQUIPMENT

11-36 Log #397 NEC-P11 **Final Action: Accept in Principle**
(440.2)

Submitter: Earl W. Roberts, Reptec

Comment on Proposal No: 11-90

Recommendation: Accept the proposal as written.

Substantiation: The English language is used in this text, so let's use it. Just because some other organization may have used incorrect English is NO excuse for copying them. A Device is a Device, is Device. The Panel substantiation attempts to justify its position because the incorrect language "is an integral component of a cord set".

The correct term could just as well be used. The Panel Statement that "the phrase is used in product standards" is not substantiated. How was it used? It's still possible to use the phrase correctly and not call it a "device."

Panel Meeting Action: Accept in Principle

In 440.2, change the definition of "Leakage Current Detection and Interruption (LCDI) Protection" to "Leakage-Current Detector-Interrupter (LCDI). A device provided in a power supply cord or cord set that senses leakage current flowing between or from the cord conductors and interrupts the circuit at a predetermined level of leakage current."

Panel Statement: The panel changes the text of 440.2 to correlate with the product standard.

Consistency with definitions between the product standard and the NEC is important for the user of both documents.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

GOETZ, C.: It is understood that panel only modified the defined term for LCDI to use the terminology found in the product standard. The balance of the definition is unchanged by the panel action.

11-37 Log #569 NEC-P11 **Final Action: Reject**
(440.14 Exception No. 1)

Submitter: J. Ron Caccamese, Nathan Alterman Electric Company, Ltd. / Rep. International Brotherhood of Electrical Workers

Comment on Proposal No: 11-96

Recommendation: Revise as follows:

440.14 Location. ~~Exception No. 1~~: Delete the exception in its entirety.

Substantiation: The installation and application of a disconnecting means within sight does not hinder the operation of air-conditioning equipment as applied to an industrial process when the conditions include written safety procedures, and the conditions of maintenance and supervision are only performed by qualified personnel. By placing a disconnect switch within sight, safety is assured.

Panel Meeting Action: Reject

Panel Statement: The panel reiterates its position on Proposal 11-96.

The submitter has not provided any new or additional substantiati on. The exception as written provides safeguards for qualified persons. The conditions listed in the exception specifically limit the application.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

CACCAMESE, J.: The removal of the exception provides greater worker safety in the workplace by allowing the worker access to the disconnecting means within site of the work area and the ability to lock the disconnect where the work will take place. The switch could be locked in the closed position (energized) using a generic lock that all the mechanical trades would have access to, the lock could be removed and replaced with an approved lock device used exclusively for lock-out procedures (de-energized) and supplied to the worker working on the equipment. In addition, to reiterate my previous position, the installation and application of a disconnecting means within sight does not hinder the operation of the air-conditioning equipment as applied to an industrial process when the conditions include written safety procedures, and the conditions of maintenance and supervision are only performed by qualified personnel, but helps to ensure worker safety.

11-38 Log #570 NEC-P11 **Final Action: Reject**
(440.22(A), FPN (New))

Submitter: J. Ron Caccamese, Nathan Alterman Electric Company, Ltd. / Rep. International Brotherhood of Electrical Workers

Comment on Proposal No: 11-98

Recommendation: Add a new Fine Print Note to 440.22(A):

FPN: Circuit breakers that open as a result of a ground fault or short circuit at or near their maximum interrupting rating shall be tested or serviced or replaced before reenergizing the motor circuit. NEMA A4B Guidelines for Inspection and Preventive Maintenance or MCCBs Used in Commercial and Industrial Applications is a source for correct procedures to follow.

Substantiation: The submitter's original substantiation shows the need for the installer/maintainer being aware of the hazard of re-energizing a breaker without clearing of a fault; however, a FPN would make the qualified person performing work aware of the existence of the proper procedure needed for safe work practices.

Panel Meeting Action: Reject

Panel Statement: The recommendation of this proposal is not part of the electrical installation requirements of the NEC. Refer to the recommendations in NFPA 70B.

This issue is already addressed in 225.3 of NFPA 70E.

The magnitude (e.g., 5KA, 10KA, 20KA fault) of fault current for a specific event cannot readily be ascertained in the field.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

CACCAMESE, J.: The addition of a fine print note informing the user that guidelines exist regarding the precautions associated with energizing a circuit breaker that has operated as a a result of a ground fault or short circuit is at the least reasonable. While the panel statement is correct in that this information is available in NFPA 70B and 70E, to provide guidance in NFPA 70 or at least provide a FPN that directs the user to the referenced NFPA codes and standards. In regard to the fault level imposed, one must presume that when a fault occurs it is at the maximum value of the breaker's withstand rating. Finally, a FPN would make the qualified person performing work aware of the existence of the proper procedure needed for safe work practices.

11-39 Log #1127 NEC-P11 **Final Action: Reject**
(440.55(B))

Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 11-104
Recommendation: Change the voltage value from 250 to 277 Volts.
Substantiation: Please see statement for Proposal 11-104.
Panel Meeting Action: Reject
Panel Statement: No additional substantiation has been presented for consideration. Increasing the voltage level to 277 volts will not enhance a safer installation.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-40 Log #1128 NEC-P11 **Final Action: Reject**
(440.60)

Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 11-105
Recommendation: Revise the third sentence in 440.60 as follows:
The provisions of Part VII cover equipment rated not over 277 volts, single phase, and such equipment shall be permitted to be cord- and-attachment-plug connected.
Revise second paragraph: A room air conditioner that is rated three phase or rated over 277 volts shall be directly connected to a wiring method recognized in Chapter 3 and provisions of Part VII shall not apply.
Substantiation: Please see statement for Proposal 11-105.
Panel Meeting Action: Reject
Panel Statement: No additional substantiation has been presented for consideration. Increasing the voltage level to 277 volts will not enhance a safer installation.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-41 Log #1129 NEC-P11 **Final Action: Reject**
(440.62(A)(2))

Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 11-106
Recommendation: Revise to read:
Its rating is not more than 40 amperes and 277 volts, single phase.
Substantiation: Please see substantiation with Proposal 11-104.
Panel Meeting Action: Reject
Panel Statement: No additional substantiation has been presented for consideration. Increasing the voltage level to 277 volts will not enhance a safer installation.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

11-41a Log #CC1100 NEC-P11 **Final Action: Accept**
(440.65)

Submitter: Code-Making Panel 11,
Comment on Proposal No:
Recommendation: Change the title of 440.65 to read as follows:
440.65 Leakage-Current Detector-Interrupter (LCDI) and Arc Fault Circuit Interrupter (AFCI)
Substantiation: See action and statement on Comment 11-36.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
GOETZ, C.: It is understood that this panel comment is related to proposals 11-90 and 11-107 and is intended to correlate the revision made in Comment 11-36 with Section 440.65, which is the only Section in Article 440 where the defined term, LCDI, is used.

ARTICLE 445 — GENERATORS

13-4 Log #718 NEC-P13 **Final Action: Accept**
(445.3)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 13-4
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 13 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM,ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14
Ballot Not Returned: 1 Gustafson, R.

13-5 Log #866 NEC-P13 **Final Action: Accept**
(445.3 (New))

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 13-4
Recommendation: The panel is encouraged to continue to Reject Proposal 13-4.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14
Ballot Not Returned: 1 Gustafson, R.

13-6 Log #1963 NEC-P13 **Final Action: Reject**
(445.13)

Submitter: Elliot Rappaport, Electro Technology Consultants
Comment on Proposal No: 13-7
Recommendation: Change "250.30(A)" to "250.30(A)(8)".
Substantiation: The reference to 250.30(A) is too general since it includes grounding electrode conductors which are not intended to carry ground fault currents.
Panel Meeting Action: Reject
Panel Statement: Refer to the substantiation on Proposal 13-7, "Accepting the revised text will identify that the conductors in question are part of a "system" as opposed to a service which is supplied by a utility. Section 250.30(A)(2) and (8) contain the proper sizing requirements and are a more appropriate reference for the systems which are the subject of 445.13."
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
HORNBERGER, B.: The comment should be accepted. The commenter references a more specific area of the code which applies to the sizing of conductors that must carry ground fault current. Reference to the entire section of 250.30(A) applies to sizing of other parts of the grounding system which do not apply to separately derived system generators. This comment supports the negative vote comment by R.Swayne in the Proposal ballot stage.
RAPPAPORT, E.: The panel statement is correct but the panel action is not. The reference in the proposal to "250.30(A)" is too inclusive and should be changed to "250.30(A)(2) and (8)" to limit the text to sections that are applicable.
Comment on Affirmative:
GALLO, E.: This comment should be accepted in principle with the recommendation revised as change "250.30(A)" to "250.30(A)(2) or 250.30(A)(8)" to provide clarity and correlate with the panel statement.

13-7 Log #1338 NEC-P13 **Final Action: Reject**
(445.18)

Submitter: Steve Englund, Cummins Power Generation
Comment on Proposal No: 13-9
Recommendation: Delete text added by panel action, "lockable in the open position".
Substantiation: As proposed, the provision for lockable disconnect would be interpreted as applying to all generators types not covered by the exceptions, including generator types such as portable, RV, and commercial vehicle where a lockout is not needed to provide safety. Persons working on these types of generators or the electrical circuits or equipment connected to these generators, will be in sufficient proximity to the entire system so as to assure they have control over the status of the generator, circuits, and equipment.

Also, disconnect for these generators is generally provided by recognized supplementary protectors that are not available with features or accessories that can be added to provide a lockout means. Requiring a lockout means would be a substantial burden for manufacturers of RV, CM, portable, and home standby gensets as small supplementary protectors that are used are not directly procurable with a lock out hasp, and if available, would be a more expensive part and may also require new generator features to fit the revised protectors.

This submitter recognizes the panel might believe that there is relief for the mentioned generator types due to exception (1), however, applicability of this exception for these generator types is an untested concept.

If the text added by panel action is not deleted, an exception should be created for portable, RV, and commercial vehicle generator types: "Disconnects for portable, recreational vehicle, and other mobile vehicle generators are not required to be lockable in the open position.
Panel Meeting Action: Reject
Panel Statement: The disconnect must be lockable in the open position to provide a means to lockout/tagout the generator supply when working on equipment powered by the generator. In the case of the portable generators noted by the commenter, compliance with (1) and (2) would obviate the need for the disconnect switch altogether.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14
Ballot Not Returned: 1 Gustafson, R.

13-8 Log #1615 NEC-P13 **Final Action: Reject**
(445.18)

Submitter: Lawrence A. Bey, Cummins Power Generation
Comment on Proposal No: 13-9
Recommendation: Reject the proposal.
Substantiation: The substantiation given for the proposal is not correct. Locking the disconnect in the open position does not provide additional safety for someone working on the generator, because locking the disconnect does not prevent the line terminals from being energized or the prime mover from starting and running. The generally accepted safety procedure for working on generators is to disable the driving means, typically by use of the prime mover controller start/stop switch and/or disconnecting the starting batteries.

The NEC does not require locking provisions with other disconnects for services, motors, etc., and there is no disconnect locking provisions required for all installations in Article 110; so it is not clear why generator disconnects should be singled out for locking provisions.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-7.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14
Ballot Not Returned: 1 Gustafson, R.

13-9 Log #1617 NEC-P13 **Final Action: Reject**
(445.18)

Submitter: Lawrence A. Bey, Cummins Power Generation
Comment on Proposal No: 13-9
Recommendation: Add "or within locked outdoor enclosures" after "lockable in the open position" so that the new clause reads "lockable in the open position or within locked outdoor enclosures.
Substantiation: 110.26(F)(1) requires a suitable enclosure to outdoor electrical equipment that provides protection from unauthorized personnel. Where the generator is outdoors in a locked enclosure, the requirement for locking the disconnect open should not apply.
Panel Meeting Action: Reject
Panel Statement: There is no requirement for the enclosure to meet the lockout/tagout rules.
The presence of an enclosure does not obviate the need for locking out the disconnect. Also, see panel action and statement on Comment 13-7.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14
Ballot Not Returned: 1 Gustafson, R.

13-10 Log #698 NEC-P13 **Final Action: Hold**
(445.19)

TCC Action: The Technical Correlating Committee directs that this comment and Proposal 13-11 be reported as "Hold" since the comment points out that the proposal introduced potential conflicts with material under the jurisdiction of Code-Making Panels 3 and 15. The Technical Correlating Committee will appoint a task group with members from Code-Making Panels 3, 13, and 15 to address these issues.
Submitter: Kurt Eckroth, Waukesha County Technical College
Comment on Proposal No: 13-11
Recommendation: Proposal 13-11 should be rejected.
Substantiation: 702.6 requires the use of a transfer switch to connect a portable generator to premises wiring. The proposed addition to Article 445 would require GFCI protection on all outlets of all portable generators. Unfortunately, GFCI protected generators are incompatible with currently available transfer switch technology. If the proposed addition to Article 445 is approved, users may be encouraged, if not forced, to connect their new GFCI protected generator to their premises wiring by ungrounded backfeeding. Backfeeding is a notoriously dangerous practice, and the reason for the NEC transfer switch requirement in the first place. It is illogical to institute a change to Article 445 that forces/encourages users to violate Article 702. Therefore, the proposal should be rejected.

523.23(C) prohibits GFCI protection of egress lighting at carnivals, circuses, fairs and similar events. These events are commonly powered by portable generators. The proposed addition to Article 445, which would require GFCI protection on all outlets of all portable generators, would be in direct conflict with 523.23(C). It is illogical to institute a change to Article 445 that requires users to violate Article 523. Therefore, the proposal should be rejected.

The exception to 590.6(A) exempts GFCI protection of circuits in temporary installations where a greater hazard sold be created if power were interrupted. The proposed addition to Article 445, which would require GFCI protection on all outlets of all portable generators, would be in direct conflict with 590.6(A). It is illogical to institute a change to Article 445 that requires users to create safety hazards anticipated by Article 590. Therefore, the proposal should be rejected.

The proposed addition to Article 445 would require GFCI protection on all outlets of all portable generators. The GFCI protection would only function if the portable generator was properly grounded to a properly installed grounding rod. It is common knowledge that a significant percentage of users of portable generators do not ground the generator. It is illogical to require the addition of a "safety" device to a portable generator that, in many instances, will not function, but only provide the user with the illusion of safety and a false sense of security. Therefore, the proposal should be rejected.
Panel Meeting Action: Reject
Panel Statement: The GFCI provides a significantly higher level of safety for the user of a portable generator, regardless of the location of the generator. The requirements of Article 590 do nothing to protect users who are not on the jobsite. When connecting a GFCI-protected portable generator to a premise wiring system, the generator becomes a separately derived system. This does not eliminate the possibility of using a transfer switch – the transfer switch will need to be a multiple pole transfer switch that also switches the neutral conductor. The proposal does not require GFCI protection of all outlets, only 30 A and less, 125 or 125/250 V outlets. With respect to the exception to 590.6(A), portable generators should not be used where loss of power would create a hazard. The commenter is mistaken regarding the operation of the GFCI on a generator. Since the generator frame is the system ground, the grounded circuit conductor is then bonded to the frame, and the GFCI functions properly.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

ELKINS, D.: These comments modifying Proposal 13-11 should have been accepted. Proposal 13-11 as accepted by the Panel does not provide an exception for industrial applications of portable generators in which loss of power can have safety consequences. Examples include: refrigeration compressors for cryogenic storage of flammable materials, flood lighting for workers on elevated structures, egress lighting, magnetically held cutting/welding tools or ventilation/pressurization for enclosures.

FLACH, G.: I agree that GFCI protection should not be required on 30-ampere, 125- and 250-volt receptacles.
Comment on Affirmative:

GALLO, E.: This comment should be accepted in principle by using wording in Comment 13-18. The panel statement does not address use of portable generators for existing premises wiring systems that do not have a transfer switch that also switches the neutral conductor.

13-11 Log #1409 NEC-P13 **Final Action: Reject**
(445.19)

Submitter: Michael Flegel, Reliance Controls Corporation
Comment on Proposal No: 13-11
Recommendation: Revise text to read as follows:

Ground-Fault Circuit Interrupter Protection for Receptacles on Bonded Neutral Portable Generators. All 120 ~~and 120/240~~ volt, single-phase, 15~~-~~, and 20~~-, and 30~~ ampere receptacle outlets that are part of a portable generator where the grounded conductor and grounding conductor are bonded shall have listed ground-fault circuit interrupter protection for personnel.

Substantiation: A requirement for GFCI protection on **all** receptacles on **all** portable generators for **all** applications is not necessary and may be undesirable based on the following facts:

(1) In Article 590.6(A), GFCI protection can be supplied by add-on devices and does not have to be built into the generator receptacles. One reason this option exists is to comply with the exception in 590.6(A) where GFCI protection is not allowed to supply equipment that would create a greater hazard if power was interrupted or having a design that is not compatible with GFCI protection.

(2) Article 525.23(C) does not allow GFCI protection on egress lighting.

(3) Some applications have safety records that do not require GFCI protection. These safety records are easily supported by sound technical reasoning. One of these applications is Article 702, Optional Standby Systems. My following comments will be on these systems with a 120/240 volt single phase generator:

(a) The majority of Optional Standby Systems are used for home standby power when utility power fails. In most applications, this happens infrequently and in an environment void of power tools and heavy equipment that you would see on a construction site. As a result, there is less likelihood the equipment and cords are worn or damaged.

(b) UL and the CPSC did research for STP2201 to find reported injuries or deaths when using a portable generator to power a premise wiring system. They found one case but not enough information was available to conclude that GFCI protection would have saved this life.

(c) Very few people, if any, ground their generator with a ground rod and generators generally sit on pavement and/or wheel kits when operating. Some generators don't have a connection between generator ground and the neutral (floating neutral). As a result, generators do not have a connection to earth which means **no ground faults can exist**. There can be failures in the isolation but this is remote especially in the benign home standby environment. For a catastrophe to occur there has to be two things that happen to the isolation. In a floating neutral generator, the first failure would have to be so unique that it has to make a connection between the neutral and the earth that doesn't involve a hot lead shorting to the neutral and tripping the generator circuit breaker. In a bonded neutral generator, a good connection between the generator frame and earth has to exist. The second isolation failure that has to occur connects the person standing on the ground to a hot lead coming from the generator, again unique enough that it doesn't short a hot and trip the circuit breaker.

(d) People are instructed to plug in the power cord into the generator before they start the generator and remove it after they stop the generator, thus people do not have to handle the cord when the generator is running.

(e) As soon as the generator is plugged in to the house, the generator ground is bonded with the neutral through the service entrance panel and a good connection between the generator ground and earth is made. Also, since home standby systems are generally non-separately derived systems with a common neutral between the generator and the utility, the ground is bonded to neutral at the service entrance. The system no longer has double isolation. This single isolation seems sufficient based on points 3a, 3b, 3c, and 3d above. Even if people handle the cord with the generator running, the protection reverts to double isolation as soon as it is unplugged from the house.

(f) If GFCI protection is added to generators as stated in the proposal, then the bonded neutral generator cannot be connected to a premises wiring system using a conventional two-pole transfer switch. This will require a system using a three-pole transfer switch. Floating neutral generators can use a conventional two pole transfer switch. Almost all the installed home standby systems in the US have two pole transfer switches. Both floating and bonded neutral generators are used. There will be a great deal of confusion to the homeowner trying to make a decision especially on a replacement generator with GFCI protection as proposed. If they find themselves with a GFCI protected bonded neutral generator and a conventional two-pole transfer switch, they will find ways to make them work which will have a negative effect on safety like cutting off the ground blade on the cord plug to the generator.

(g) If GFCI protection is required for all generators, the cost of generators and transfer switches will increase. People will probably be willing to spend more money on generators but will have less money left to buy the more expensive three pole transfer switches. Transfer switch use will decrease. Back feeding causing injury to utility workers and others is a widely documented safety issue which will be made worse by adding GFCI protection to all portable generators.

(h) A floating neutral generator is safe based on isolation, and GFCI protection adds cost while adding no additional level of safety.

(i) Switching the neutral (three pole transfer switch) is more prone to failure than a solid connection (two pole transfer switch). Losing the neutral can create unsafe conditions.

Summary

There is no evidence of safety issues in home standby systems and sound electrical theory supports this. Article 590 allows the addition of GFCI protective equipment to outlets that don't have this protection. The protection does not have to be built-in to the outlet on the generator. There is no data to support that a problem exists with these methods

Currently floating neutral generators have more than enough levels of safety to prevent injury without GFCI protection, especially in the home standby environment. Adding unnecessary expense to these systems will decrease the use of transfer switches and create a larger back-feeding safety problem which is already serious.

Not providing GFCI protection on 120/240 volt receptacles on bonded neutral generators will allow people to use new generators with existing transfer switches without creating unsafe modifications and eliminating the need to switch the neutral which is more likely to cause problems than a solid neutral connection. This also allows compliance with sections of the code that prohibit GFCI protection for certain equipment. I don't believe the safety records indicate that drastic and immediate action is required and more discussion may be needed before the final outcome is determined.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-10.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 11 Negative: 3
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

ELKINS, D.: See My Explanation of Negative on Comment 13-10.

NASBY, J.: See NEMA Explanation of Negative on Comment 13-18.

RAPPAPORT, E.: GFCI receptacles should be required on 15 and 20 ampere, 125 volt receptacles where individual loads are used. 30 ampere and 125/250 volt receptacles will be used to feed multiple loads such as residences. If the premises wiring is grounded, the GFCI will trip making it unusable. This will likely result in modifications to the generator wiring that could make it unsafe. The GFCI receptacles on portable generators should be limited to 15 and 20 ampere, 125 volt ratings.

13-12 Log #1828 NEC-P13 **Final Action: Reject**
(445.19)

Submitter: William R. Drake, Marinco
Comment on Proposal No: 13-11
Recommendation: Reject the Proposal.
Substantiation: Although I support GFCI protection for most every situation, GFCI protection should not be required in circuits where it adds cost without any benefit. Requiring GFCI protection on all portable generators is unnecessary. GFCI protection makes sense for non-isolated generators that have a connection to ground, but for generators where the neutral and ground are isolated, the GFCI provides no additional protection.

Isolated generators are commonly used to provide temporary power for homes when the utility power is out, and the ground and neutral are tied together downstream at the service for the house. There is appropriate GFCI protection within the house, and a GFCI at the generator provides no benefit.

I suggest that the Code Panel establish a task group to thoroughly think through which applications are appropriate, and which are not, for GFCI protection. When the safety record is good, it is irresponsible to add cost without benefit.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-10.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

ELKINS, D.: See My Explanation of Negative on Comment 13-10.

13-13 Log #1965 NEC-P13 **Final Action: Reject**
(445.19)

Submitter: Elliot Rappaport, Electro Technology Consultants
Comment on Proposal No: 13-11
Recommendation: This proposal should be rejected.
Substantiation: The requirements for ground fault protection is best understood by CMP 5 and should be centralized in Article 250.
Panel Meeting Action: Reject
Panel Statement: Application of GFCI protection is not a grounding method. Placing the requirements in Article 250 will do nothing to protect the users of portable generators.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-11.

13-14 Log #2239 NEC-P13 **Final Action: Reject**
(445.19)

Submitter: Wes Hoppler, American Power Technologies Inc.
Comment on Proposal No: 13-11
Recommendation: Revise text to read as follows:
All 120 ~~and 120/240~~ volt single phase 15-, 20-, and 30 ampere receptacle outlets that are a part of a portable generator shall have listed ground fault circuit interrupter protection for personnel.
Substantiation: The requirement for 120/240 volt receptacles to have GFCI protection will cause many more dangerous conditions to exist. If adopted as proposed, future built portable generators will be incompatible with previously code conforming installations of 2 pole transfer switches that are part of the premises wiring. Instead of reducing the problems with safe generator usage during power outages, may new dangerous configurations may be attempted to get future built generators to work with existing transfer switches. The application should be regulated (temporary power usage for construction, maintenance...), not the equipment (all generators). For non-premises wire connected applications GFCI adapters could be required in lieu of GFCI protected 120/240 volt receptacles on the generator.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-10.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
NASBY, J.: See NEMA Explanation of Negative on Comment 13-18.
Comment on Affirmative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-11.

13-15 Log #331 NEC-P13 **Final Action: Accept**
(445.19 (New 445.20))

Submitter: L. Keith Lofland, International Association of Electrical Inspectors
Comment on Proposal No: 13-11
Recommendation: Revise proposed wording to read as follows:
Ground-fault Circuit Interrupter Protection for Receptacles on Portable Generators. All ~~120~~ 125 and ~~120/240~~ 125/250 volt, single-phase, 15-, 20-, and 30-ampere receptacle outlets that are a part of a portable generator shall have listed ground-fault circuit interrupter protection for personnel.
Substantiation: This new proposed requirement for GFCI protection for receptacles on portable generators refers to the voltage rating of the receptacle. The referenced voltage rating for the receptacle should match the voltage rating for receptacles referenced to in 406.2(B). The submitter of the original proposal referenced 125-volt rated receptacles as well.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-11.

13-16 Log #891 NEC-P13 **Final Action: Reject**
(445.19 (New 445.20))

Submitter: Paul Schnackenberg, Gen/Tran Corp.
Comment on Proposal No: 13-11
Recommendation: Change second sentence of proposed 445.20 to read:
All 15 and 20 ampere receptacle outlets that are part of a portable generator, with a bonded neutral, shall have GFCI protection for personnel.
Substantiation: In searching through catalogs, tool supply outlets and rental companies, NO tools have been found on the market that use 30A-125V plugs. The only use of a 125/250V outlet on a construction site is to power a "Spider Box" which already have GFCI protection. 120/240V GFCI receptacles used with listed transfer switches DO NOT WORK. These GFCIs trip instantly in this application. We have a 25 year history of this problem.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-10.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
NASBY, J.: See NEMA Explanation of Negative on Comment 13-18.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-11.

13-17 Log #1479 NEC-P13 **Final Action: Reject**
(445.19 (new 445.20))

Submitter: James Allison, Mechanical Products Co.
Comment on Proposal No: 13-11
Recommendation: Revise as follows:
Ground-Fault Circuit Interrupter Protection for Receptacles on Portable Generators. All 120 ~~and 120/240~~ volt, single-phase, 15- and 20, ~~and 30~~ ampere receptacle outlets that are part of a portable generator shall have listed ground-fault circuit interrupter protection for personnel.
Substantiation: Mechanical Products Co. recommends that GFCI protection NOT be required on 30 amp 120/240 VAC twist-lock receptacles for use with portable generators. One of the biggest arguments against this proposal is that it will necessitate the installation of a more expensive three-pole transfer switch. Higher consumer (residential user) cost for these transfer switches will inevitabley equate to an overall reduction in the number of new switches installed. Fewer installed switches mean more back-feed problems, and this simply exacerbates safety issues the proposal is attempting to eliminate.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-10.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
NASBY, J.: See NEMA Explanation of Negative on Comment 13-18.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-11.

13-18 Log #1090 NEC-P13 **Final Action: Reject**
(445.20)

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 13-11
Recommendation: Revise the panel action text as follows:
445.20 Ground-Fault Circuit Interrupter Protection for Receptacles on Portable Generators. All 120 and 120/240 volt, single-phase, 15-, and 20~~, and 30~~ ampere receptacle outlets that are a part of a portable generator shall have listed ground-fault circuit interrupter protection for personnel.
Substantiation: Although I would agree in general that having GFCI protection on all receptacles is a positive approach, the addition on the 30 ampere receptacles creates a significant concern in many applications of portable generators.
As the panel is aware, the application of portable generators as an optional power source for electrical systems has become very popular. The typical connection is to install a small sub panel with interlocked circuit breakers to allow for transfer between the utility and generator power sources. This panel is fed from a flanged inlet that is then cord connected to the portable generator. There are thousands of these installations in place with 30 ampere connections. If GFCI protection is provided on the 30A receptacle on the generator, the system will not work because the GFCI will trip. The technical reason for this is because none of these installations have the neutral switched and the GFCI detects the grounded neutral at the service.
If the panel moves forward with the requirement, as soon as a new generator is purchased, it renders these existing installations useless. This will lead the user to find a way to bypass the GFCI protection so that the generator will work with their installation. The panel should drop the 30 ampere provision to allow the generator to continue to serve in the optional stand-by applications.
The provision for 15 and 20 ampere receptacles can continue since very few of these generators are connected at 20A or less.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-10.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 11 Negative: 3
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
FLACH, G.: See my explanation of negative vote on Comment 13-10. GFCI protection should not be required on 30-ampere, 125- and 250 volt receptacles.
NASBY, J.: NEMA disagrees with Panel Action. The Comment should have been accepted. The submitter is correct that when the generator is used as an alternate power source in accordance with Article 702, the GFCI will not function properly on systems where the neutral is not switched. The vast majority of residential stand by systems do not have the neutral switched at

the transfer equipment. For construction site applications, Article 590 already provides requirements for protection of the 30 ampere circuits.

RAPPAPORT, E.: See my explanation of negative vote on Comment 13-11.

Comment on Affirmative:

GALLO, E.: This comment should be accepted for reasons stated by the submitter.

13-19 Log #1864 NEC-P13 **Final Action: Reject**
(445.20 (New))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 13-11
Recommendation: Add text to read as follows:

Exception: In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified personnel are involved, portable generators without GFCI receptacles may be applied when serving loads whose loss are judged by the Authority Having Jurisdiction to have safety consequences.

Substantiation: The proposal ignores industrial applications of portable generators in which loss of power can have safety consequences. Examples might include: refrigeration compressors for cryogenic storage of flammable materials, flood lighting for workers on elevated structures, magnetically held cutting/welding tools or ventilation/pressurization for enclosures in a hazardous location. The proposal could be supported if an exception is added as shown above.
Panel Meeting Action: Reject
Panel Statement: Portable generators should not be used where maintaining the power supply is essential to life safety.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

ELKINS, D.: See My Explanation of Negative on Comment 13-10.

ARTICLE 450 — TRANSFORMERS AND TRANSFORMER VAULTS

9-74 Log #63 NEC-P09 **Final Action: Accept**
(450.5)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 9-134
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 5-119 since this proposal changed 250.32(B)(2) into an exception. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Reinstate the reference to 250.32(B)(2), but restated as 250.32(B) Exception.

Panel Statement: This Comment correlates with CMP-5 action on Comment 5-58.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-75 Log #1242 NEC-P09 **Final Action: Accept**
(450.5(B)and (C))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 9-18
Recommendation: Accept CMP-9's Panel action reference item 7 on 450.5(B) and (C) in Proposal 9-18.
Substantiation: The NEC TCC Task Group on Grounding and Bonding agrees with CMP-9 that "grounding autotransformer" is the proper reference as used throughout 450.5 in the 2005 NEC.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-76 Log #821 NEC-P09 **Final Action: Reject**
(450.15 (New))

Submitter: Rod Belisle, NECA-IBEW Electrical Training Center
Comment on Proposal No: 9-142
Recommendation: "Accept in principle" with the addition of the following:
The provisions for locking shall remain in place with or without the lock installed.
Substantiation: This proposal should have been "accept in principle" with the addition of the following: "The provisions for locking shall remain in place with or without the lock installed."

See my previous comments for a negative vote in the ROP on this proposal.

Panel Meeting Action: Reject
Panel Statement: CMP 9 reaffirms its panel statement on this subject. The statement applies whether or not the locking arrangements are permanent.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 9 Negative: 2
Explanation of Negative:

BELISLE, R.: The addition of an insight disconnect at the transformer provides an additional level of safety that would benefit workers providing maintenance and installation. Lock out and safety of energized equipment should always be considered when workers are required to work on the associated equipment.

SZENDRE, M.: I agree that insight disconnecting means should be required, and if not insight a means provided for locking. Safety of electrical workers cannot be ignored and with increased fault currents and FR clothing requirements, this issue will not go away.

9-77 Log #721 NEC-P09 **Final Action: Accept**
(450.20(A))

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 9-143
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 9 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Accept
Panel Statement: The Panel does not necessarily agree with all the substantiation provided by the submitter of this Comment.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:

SZENDRE, M.: While I understand the submitter's comment on limiting fine print notes, I disagree that they are a compilation of generic information that provides no information to the users. These manuals are well written and provide valuable information to the users.

9-78 Log #862 NEC-P09 **Final Action: Accept**
(450.20(A) (New))

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 9-143
Recommendation: The panel is encouraged to continue to Reject Proposal 9-143.
Substantiation: The reasons to continue to Reject the Proposal are as follows:

1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.

5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).

6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Accept

Panel Statement: The Panel does not necessarily agree with all the substantiation provided by the submitter of this Comment.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-79 Log #720 NEC-P09 **Final Action: Accept**
(450.20(B))

Submitter: Robert Kelleher, Paramount Electrical Services

Comment on Proposal No: 9-144

Recommendation: Continue to Reject .

Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 9 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.

Panel Meeting Action: Accept

Panel Statement: The Panel does not necessarily agree with all the substantiation provided by the submitter of this Comment.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

SZENDRE, M.: See my explanation of affirmative vote on Comment 9-77.

9-80 Log #863 NEC-P09 **Final Action: Accept**
(450.20(B))

Submitter: John P. Masarick, Independent Electrical Contractors Inc.

Comment on Proposal No: 9-144

Recommendation: The panel is encouraged to continue to Reject Proposal 9-144.

Substantiation: The reasons to continue to Reject the Proposal are as follows:

1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.

2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.

3. These standards are also covered by a Fine Print Note in 110.12.

4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.

5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).

6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Accept

Panel Statement: The Panel does not necessarily agree with all the substantiation provided by the submitter of this Comment.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

13-20 Log #2183 NEC-P13 **Final Action: Reject**
(455.7(C))

Submitter: Patrick Gaffney, Ronk Electrical Industries, Inc.

Comment on Proposal No: 13-13

Recommendation: 455.7 covers the overcurrent protection for the input side of the phase converter, not the output side. If a short circuit occurs in the input section of the converter, or wiring from overcurrent protection to the input, the only limiting factor is source impedance. Therefore, accept text as proposed in Proposal 13-13 for those cases where a power loss hazard exists, which by the way, are very rare instances. Current 125 percent or next standard size limit is too restrictive for equipment which must operate for safety and may be operating at loads exceeding rated full load of the motor operating the device.

Substantiation: The panel statement speaks of phase converter supplying short circuit current, Section 455.7 covers phase converter input overcurrent protection only. Output overcurrent is covered by Articles for the type of equipment being operated (Article 430 for motor loads, for example). 240.4(A) allows equipment to be protected for short circuit only when power loss hazards exist if overcurrent protection is based on typical overload sizing. If nothing else, there certainly needs to be something that allows more than the existing 125 percent or next standard size limit that now exists, when loads that must operate are involved, say 300-1000 percent at minimum.

Panel Meeting Action: Reject

Panel Statement: This comment does not comply with Section 4.4.5 (c) of the NFPA Regulations Governing Committee Projects in that it does not provide text of the comment, including the wording to be added, revised (and how revised), or deleted.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Gustafson, R.

ARTICLE 480 STORAGE BATTERIES

13-21 Log #1421 NEC-P13 **Final Action: Accept in Principle**
(480.5 (New))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)

Comment on Proposal No: 13-16

Recommendation: NEMA disagrees with the panel action. NEMA recommends that Proposal 13-16 be Accepted as written:

480.5 (new) Disconnecting Means. A disconnecting means shall be provided for all ungrounded conductors derived from a stationary battery system. A disconnecting means shall be readily accessible and located within sight of the battery system.

Substantiation: The panel action on Proposal 13-16 should be Rejected for the following reasons:

From an infrastructure standpoint of using and maintaining a safe battery system, battery systems require maintenance. The purpose of this proposal is to provide a safe and standardized method to perform routine battery maintenance. Mr. Nasby's, Mr. Stafford's and Mr. Swayne's negative panel comments clearly describe the potential hazards to not having a disconnecting means readily accessible and located within sight of the battery system.

The proposal specifically left out details and ratings for disconnect means as that is not in the purview of an installation code. Construction details, ratings and performance criteria are best developed in specific product standards.

Panel Meeting Action: Accept in Principle

Revise the new 480.5 to read as follows:

480.5 Disconnecting Means. A disconnecting means shall be provided for all ungrounded conductors derived from a stationary battery system over 30 volts. A disconnecting means shall be readily accessible and located within sight of the battery system.

Panel Statement: A disconnect is necessary for maintenance of battery systems over 30 volts.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 11 Negative: 3

Ballot Not Returned: 1 Gustafson, R.

Explanation of Negative:

ELKINS, D.: This comment as modified by the panel should be rejected. No substantial basis was provided for the 30 Volt threshold, nor was any amp-hour minimum or basis provided for the disconnect requirement.

GALLO, E.: This comment should be rejected for the following reasons:

1. The practical effect of the language accepted by the panel is only to create confusion. According to the definition in Article 100, Disconnecting Means is a device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply. Therefore, as CMP 13 confirmed by acceptance of Comment 13-37, disconnecting means can be bolted connections or terminals and do not necessarily have to be switches or circuit breakers. Since installation of storage batteries typically already have volted connections at their terminals, this language is redundant and the effect of this proposal will only be to create confusion among users of the NEC.

2. The rationale for having a disconnecting means for storage batteries is flawed. The panel seems to be concerned with the possibility of arcing during the disconnection.

a) Typically, battery maintenance is not done while batteries are charging or discharging, but while the batteries are on float. In this condition, the float current is tiny and the hydrogen evolution is minimal.

b) Building codes require adequate ventilation of battery rooms to prevent the accumulation of an explosive mixture. In addition, modern battery chargers are typically designed to prevent situations that lead to excessive hydrogen evolution, such as overcharging or reverse charging.

c) Article 480 covers various types of storage batteries. Not all storage batteries emit hydrogen, so in many cases, this concern is moot.

d) If the panel really intended to address the alleged explosion hazard than the proposed text is inadequate since it does not assure that the disconnect means does not generate sparks.

3. The panel provides no substantiation whatsoever for the 30 Volt threshold. Why is the threshold selected by the panel different from the established battery disconnect threshold in 690.71(E) and 690.71(F)? Note that these apply to the more severe situation where the batteries are cycled frequently as opposed to typical usage for back-up purposes where the batteries are not cycled frequently.

HORNBERGER, B.: There are other methods of providing disconnecting means without the installation of a single disconnect device. The wording proposed in this section is not clear as to the number of disconnects allowed. There is no substantiation for the need of a single disconnect device nor the need for it to be in sight of the battery.

ARTICLE 490 EQUIPMENT, OVER 600 VOLTS, NOMINAL

9-81 Log #1836 NEC-P09 **Final Action: Reject**
(490.21(A)(4)(2))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.
Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 9-152
Recommendation: The panel should have voted to Accept this Proposal.
Substantiation: This proposal as written recognizes a system that provides reliable power to loads in large manufacturing plants. These secondary selective systems are common in double ended substations where maintaining power to loads is critical for operation or system safety in continuous manufacturing facilities and generating stations. These systems utilize automatic logic that parallels sources only momentarily and prohibits continuous paralleling. IEEE 666, "Design Guide for Electric Power Service Systems for Generating Stations" specifically allows this arrangement. Transformer impedances required to allow continuous paralleling would limit the ability to start very large motors in these facilities when operating on a single source. Also, the probability of a fault during the very brief time when both sources are connected in parallel is very low.
Panel Meeting Action: Accept in Principle

Convert the text to mandatory text, as follows:
Insert the following new (5)

(5) Ratings for Systems with Tie Breakers. Circuit breakers shall be permitted to be rated based on the maximum contribution from all connected sources of energy with the tie breaker open provided all of the provisions in (1) through (3) are met.

(1) The conditions of maintenance and supervision shall assure that only qualified persons will design and operate the system.

(2) The system shall have a transfer scheme that limits the time the sources can be operated in parallel.

(3) The time period for which the source and tie breakers can be simultaneously closed during source transfers shall be strictly limited through compliance with (a) and (b.)

(a) A source breaker is arranged to automatically open at the end of the design delay, which shall not exceed 1 second.

(b) Any failure of a source breaker to open at the end of the design delay period results in the generation of an alarm at a continuously monitored point.

Panel Statement: CMP 9 agrees that the comment has merit, however, the subject has many mandatory features and does not qualify for inclusion as a fine print note.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 7 Negative: 4
Explanation of Negative:

BELISLE, R.: Although I agree with the panel in allowing alternative methods to provide switching, manual vs. automatic; in double ended power systems, I do not agree that a time amount can be determined at random to allow for overlap of both systems, thereby exceeding the Fault Current Rating of the associated equipment for any amount of time. In electrical terms, one second is an extremely long time and no documentation was presented to show that said equipment can function in this method without damage or failure. I do not believe the CMP was provided with adequate information to make such a change.

BREITKREUTZ, B.: This comment should be rejected because it would allow the short circuit rating to be exceeded for too much time. There should be no intentional delay.

OSBORNE, R.: The comment permits the sources to be in parallel for 1 second. A fault can occur in much less than 1 second and significant damage may occur within 1/2 cycle or less. If the circuit breaker has an interrupting rating that is less that the fault current, the breaker may fail to interrupt the fault, may be violently destroyed, and may present a fire hazard. Failure to interrupt fault current can in turn cause catastrophic damage to the entire system.

RUPP, B.: This comment should have continued to be rejected. As stated by the panel in the ROP, a tie breaker should have a short circuit interrupting rating based on an evaluation that considers contributions from ALL available sources. There was no substantiation that paralleling for one second without an adequately rated interrupting device results in a safe installation.

9-82 Log #1243 NEC-P09 **Final Action: Accept**
(490.37, 490.55, and 490.72(D))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 9-18
Recommendation: Accept CMP-9's Panel action reference items 10, 11, and 12 on 490.37, 490.55, and 490.72(D) in Proposal 9-18.
Substantiation: This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-83 Log #580 NEC-P09 **Final Action: Accept**
(490.46)

Submitter: Charles Ball, S & C Electric Company
Comment on Proposal No: 9-158
Recommendation: Reject Proposal 9-158 and retain the text in the 2005 edition.
Substantiation: Most utilities have their own design requirements for customer-owned switchgear that is connected to their system. These requirements are based on decades of experience and typically apply to incoming and metering sections. Proposal 9-158 contains design requirements for the incoming section of metal-clad or metal-enclosed switchgear applied as high-voltage service equipment. While these requirements are based on those of one utility, not all utilities have the same requirements. When there is a conflict, the utility will continue to insist that their requirements be met if the power user wants service. The power user will be in a catch 22 between utility requirements and NEC requirements.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:

FOGARTY, R.: Proposal 9-158 should not have been rejected. The requirements were reviewed and affirmed by the member utilities of the Edison Electric Institute which represents the consensus of the utility industry through EEI and not just of one utility.

HARTWELL, F.: Please refer to my Explanation of Negative vote on Comment 9-91.

MCCULLOUGH, R.: See my explanation of negative vote on Comment 9-91.

9-84 Log #889 NEC-P09 **Final Action: Accept**
(490.46)

Submitter: Brad Gruenewald, We Energies
Comment on Proposal No: 9-158
Recommendation: Reject Proposal 9-158 and retain the text in the 2005 edition.
Substantiation: As an electric utility, We Energies has design requirements for customer-owned medium-voltage switchgear, which is connected to our electrical system. These design requirements have been developed with decades of experience. Our design requirements for medium-voltage switchgear (either metal-clad or metal-enclosed) require separate incoming (termination) and metering bay sections. Typically the termination compartment and isolating switch are contained in the same compartment. This compartment is exclusively under utility control. Our utility personnel are fully qualified to perform switching, testing and phasing operations. This Proposal 9-158 to the 2008 National Electrical Code (NEC) contains design requirements for the termination section of medium-voltage switchgear when applied as service equipment which is in direct conflict with our design requirements.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:

FOGARTY, R.: Proposal 9-158 should not have been rejected. The requirements were reviewed and affirmed by the member utilities of the Edison Electrical Institute which represents the consensus of the utility industry through EEI and not just of one utility.

HARTWELL, F.: Please refer to my Explanation of Negative vote on Comment 9-91.

MCCULLOUGH, R.: See my explanation of negative vote on Comment 9-91.

9-85 Log #916 NEC-P09 **Final Action: Accept**
(490.46)

Submitter: George House, Yaskawa Electric America, Inc.
Comment on Proposal No: 9-158
Recommendation: Reject Proposal 9-158 and retain the text in the 2005 edition.
Substantiation: It would appear unwise to make such a widespread amendment based on the requirements of one utility since not all utilities have the same requirements. In such a conflict it will be the "user" of such equipment caught between the requirements of the electric utility and the NEC requirements. Why must NEC amend and enforce new design requirements that utilities have (for many years) provided for to incoming and metering sections of metal-clad and metal-enclosed switchgear? This amendment will have serious repercussions for customers desiring NEC approval and meeting the demands of the electric utilities' requirements.
Please strike completely.
Panel Meeting Action: Accept
Panel Statement: The Panel does not necessarily agree with all the substantiation provided by the submitter of this Comment.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
FOGARTY, R.: Proposal 9-158 should not have been rejected. The requirements were reviewed and affirmed by the member utilities of the Edison Electrical Institute which represents the consensus of the utility industry through EEI and not just of one utility.
HARTWELL, F.: Please refer to my Explanation of Negative vote on Comment 9-91.
MCCULLOUGH, R.: See my explanation of negative vote on Comment 9-91.

9-86 Log #1451 NEC-P09 **Final Action: Accept**
(490.46)

Submitter: Robert Molde, Xcel Energy
Comment on Proposal No: 9-158
Recommendation: Reject Proposal 9-158 and retain the text in 490.46 in the 2005 edition.
Substantiation: The design requirements included in Proposal 9-158 are too limiting. Utilities typically have specific requirements for customer-owned switchgear connected to their system. Not all utilities have the same requirements. Contrary to Proposal 9-158 our utility presently specifies the service conductors and an isolating switch in the same compartment and the metering equipment is required to be in an adjacent separate metering compartment. Although there is a footnote in Proposal 9-158 stating the utility may have additional requirements, conflicts with customers will occur when the mandatory requirements of the utility differ from the NEC rule.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
FOGARTY, R.: Proposal 9-158 should not have been rejected. The requirements were reviewed and affirmed by the member utilities of the Edison Electrical Institute which represents the consensus of the utility industry through EEI and not just of one utility.
HARTWELL, F.: Please refer to my Explanation of Negative vote on Comment 9-91.
MCCULLOUGH, R.: See my explanation of negative vote on Comment 9-91.

9-87 Log #1825 NEC-P09 **Final Action: Reject**
(490.46)

Submitter: Jerry Baskin, Federal Pacific
Comment on Proposal No: 9-158
Recommendation: Omit (delete) the entire proposed Section 490.46 Metal Enclosed and Metalclad Service Equipment.
Substantiation: This proposed section develops specific design criteria for metal-enclosed switchgear. (1) The NEC is not be be design oriented, (2) There is no particular safety advantage in arranging the switchgear in the described fashion (i.e., there is the same exposure to high voltage), (3) The developed design precludes other configurations of metal-enclosed and metalclad switchgear that have been used successfully for decades, (4) The developed design precludes the use of certain other classes of equipment such as wall-mounted switches and pad-mounted switchgear that have been used successfully for decades as high-voltage service equipment and (5) The developed design is known to be presently used only in a small area of the United States and only by one organization.
Panel Meeting Action: Reject
Panel Statement: There is no substantiation to delete the entire existing section 490.46, as well as the proposed text. See panel action and statement on Comment 9-83.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

9-88 Log #1838 NEC-P09 **Final Action: Accept in Principle**
(490.46)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 9-158
Recommendation: This proposal should have been rejected by the Panel.
Substantiation: The panel should have voted to reject this proposal. The submitter provided no substantiation as to the safety benefits to be added by these new requirements over existing practices. These are design specifications.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 9-83.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
FOGARTY, R.: Proposal 9-158 should not have been rejected, Consistency in equipment is of benefit for safety where contractors work on equipment connecting to different utilities.
HARTWELL, F.: Please refer to my Explanation of Negative vote on Comment 9-91.
MCCULLOUGH, R.: See my explanation of negative vote on Comment 9-91.

9-89 Log #2173 NEC-P09 **Final Action: Accept**
(490.46)

Submitter: Daniel Wycklendi, Copper Power Systems
Comment on Proposal No: 9-158
Recommendation: Reject Proposal 9-158 and retain the text in the 2005 edition.
Substantiation: Most utilities have their own design requirements for customer-owned switchgear that is connected to their system. These requirements are based on decades of experience and typically apply to incoming and metering sections. Proposal 9-158 contains design requirements for the incoming section of metal-clad or metal-enclosed switchgear applied as high-voltage service equipment. While these requirements are based on those of one utility, not all utilities have the same requirements. When there is a conflict, the utility will continue to insist that their requirements be met if the power user wants service. The power user will be in a catch 22 between utility requirements and NEC requirements.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
FOGARTY, R.: Proposal 9-158 should not have been rejected. The requirements were reviewed and affirmed by the member utilities of the Edison Electrical Institute which represents the consensus of the utility industry through EEI and not just of one utility.
HARTWELL, F.: Please refer to my Explanation of Negative vote on Comment 9-91.
MCCULLOUGH, R.: See my explanation of negative vote on Comment 9-91.

9-90 Log #2232 NEC-P09 **Final Action: Accept**
(490.46(1))

Submitter: Anne Morgan, Pepco
Comment on Proposal No: 9-158
Recommendation: Reject Proposal 9-158 and retain the text in the 2005 edition.
Substantiation: The proposed wording contains design requirements, but little that addresses safety. Our design requirements for primary customers have been in place for decades and used successfully for both the customer and our electric system. We require MC switchgear with drawout breakers, glow tubes, voltage transformers as well as the equipment listed. For special installations we need to be able to design to the need and not be limited to the devices listed in the NEC. We also require a ground and test device for testing and phasing. Isolating switches and ground bails would not be allowed in the MC switchgear connecting to our system. I am not sure from the wording that the difference between MC and ME switchgear is understood. The proposed wording addresses design and goes well beyond the stated purpose of the NEC. It leaves our customers with the difficult choice of designing to our requirements or the NEC requirements.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:
FOGARTY, R.: Proposal 9-158 should not have been rejected. The requirements were reviewed and affirmed by the member utilities of the Edison Electric Institute which represents the consensus of the utility industry through EEI and not just of one utility. The proposal does not restrict the use of additional requirements of a particular utility.
HARTWELL, F.: Please refer to my Explanation of Negative vote on Comment 9-91.
MCCULLOUGH, R.: See my explanation of negative vote on Comment 9-91.

9-91 Log #1176 NEC-P09 **Final Action: Reject**
(490.46(B)(1))

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 9-158
Recommendation: The Panel action rewording of paragraph 490.46(B)(1) should be changed back to the original wording of the submitter. The text would now read as follows:
(B)(1) Door. The compartment shall include a hinged door with provision for applying a separate lock in the field.
Accept the remainder of the text as shown in the Panel meeting action section published in the ROP on Proposal 9-158.
Substantiation: The hinged cover provides for more immediate access to service entrance equipment which enhances safety for the purpose of testing for the presence of voltage and applying safety grounds. A hinged cover provides a safer means of access.
Edison Electric Institute affirms the remainder of the Panel's action and the work of the Panel represents the consensus of the utility industry through EEI and not just of one utility.
Panel Meeting Action: Reject
Panel Statement: The panel action on Comment 9-83 has removed this text. Refer to the substantiation in Comments 9-83, 9-84, 9-85, 9-86, 9-88, 9-89 and 9-90.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 3
Explanation of Negative:
FOGARTY, R.: Proposal 9-158 should not have been rejected, and this comment should have been accepted. The requirements were reviewed and affirmed by the member utilities of the Edison Electric Institute which represents the consensus of the utility through EEI and not just of one utility.
HARTWELL, F.: This comment should have been accepted. It is apparent that the utilities have coalesced, finally, around consensus language that would lead to a consistent approach that would allow consistency in training. It is worthy of note that of the negative comments, only two were from utilities, although the reported negative oral comment from a former utility member of this panel is of concern. This comment should form the basis for a further attempt at consensus during the next cycle.
Note to the TCC: Assuming this comment remains rejected, this submitter's Comment 4-51 should be reported as rejected as well. CMP 4 met before CMP 9 and would not have been aware of this action. In addition, the staff decision in the Draft to locate this section as 490.47 is correct and should stand.
MCCULLOUGH, R.: I concur with the reasoning of Mr. Fogarty and Mr. Hartwell. Comment 9-158, submitted on behalf of the EEI, does indeed indicate consensus by that segment of the industry.

9-92 Log #1508 NEC-P09 **Final Action: Accept**
(490.72(D))

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc.
Comment on Proposal No: 9-163
Recommendation: Technical Correlating Committee Task Group on the definition of "Neutral Conductor" concurs with the panel action on this proposal.
Substantiation: This comment was developed by the Technical Correlating Committee (TCC) Task Group (TG) on the definition of "Neutral Conductor." Task Group members were: Jeffrey Boksiner (Chair) (CMP 5, TCC), Paul Dobrowsky (CMP 5), Walter Skuggevig (CMP 5), Doug White (CMP 5), Michael Toman (CMP 2, TCC), Bob Wilkinson (CMP2), Jim Daly (CMP 6, CMP 7, TCC), Bill Laidler (CMP 6), and Oran Post (CMP 6). The TCC directed that the action on this proposal be sent to the TG for review and comment.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ARTICLE 500 HAZARDOUS (CLASSIFIED) LOCATIONS, CLASS I, II, AND III, DIVISIONS 1 AND 2

14-1 Log #116 NEC-P14 **Final Action: Accept in Part**
(500.6(A), FPN 3)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-14
Recommendation: The Technical Correlating Committee directs the panel to reconsider the action on this proposal and include the Fahrenheit temperature in order to maintain consistency with the balance of the code. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
The panel is accepting the TCC direction to reconsider. But the panel is not changing the action on Proposal 14-14
Panel Statement: The panel is not changing the action on Proposal 14-14 because:
- Degrees Celsius is the industry standard for this application.
- The panel wishes to maintain consistency with Table 4.4.2 of NFPA 497, which reports data in degrees Celsius.
The panel notes that portions of the Code express certain parameters as a percentage of the autoignition temperature in degrees Celsius. The percentage of the autoignition temperature in degrees Fahrenheit is not the same.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-2 Log #636 NEC-P14 **Final Action: Reject**
(500.7(K))

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-15
Recommendation: The panel statement indicates that the referenced standard contained in the recommendation is not currently published. The referenced standard will be published and publicly available prior to the ROC meeting.
Substantiation: The standard referenced, ISA TR12.13.03 will be published prior to the ROC meeting.
Panel Meeting Action: Reject
Panel Statement: This particular standard has not been published and, therefore, cannot be referenced.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-3 Log #2026 NEC-P14 **Final Action: Reject**
(500.7(K), FPN 1)

Submitter: Patrick J. Byrne, FM Approvals, LLC
Comment on Proposal No: 14-18
Recommendation: Revise as follows:
FPN No. 1: For further information, see ANSI/ISA-12.13.01, Performance Requirements, Combustible Gas Detectors, ~~and ANSI/UL2075~~, Gas ~~and Vapor Detectors and Sensors.~~
Substantiation: There are three main technical reasons to show that a gas detector listed to ANSI/UL 2075 not only contradicts the requirements of ANSI/ISA 12.13.01 it also contradicts the requirements of this article within the NEC. ANSI/UL 2075 does not mandate acceptance to ANSI/ISA 12.13.01 section 15.1 it requires compliance to ANSI/ISA 12.13.01 or UL 284. The section 15.1 e) which references ANSI/ISA 12.13.01 violates two main requirements in ANSI/ISA 12.13.01, it allows both the measurement and the alarm levels to exceed 100% LEL. ANSI/ISA 12.13.01 limits the measurement to 100% LEL and limits Alarm levels not to exceed 60 percent LEL. Section 9.4.1 states "Removal of a snap on cover to gain access to the sensitivity control is permissible only when no hazardous voltage parts are able to be contacted by the user. By not requiring a too secured cover or password protection to the adjustments, this requirement contradicts the first sentence of 500.7 K) "...where the conditions of maintenance and supervision ensure that only qualified persons service the installation." Section 2.7.2 of ANSI/ISA 12.13.01 states a special tool is required to gain access to, or to adjust, controls. The design of the tool is intended to discourage unauthorized interference with the apparatus.
The use of this standard is not common practice by the gas detection community in fact the standard, in its current format, has been rejected by the gas detection community. Three of the most predominate nationally recognized testing laboratories (NRTL) that list gas detection equipment for the detection of combustible gas detectors are FM Approvals. CSA International and UL.

As a representative of FM approvals, I can state that it is FM approvals policy to use our FM 6310.6320 and ANSI/ISA 12.13.01 to certify a combustible gas detector. I have provided documents taken from both CSA International and from the UL website which identifies the requirements for having a gas detector listed for performance both documents state ISA 12.13, as the performance requirement and neither identify ANSI/UL 2075 as a required standard. Furthermore, there are only six manufacturers that have any gas detection equipment listed by these three NRTLs to ANSI/UL 2075. Of the six certifications, only two are certified as a combustible gas detector that can be used in this application. Both are certified to ISA 12.13 but neither are certified to the current edition of ANSI/UL 2075. I have discussed this standard with manufacturers including one of the UL listed manufacturers, and they have no intention to use this standard for a number of reasons. One of the main technical reasons is one test requires the exclusion of dust. This test will exclude one the of the most common types of technology used, catalytic sensors. A catalytic sensor requires an explosionproof protection method. A sintered metal disk is used to protect the sensor which acts as a flame arrestor, during this dust test the sintered disk would clog resulting in a failure. Based on the extremely limited use of the standard, the contradiction between the ANSI/UL 2075 with the National Electrical Code and ANSI/ISA 12.13.01 and that the testing will exclude one of the most common types of technology in use today please reconsider the addition of this standard.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: UL 2075 references ISA 12.13.01 for performance requirements. It also includes requirements for reliability of circuitry and components. The panel notes that the substantiation statement references a UL document (UL 284) that does not exist.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

LAWRENCE, JR., W.: The submitter notes that a typographical error was introduced into the comment and that the correct UL Standard is UL 1484, not the UL284 as was shown in the comment.

ARTICLE 501 CLASS I LOCATIONS

14-4 Log #1254 NEC-P14 **Final Action: Accept**
(501, 502, 503, 505, 506, and 511)

Submitter: Neil F. LaBrake, Jr., Syracuse, NY

Comment on Proposal No: 14-22

Recommendation: Continue to accept the following portions of the TCC Grounding and Bonding Task Group proposal 14-22 as modified and revised by the actions of CMP-14: 501.10(A)(1)(c), 501.10(B)(2)(5), 501.15(A)(4) Exception No. 2, 501.140(B)(2), 501.145, 502.10(A)(1)(3), 502.140(2), 502.145(A), 502.145(B), 503.140, 505.15(B)(1)(b), 505.17(2), 506.15(A)(3), 506.17(2), and 511.16(B)(2).

Substantiation: The CMP-14 revisions to the proposal have been made for clarity and continue to be consistent with the Grounding and Bonding Task Group's original initiatives.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-5 Log #117 NEC-P14 **Final Action: Accept in Part**
(501.10(A)(1)(c) and (d))

TCC Action: In accordance with the direction of the Technical Correlating Committee at the Report on Proposal stage, the Technical Correlating Committee directs that the following FPNs be deleted.

FPN No. 2 of 501.10(A)(1)d

FPN No. 4 of 501.15

FPN of 502.10(A)(1)

FPN No. 2 of 506.15(A)(3) Exception

The Technical Correlating Committee notes that the purpose of establishing Annex A was to eliminate the need to have FPNs throughout the code that reference the product standards. There is no basis for the Chapter 5 articles to be treated differently.

The Technical Correlating Committee further directs that the title for UL 2225 in Annex A be revised from "Metal-Clad Cables and Cable-Sealing Fittings for Use in Hazardous (Classified) Locations" to "Cables and Cable Fittings for Use in Hazardous (Classified) Locations" to be consistent with the title from the product standard.

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 14-26

Recommendation: The Technical Correlating Committee directs that the panel reconsider the action on this Proposal. The requirement in the main text is for the cable in question to be listed. The FPNs add a reference to the product standard. Annex A of the NEC was specifically added to handle these types of references. The panel should delete the new FPNs and add a reference to UL 2225 into Annex A. This will make the text consistent with how standards for listing are treated elsewhere in the code. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept in Part

The panel has accepted the direction of the TCC to reconsider the issue and agrees that the reference should also be in Annex A. However, it is the position of the panel that it is essential to retain the fine print notes and references for the benefit of users of this particular part of the Code.

Panel Statement: To help ensure safe application and installation of the equipment. This is additional information to lead the user to a specific reference document. The panel points out that the purpose of the standard references in these fine print notes is to improve the usability of the Code.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-6 Log #118 NEC-P14 **Final Action: Accept**
(501.10(A)(1) Exception)

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 14-27

Recommendation: The Technical Correlating Committee directs the panel to reconsider the action on this proposal and remove the redundant reference to Article 352 since this is already covered by 90.3. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See panel action on Comment 14-7.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-7 Log #356 NEC-P14 **Final Action: Accept**
(501.10(A)(1) Exception)

Submitter: Code-Making Panel 8,

Comment on Proposal No: 14-27

Recommendation: CMP-8 recommends that CMP-14 accept this proposal in principle with the revised text:

Exception: Type PVC Conduit and Type RTRC Conduit ~~Rigid nonmetallic conduit complying with Article 352~~ shall be permitted where encased...

Substantiation: CMP-8 recommends CMP-14 Accept in Principle Proposal 14-27 with the proposed revised wording based on CMP-8's actions on Proposals 8-53 and 8-78. This revision also addresses the NEC Style Manual.

This comment has been balloted through CMP-8 with the following ballot results:

12 Eligible to Vote

11 Affirmative

1 Negative

Mr. R. Loyd voted negatively stating: "Proposal 14-27 was to Reject. No comment necessary, CMP-8 has no substantiation for recommending that CMP-14 reverse their action. Note: UL does not recognize any RTRC nonmetallic conduit as comparable to schedule 80 PVC which is suitable for use where subject to physical damage.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-8 Log #548 NEC-P14 **Final Action: Accept in Principle**
(501.10(B)(1)(7))

TCC Action: The Technical Correlating Committee notes that the purpose of establishing Annex A was to eliminate the need to have FPNs throughout the code that reference the product standards. There is no basis for the Chapter 5 articles to be treated differently.

Directs that the FPN added in the panel action be deleted. Product standards references are to be included in Annex A and are not to be added as FPNs.

Submitter: Edward M. Briesch, Underwriters Laboratories Inc.

Comment on Proposal No: 14-33a

Recommendation: Revise text to read as follows:

(7) In industrial establishments with restricted public access where the conditions of maintenance and supervision ensure that only qualified persons service the installation and where metallic conduit does not provide sufficient corrosion resistance, Reinforced Thermosetting Resin Conduit (RTRC) marked with suffix -XW, factory elbows, and associated fittings in accordance with 355.6, and Schedule 80 PVC Conduit, factory elbows and associated fittings, in accordance with 352.6 shall be permitted.

Where seals are required for boundary conditions as defined in 501.15(A)(4), the Division 1 wiring method shall extend into the Division 2 area to the seal which shall be located on the Division 2 side of the Division 1 – Division 2 boundary.

Substantiation: In order to obtain RTRC with the equivalent mechanical strength of Schedule 80 PVC, RTRC marked RTRC-XW needs to be specified.

Panel Meeting Action: Accept in Principle

Revise text to read as follows:

(7) In industrial establishments with restricted public access where the conditions of maintenance and supervision ensure that only qualified persons service the installation and where metallic conduit does not provide sufficient corrosion resistance, Reinforced Thermosetting Resin Conduit (RTRC) factory elbows, and associated fittings, all marked with suffix -XW, ~~in accordance with 355.6,~~ and Schedule 80 PVC Conduit, factory elbows and associated fittings~~, in accordance with 352.6~~ shall be permitted.

Where seals are required for boundary conditions as defined in 501.15(A)(4), the Division 1 wiring method shall extend into the Division 2 area to the seal, which shall be located on the Division 2 side of the Division 1 – Division 2 boundary.

Add a fine print note to 501.10(B)(1)(7) to read:

FPN: For additional information on RTRC-XW, see ANSI/UL 1684A, Supplemental Requirements for Extra-Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings

Also, add ANSI/UL 1684A, Supplemental Requirements for Extra-Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings, to Annex A.

Panel Statement: The panel has moved the reference to "XW" marking to clarify that it applies to the elbows and fittings as well as the conduit itself. The references to 352.6 and 355.6 are deleted because they are covered in 90.3. A fine print note has been added to provide a correlation between RTRC-XW and the specific product standard. A reference has been added to Annex A to the appropriate product standard. See also panel action on Comment 14-5.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-9 Log #798 NEC-P14 **Final Action: Reject**
(501.10(B)(1)(7))

Submitter: Richard E. Loyd, Sun Lakes, AZ

Comment on Proposal No: 14-33a

Recommendation: Do not change the existing text. Please Reject this Proposal.

Substantiation: There is no substantiation provided that Reinforced Thermosetting Resin Conduit (RTRC) or Schedule 80 PVC will adequately stand up to and safely contain all of the types of hazardous liquids, vapors or gases likely to be present at sometime during the life of the installation. PVC is not recommended for use where subject to petroleum based products. Although explosions are not likely to occur in a Class I Division 2 location they do and no testing has been done on these products to verify they will withstand pressure piling or contain an explosion. Also, the solvent attached couplings will not allow the gases to escape slowly to allow them to cool to a safe level. Static is another source of ignition that has not been examined when the raceways are nonmetallic. The proposed language would permit limited use of nonmetallic raceways where metal raceway does not provide sufficient corrosion protection. The corrosion performance of the PVC coated rigid metal conduit and the rigid PVC conduit is virtually identical. However, the PVC coated rigid metal conduit provides increased physical strength and electric conductive performance. PVC coated rigid metal conduit provides superior sun light resistance protection and its characteristics do not change when exposed to extreme hot or cold environments.

The 2006 UL White book states that RTRC 40 and RTRC 80 are not suitable for use where subject to physical damage. There are many more valid reasons why this proposal should not be accepted, even the prevention of one loss property or life accident is reason enough to reject the proposal.

Panel Meeting Action: Reject

Panel Statement: The concerns raised by the submitter were previously addressed in the substantiation to Proposal 14-33a, and the panel concludes that the substantiation continues to be valid. Additionally, RTRC-XW has been specified to address locations subject to physical abuse. In Division 2 locations, raceway systems are not required to contain an explosion.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

BERNSEN, M.: I disagree with the Panel's action to "reject" and I am voting negative for the following reasons:

There is no substantiation that Reinforced Themosetting Resin Conduit (RTRC) or Schedule 80 PVC will be adequate as a wiring method in a hazardous location. I would first question the lack of testing and evaluation, especially the ability of the attached fittings and solvent to allow the gases to cool and escape slowly. Where metal raceways do not permit sufficient corrosion protection, PVC coated rigid metal conduit will provide the physical protection as well as corrosion protection.

The 2006 UL White book clearly states that RTRC 40 and 80 are not suitable for use where subject to physical damage.

I don't believe that RTRC or PVC schedule 80 should be permitted to be installed in hazardous locations without further evaluation.

14-10 Log #1231 NEC-P14 **Final Action: Reject**
(501.10(B)(1)(7))

Submitter: Joseph Dodds, P.E., Trafford, PA

Comment on Proposal No: 14-33a

Recommendation: Proposal should be Rejected.

Substantiation: Several technical and safety issues exist for rejecting this proposal for installing Schedule 80 PVC and RTRC in Division 2 applications.

Substantiation #1 states that poor installation concerns are a general problem and are addressed by limiting the installations to industrial facilities with qualified personnel. Limiting the installations to industrial facilities with qualified personnel does not resolve the concerns associated with Schedule 80 PVC and RTRC in Division 2 applications because the installation procedure is much different.

Adhesives are used to make the connections of Schedule 80 PVC and RTRC; the proper use of adhesives significantly complicates the installation and safety. Limiting the application to industrial facilities does not insure that qualified personnel familiar with the proper application of adhesives will occur. Cleanliness of the surfaces to be joined; proper mixing of the adhesive; and application conditions such as temperature and humidity greatly impact the formation of an acceptable and safe connection. There is no test identified in the substantiation to confirm that a Schedule 80 PVC or RTRC connection is acceptable; an electrical continuity test can be used to confirm that metal thread connections are acceptable.

NEC Section 500.8 states, "Equipment shall be identified not only for the class of location, but also for explosive, combustible, or ignitable properties of the specific gas vapor, dust, fiber, or flyings that will be present." What test or qualification data are presented for Schedule 80 PVC or RTRC to confirm performance in these applications?

Substantiation #4 states that the risk of physical damage has been minimized by use of RTRC or Schedule 80 PVC. When exposed to impact or crush loads, the failure mode of RTRC or Schedule 80 PVC is not the same as metal conduit. Not only will the RTRC or Schedule 80 PVC become severely damaged at a much lesser impact or crush load, but the failure mode and consequences of the failure mode present a greater safety concern. Metal conduit will be deformed from an impact or crush load, but physical protection for the internal wiring continues. Usually RTRC and Schedule 80 PVC will fracture. The PVC fragment could cut wire insulation and cause short circuits. RTRC will fracture allowing ingress of the corrosive elements and exposing the re-enforcing fibers to attack. Once the RTRC is fractured, its impact and crush strength are greatly reduced.

Substantiation #5 questions materials that might "attack" RTRC or Schedule 80 PVC, but considers this to be addressed by 110.11 and it was suggested that this was not a greater hazard than any other material currently used. Externally PVC coated, internally polyurethane coated steel metal conduit is a product that has successfully performed for nearly 20 years in many very corrosive environments. This product not only provides corrosion protection, but also the rigid metal conduit provides physical protection. Rigid metal conduit will not corrode if the coating adhesion is maintained. Excellent coating adhesion is now confirmed by performance testing in high humidity and high temperature conditions for extended periods of time. Some coated conduit products are now labeled by recognized test laboratories confirming that process procedures produce consistent adhesion. A corrosion resistant product with protective coatings and mechanical strength provided by steel conduit is available for Class I, Division 2 applications.

Substantiation #9 says "Ingress of vapors is assumed as is the case for all other installations and thus is not different for RTRC or PVC conduit installations." The ingress of vapors may be assumed for all installations; however, the mechanical protection and safety performance of an internally coated metal conduit system is superior to RTRC and PVC installations. The protection against impact and crush loads as well as the electrical shielding provided by the coated metal conduit system cannot be duplicated by an RTRC or PVC conduit system. This substantiation appears to imply that it is not different.

Substantiation #10 reports that UL-1684 indicates that Reinforced Thermosetting Resin Conduit (RTRC) material is tested and must be stronger than the connected equipment; therefore it is acceptable. This conclusion does not necessarily follow that a material is acceptable because it must be stronger than the connected equipment. It is necessary to know the specific characteristics that are acceptable and that the characteristics will confirm the safety of the installed system. As stated earlier, the failure mode is also an important indicator of safe performance.

Substantiation #11 states that "Generation of static electricity is not an issue that is specific to RTRC or PVC conduits, since these materials are used for enclosures, flexible connections, etc. which are already permitted." For applications in ordinary locations this statement may be acceptable, but in hazardous locations static electricity is a significant issue. It is also a significant issue where electrical shielding is required. The static electricity issue is resolved by providing a discharge path. This is accomplished easily with metal

conduit or coated metal conduit because the steel is electrically conductive and when properly grounded will provide a discharge path. Removing the static charge from RTRC or PVC conduit is more difficult and impacts the safe operation of these conduit systems.

Based on the concerns expressed above the proposal should be rejected unless test results and evaluations are produced to confirm the performance and safety of RTRC and PVC conduit in Class I, Division 2 application conditions.

Panel Meeting Action: Reject

Panel Statement: The concerns raised by the commenter were previously addressed in the substantiation to Proposal 14-33a, and the panel concludes that the substantiation continues to be valid. Additionally, RTRC-XW has been specified to address locations subject to physical abuse.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

BERNSEN, M.: See my Explanation of Negative Vote on Comment 14-9.

14-11 Log #1384 NEC-P14 **Final Action: Accept in Principle**
(501.10(B)(1)(7))

Submitter: William Wagner, Certification Solutions

Comment on Proposal No: 14-33a

Recommendation: This Proposal should continue to be Accepted with the following revision to the proposed text:

In industrial establishments with restricted public access where the conditions of maintenance and supervision ensure that only qualified persons service the installation and where metallic conduit does not provide sufficient corrosion resistance, Reinforced Thermosetting Resin Conduit (RTRC), factory elbows, and associated fittings identified for use in areas where subject to physical damage in accordance with 355.12(C), and Schedule 80 PVC Conduit, factory elbows, and associated fittings~~, in accordance with 352.6,~~ shall be permitted. Where seals are required for boundary conditions as defined in 501.15(A)(4), the Division 1 wiring method shall extend into the Division 2 area to the explosionproof seal which shall be located on the division 2 side of the Division 1 - Division 2 boundary.

FPN: Type XW RTRC is identified for use in areas where subject to physical damage.

Substantiation: The proposed revision addresses the Technical Correlating Committee's comment regarding redundant references. The referenced section for RTRC was changed from 355.6 to 355.12(C), which addresses the requirement that conduit used in areas where subject to physical damage shall be identified for the use. A reference to 352.12(C) is not needed as Schedule 80 PVC Conduit is listed and identified for use in areas where subject to physical damage. A FPN was added to show the correct identification for RTRC currently acceptable for use in locations where subject to Physical Damage.

Panel Meeting Action: Accept in Principle

Panel Statement: The commenter's concerns have been addressed by the panel action on Comment 14-8.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

BERNSEN, M.: See my Explanation of Negative Vote on Comment 14-9.

14-12 Log #1869 NEC-P14 **Final Action: Reject**
(501.10(B)(1)(7))

Submitter: Michael Walls, American Chemistry Council

Comment on Proposal No: 14-30

Recommendation: Add text to read as follows:

The Amercian Chemistry Council supports CMP 14 action on 14-30 and 14-33a dealing with the permitted use of non metallic conduit as addressed in Articles 352 for Rigid Nonmetallic Polyvinyl Chloride Conduit and Article 355 for Reinforced Thermosetting Resin Conduit in Hazardous Classified locations. Also as appropriate in the Article 500 series, the term "PVC" Conduit should be revised to "Rigid Nonmetallic Polyvinyl Chloride" Conduit: Type PVC RNC, as for example in 501.10(B)(1)(7).

Substantiation: See the affirmative balloting comments on this and proposal 14-30.

Panel Meeting Action: Reject

Panel Statement: The nomenclature for this product is the responsibility of CMP-8.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-13 Log #2159 NEC-P14 **Final Action: Accept in Principle**
(501.10(B)(1)(7))

Submitter: David H. Kendall, Carlon

Comment on Proposal No: 14-33a

Recommendation: This Proposal should continue to be Accepted with the following revision to the proposed text:

In industrial establishments with restricted public access where the conditions of maintenance and supervision ensure that only qualified persons service the installation and where metallic conduit does not provide sufficient corrosion resistance, Reinforced Thermosetting Resin Conduit (RTRC) identified as XW, factory elbows, and associated fittings ~~in accordance with 355.x~~, and Schedule 80 PVC Conduit, factory elbows, and associated fittings~~, in accordance with 352.6,~~ shall be permitted.

Where seals are required for boundary conditions as defined in 501.15 (A)(4), the Division 1 wiring method shall extend into the Division 2 area to the explosionproof seal which shall be located on the Division 2 side of the Division 1 - Division 2 boundary.

Substantiation: The proposed revision addresses the Technical Correlating Committee's comment regarding redundant references. The referenced sections were deleted since both RTRC-XW and Schedule 80 conduits are both listed and identified for areas of physical damage.

In addition, RTRC-XW was added since RTRC is required to be identified for areas of physical damage. This requirement is the same for the Schedule 80 PVC conduit and ensures additional protection of the wiring method.

Panel Meeting Action: Accept in Principle

Panel Statement: The commenter's concerns have been addressed by the panel action on Comment 14-8.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

BERNSEN, M.: See my Explanation of Negative Vote on Comment 14-9.

14-14 Log #2206 NEC-P14 **Final Action: Reject**
(501.10(B)(1)(7))

Submitter: William A. Wolfe, Steel Tube Institute of North America

Comment on Proposal No: 14-33a

Recommendation: This Proposal should be Rejected.

Substantiation: Schedule 80 PVC and RTRC are allowed to be used in Class I, Division 2 locations when encased in concrete and provided with 24 in. of cover. This condition has appeared in the NEC for years. Before Intermediate Metal Conduit (IMC) was allowed to be used in hazardous locations, Panel 14 required a UL fact-finding investigation to show that IMC was suitable for use in these critical locations. The UL investigation covered four areas: explosion pressure test, flame propagation test, hydrostatic strength tests and tensile strength tests. IMC passed all of the tests and was accepted by Code Panels 8 and 14 for use in hazardous locations in 1978.

There has been no fact-finding investigation to show that Schedule 80 PVC and RTRC are suitable for use in these hazardous locations without concrete encasement, etc. A special task group from Panel 14 reviewed product literature and concluded that the products were suitable. This product literature review, however, is not equivalent to actual performance testing. For example, the explosion tests that IMC was subjected to were run to determine as closely as possible the maximum explosion pressures which would result from different mixtures of explosive gases and piping/devices or test configurations. Four hundred and ninety-nine (499) tests were run to conclude that at no time was the pressure great enough to rupture the conduit. Two hundred (200) flame propagation tests were run to show that flame would not propagate to the exterior of an IMC conduit system with threaded joints.

Schedule 80 PVC and RTRC should also be subjected to such testing rather than a literature review to determine if the long-standing restrictions for use in Class 1, Division 2 locations should be removed.

The proposal includes text stating that these conduits may be used "where metallic conduit does not provide sufficient corrosion resistance". In severely corrosive areas, metal conduit with supplementary corrosion protection can be used to provide not only the performance characteristics of metal conduit but additional corrosion protection.

Panel Meeting Action: Reject

Panel Statement: The raceway system in a Division 2 location is not expected to contain an explosion, and therefore tests similar to what were performed to accept IMC, which is a Division 1 wiring method, would not be appropriate.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

BERNSEN, M.: See my Explanation of Negative Vote on Comment 14-9.

14-15 Log #119 NEC-P14 **Final Action: Accept**
(501.10(B)(1)(7))

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 14-33a

Recommendation: The Technical Correlating Committee directs the panel to reconsider this proposal and remove the redundant references to Articles 352 and 355. Both of these articles already require that RTRC and RNMC be listed wherever they are used in the NEC. The Technical Correlating Committee is concerned that the references specifically to the xxx.6 sections imply that there are other applications where the listing requirement does not apply. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See panel action on Comment 14-8.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-16 Log #120 NEC-P14 **Final Action: Accept in Part**
(501.15, FPN No. 3 and No. 4)

TCC Action: The Technical Correlating Committee notes that the purpose of establishing Annex A was to eliminate the need to have FPNs throughout the code that reference the product standards. There is no basis for the Chapter 5 articles to be treated differently.

directs that FPN No. 3 of 501.15 and FPN No. 1 of 501.15(E)(2) be deleted in accordance with the direction given to the panel in Comment

14-16. The Technical Correlating Committee notes that the purpose of establishing Annex A was to eliminate the need to have FPNs throughout the code that reference the product standards. There is no basis for the Chapter 5 articles to be treated differently.

The Technical Correlating Committee intends that the use of Annex A be consistent throughout the code.

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-35
Recommendation: The Technical Correlating Committee directs the panel to reconsider the action on this proposal and relocate the product standards references to Annex A. The Technical Correlating Committee intends that the use of Annex A be consistent throughout the NEC. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
Panel Statement: See panel action on Comment 14-5
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-17 Log #121 NEC-P14 **Final Action: Accept in Part**
(501.15(F)(3))

TCC Action: The Technical Correlating Committee directs that last FPN 501.15(F)(3) be deleted in accordance with the direction given to the panel in Comment 14-17.

In addition, add the following reference to Annex A:

"Requirements for Process Sealing Between Electrical Systems and Potentially Flammable or Combustible Process Fluids - ANSI/ISA-12.27.01".

The Technical Correlating Committee intends that the use of Annex A be consistent throughout the code.

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-39
Recommendation: The Technical Correlating Committee directs the panel to reconsider this proposal and to relocate the reference into Annex A to be consistent with other parts of the Code. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
Panel Statement: See panel action on Comment 14-15.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-18 Log #122 NEC-P14 **Final Action: Accept in Part**
(501.30(A) Exception)

TCC Action: The Technical Correlating Committee directs that the Exception to 501.30(A), be revised to read as follows:

"Exception: The specific bonding means shall be required only to the nearest point where the grounded circuit conductor and the grounding electrode are connected together on the line side of the building or structure disconnecting means as specified in 250.32(B), provided the branch-circuit overcurrent protection is located on the load side of the disconnecting means."

This action correlates the exception with the revised text of 250.32 as accepted by Code-Making Panel 5 in Comment 5-58.

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-43
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action on Proposal 5-119. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
CMP-14 accepts the TCC direction to reconsider the action on Proposal 14-43. CMP-14 recognizes that CMP-5 actions on Proposal 5-119 have revised the application of the Exception to 501.30 (A). However, the text in the exception remains correct.
Panel Statement: The text continues to reference applicable requirements in 250.32 (A), (B), and (C). No additional action is required from CMP-14 for correlation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-19 Log #123 NEC-P14 **Final Action: Accept**
(501.35 and 502.35)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-45
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action on Proposal 5-349. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: Accept the original action on Proposal 14-45.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-21 Log #2189 NEC-P14 **Final Action: Reject**
(501.140(A)(3) (New))

Submitter: Stephen V. Norako, EGS Electrical Group
Comment on Proposal No: 14-53
Recommendation: Add new text to read as follows:

The raceway shall be sealed to minimize the gas or vapor in the well-pit from being communicated to the location of the power source. This seal shall not be required to be explosionproof.

Substantiation: These well pits are below grade and due to the accumulation of vapors and gases, typically classified Class I Division 1. The flexible cord is the wiring method. The submersible pump is listed Class I Division 1 (typically explosionproof). The pump comes with flexible cord factory installed and factory sealed (Class I Division 1 seal) where it makes connection to the pump. No additional explosionproof seal is needed. This "Suitable Raceway" is not the wiring method (the flexible cord is). The "Suitable Raceway" (typically RMC or RNMC) is there to protect the flexible code from physical damage and allow it to be run underground. It needs to be sealed to only minimize the passage of gases and vapors, not flames. The problem is that this is a subject of much confusion. Installations range from no seal being used to the enforcement of an explosionproof seal. A seal must be used but only to limit the passage of gases, but not to prevent the passage of flames. Although an explosionproof seal is a safe option, engineers are concerned with what happens when the pump needs to be removed for maintenance. This is normally performed by the mechanical trade. The explosionproof seal is ripped out and never replaced. Engineers and contractors have voiced the need for another type of seal such as a mechanical device that can be removed and reinstalled to better address the maintenance issue.
Panel Meeting Action: Reject
Panel Statement: The change in the wording from "wireway" to "raceway" does not preclude the requirements for sealing. Existing requirements for sealing in 501.15 already apply if an electrical raceway is used and is connected to an electrical apparatus.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-22 Log #2222 NEC-P14 **Final Action: Reject**
(501.140(A)(3))

Submitter: Steven J. Blais, EGS Electrical Group
Comment on Proposal No: 14-53
Recommendation: Revise text to read as follows:

The raceways shall be sealed to minimize the gas or vapor in the well-pit from being communicated to the location of the power source. This seal shall not be required to be explosionproof.

Substantiation: These well pits are below grade and due to the accumulation of vapors and gases, typically classified Class I Division 1. The flexible code is the wiring method. The submersible pump is listed Class I Division 1 (typically explosionproof). The pump comes with flexible cord factory installed and factory sealed (Class I Division 1 seal) where it makes connection to the pump. No additional explosionproof seal is needed. This "Suitable Raceway" is not the wiring method (the flexible cord is). The "Suitable Raceway" (typically RMC or RNMC) is there to protect the flexible code from physical damage and allow it to be run underground. This causes the confusion as the rule permits an open ended conduit. It is this open ended conduit that can act as means to communicate gases into the adjacent area. The code panel statement on Proposal 14-53 does refer to the prescribed requirements for boundary seals however this does not alleviate the confusion. The requirements in Class I, Division 1 boundary seals in 501.15(A)(4) requires by "guidance" of the FPN No. 1 of 501.15 that this seal is to minimize the gases and vapors and prevent the passage of flames... So by the code panel referencing back to the requirements of boundary seals it supersedes the intent of minimizing the amount of gas or vapor... which is prescribed for a Class I, Division 1 boundary seal in 501.15(A)(4). The way the current rules are written results in a cord replacement installation not being sealed to even minimize the migration of gases into the open conduit. It would be a safer requirement to require that a seal be provided, one in which can be retrofitted during cord replacement. The purpose of this seal would be to minimize the migration of gases and vapors into the open ended circuit.

The problem is that this is a subject of much confusion. Installations range from no seal being used to the enforcement of an explosionproof seal. A seal must be used but only to limit the passage of gases but not to prevent the passage of flames. Although an explosionproof seal is a safe option, engineers are concerned with what happens when the pump needs to be removed for maintenance. This is normally performed by the mechanical trade. The explosionproof seal is ripped out and never replaced. Engineers and contractors have voiced the need for another type of seal such as a mechanical device that can be removed and reinstalled to better address the maintenance issue.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 14-21.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-20 Log #466 NEC-P14 **Final Action: Reject**
(501.140(B)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-54
Recommendation: Accept as revised:
(3) Be connected to terminals ~~in an approved manner~~ in accordance with 110.14 ~~and 501.45.~~ Alternatively, delete (3).
Substantiation: Proposal provides specificity. Panel statement that reference to 110.14 is not necessary because it already applies, also makes (3)unnecessary. The requirements of 110.14 and this section, worded differently, may cause confusion.
Panel Meeting Action: Reject
Panel Statement: The reference to 110.14 is not necessary because it applies throughout the Code.
CMP-14 notes that the complete wording of 501.140(B)(3) was not shown.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
COOK, D.: The submitter and the panel statement both clarify that nothing in 501.140(B)(3) is different than the general requirements in Chapters 1 through 4. NEC 90.3 states the requirements in Chapters 5, 6, and 7 supplement or modify the general rules. The CMP-14 statement indicates there is no reason to include a reference to the general requirements for termination included in 110.14 and I agree with that statement. The current text requires the cord to be terminated in an approved manner which is required for all installations in 110.2. The submitter's alternate recommendation was to delete item 3 completely. Since the text does not supplement or modify the general requirements in Chapters 1 through 4, that recommendation should be accepted.

ARTICLE 502 CLASS II LOCATIONS

14-23 Log #124 NEC-P14 **Final Action: Accept in Part**
(502.10)

TCC Action: The Technical Correlating Committee directs that the FPN of 502.10(A)(3) be deleted in accordance with the direction given to the panel in Comment 14-23. The Technical Correlating Committee intends that the use of Annex A be consistent throughout the code.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-56
Recommendation: The Technical Committee Committee directs the panel to reconsider this proposal and to relocate the reference into Annex A to be consistent with other parts of the Code. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
Panel Statement: See panel action on Comment 14-5.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-24 Log #125 NEC-P14 **Final Action: Accept in Part**
(502.30(A) Exception)

TCC Action: The Technical Correlating Committee directs that the Exception to 502.30(A), be revised to read as follows:
"Exception: The specific bonding means shall be required only to the nearest point where the grounded circuit conductor and the grounding electrode are connected together on the line side of the building or structure disconnecting means as specified in 250.32(B), provided the branch-circuit overcurrent protection is located on the load side of the disconnecting means."
This action correlates the exception with the revised text of 250.32 as accepted by Code-Making Panel 5 in Comment 5-58.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-62
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action on Proposal 5-119. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
Panel Statement: See panel action on Comment 14-18.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-25 Log #1871 NEC-P14 **Final Action: Reject**
(502.115)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 14-63
Recommendation: Retain the current text and reject the action taken on the proposal.
Substantiation: There are two conditions affected by this proposal. The first is the deletion of text within A(1). This text should not be deleted as this text defines criteria for other similar devices, not identified in the "types" identified and additionally there is no justification offered to support this specific change being proposed. In the second case for isolating switches containing no fuses and not installed where dusts of an electrically conductive nature are present, permits these identified types of devices to be installed in dust-tight like enclosures. This has been a historical practice which has yet to be shown unsafe. The comparison to 502.115 (B) is not correct as these are not the same types of devices and the likelihood of ignition is not the same (for example containing fuses in (B) and not containing fuses in (A)(2)). Additionally see the balloting comments for Mr. Wechsler.
Panel Meeting Action: Reject
Panel Statement: The current requirement permits a construction in Division 1, which would not be permitted by 502.115(B) in Division 2.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:
WECHSLER, D.: Comments 14-25 and 14-26.
The action should have been to Accept in Principle, with the following revised text which follows the action taken on log 14-28:
502.115 Switches, Circuit Breakers, Motor Controllers, and Fuses.
(A) Class II, Division 1. In Class II, Division 1 locations, switches, circuit breakers, motor controllers, and fuses shall comply with 502.115(A)(1) through (A)(~~2~~ 3).
(1) Type Required. Switches, circuit breakers, motor controllers, and fuses, including pushbuttons, relays, and similar devices that are intended to interrupt current during normal operation or that are installed where combustible dusts of an electrically conductive nature may be present, shall be provided with identified dust-ignitionproof enclosures.
(2) Isolating Switches. Disconnecting and isolating switches containing no fuses and not intended to interrupt current and not installed where dusts may be of an electrically conductive nature shall be provided either
(a) with tight metal enclosures that shall be designed to minimize the entrance of dust and that shall (1) be equipped with telescoping or close-fitting covers or with other effective means to prevent the escape of sparks or burning material and (2) have no openings (such as holes for attachment screws) through which, after installation, sparks or burning material might escape or through which exterior accumulations of dust or adjacent combustible material might be ignited, or
(b) in dusttight enclosures.
Effective January 1, 2011 only dusttight enclosures shall be permitted.
(~~2~~) (3) Metal Dusts. In locations where dust from magnesium, aluminum, aluminum bronze powders, or other metals of similarly hazardous characteristics may be present, fuses, switches, motor controllers, and circuit breakers shall have enclosures identified for such locations.
Discussion
Comments 14-25 and 14-26:
During our Panel discussions of 502 and dusttight enclosures we seem to have lost sight of the significant importance that 502.115 (A)(2) provides to industry for personal safety and the basis for the rational for having defined (A) (1) and (A) (2) as was done many years ago with the current texts.
There is a very important distinction made in 502.115 between (A) (1) which is addressing the normal equipment control; how the equipment is designed to be started and stopped during normal operations when such equipment is in a Class II, Division 1 location, and that which is often frequent need to "isolate" for safety reasons rotating equipment which is addressed in (A) (2). I think we all understand normal start/stop controls and the appropriate design needed for use in a Class II, Division 1 location.
"Isolating switches" addressed in (A) (2) are not used for control, but rather they represent a very important additional level of protection which is often needed to allow operators to address problems within processing equipment due to blockage or obstruction or impediment of the process stream. Many Class II processes involve materials which may cake-up or form blockages within the process equipment. When this occurs prompt action must be taken to restore the process. Industry has recognized that the risk to the operator is often too great to merely depend on the standard on-off equipment switch to be used as a single safeguard to prevent the restart of rotating equipment especially when the operator may be exposed to rotating components, as is often the case when the need arises to remove the impediments to the process flow. The isolation switch as addressed in (A)(2) is treated as an additional protection level of protection used in accordance with a administrative control. Typically the actions under this administrative control include, a determination that a blockage has
occurred within the process; stopping of the process using the standard equipment controls, use of the isolation switches under a non-running/non load condition; verification that the isolation has been made, then opening the equipment as appropriate to correct the processing problem. Once the problem has been corrected, the equipment is restored to it closed operating condition, the isolation switch re-closed, the process rechecked, and then the process is restarted.
Again it is important to recognize that the isolation switch is not an operating switch and thus a comparison to other switches used for control in a Division 1 or Division 2 location is not a valid comparison. By design and application there is no transfer of electrical energy under load when the isolation switch is used, as the mechanical equipment is off and at rest. Further it is most important that the isolation switch be locally visible and accessible to permit prompt resolution to the process impairment.

Industry needs to have these isolation switches and our Code panel needs to continue to recognize the significant safety purpose for having these isolation switches and for not treating them as general equipment controls. Aside from the dusttight issue that was discussed the texts in (A) (1) and (A) (2) serve important design roles. These texts need to be retained. Eliminating the complete aspect addressed by Isolation Switches under (A) (2) would be a major disservice to industrial users and by implication could result in the possible application of using only a single means of control with life threatening potentials.

WIRFS, M.: I agree that the original text did not need to be modified. However, Mr. Wechsler has suggested changing the panel action to Accept in Principle with additional changes that have not been fully debated by the panel members.

Since the original comments asked to REJECT the original action on Proposal 14-63 and to leave the existing text in the Code, I realize that a NEGATIVE vote on the panel action leaves the original comment as an unresolved response.

If the panel action to REJECT does not receive sufficient votes to pass, it would seem to me that another action cannot be undertaken at this time and the Technical Correlating Committee should HOLD the original proposal over for the next code cycle when appropriate actions and public review can be processed.

14-26 Log #574 NEC-P14 **Final Action: Reject**
(502.115(A))

Submitter: William M. Lewis, Martinsville, IN
Comment on Proposal No: 14-63
Recommendation: The proposal should be rejected.
Substantiation: The submitter provided no technical justification nor record of safety issues resulting from the existing text.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 14-25.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:

WECHSLER, D.: Comments 14-25 and 14-26

The action should have been to Accept in Principle, with the following revised text which follows the action taken on log 14-28:

502.115 Switches, Circuit Breakers, Motor Controllers, and Fuses.

(A) Class II, Division 1. In Class II, Division 1 locations, switches, circuit breakers, motor controllers, and fuses shall comply with 502.115(A)(1) through (A)(~~2~~ 3).

(1) Type Required. Switches, circuit breakers, motor controllers, and fuses, including pushbuttons, relays, and similar devices that are intended to interrupt current during normal operation or that are installed where combustible dusts of an electrically conductive nature may be present, shall be provided with identified dust-ignitionproof enclosures.

(2) Isolating Switches. Disconnecting and isolating switches containing no fuses and not intended to interrupt current and not installed where dusts may be of an electrically conductive nature shall be provided either
(a) with tight metal enclosures that shall be designed to minimize the entrance of dust and that shall (1) be equipped with telescoping or close-fitting covers or with other effective means to prevent the escape of sparks or burning material and (2) have no openings (such as holes for attachment screws) through which, after installation, sparks or burning material might escape or through which exterior accumulations of dust or adjacent combustible material might be ignited, or
(b) in dusttight enclosures.
Effective January 1, 2011 only dusttight enclosures shall be permitted.
~~(2)~~ (3) Metal Dusts. In locations where dust from magnesium, aluminum, aluminum bronze powders, or other metals of similarly hazardous characteristics may be present, fuses, switches, motor controllers, and circuit breakers shall have enclosures identified for such locations.

Discussion

Comments 14-25 and 14-26:

During our Panel discussions of 502 and dusttight enclosures we seem to have lost sight of the significant importance that 502.115 (A)(2) provides to industry for personal safety and the basis for the rational for having defined (A) (1) and (A) (2) as was done many years ago with the current texts.

There is a very important distinction made in 502.115 between (A) (1) which is addressing the normal equipment control; how the equipment is designed to be started and stopped during normal operations when such equipment is in a Class II, Division 1 location, and that which is often frequent need to "isolate" for safety reasons rotating equipment which is addressed in (A) (2). I think we all understand normal start/stop controls and the appropriate design needed for use in a Class II, Division 1 location.

"Isolating switches" addressed in (A) (2) are not used for control, but rather they represent a very important additional level of protection which is often needed to allow operators to address problems within processing equipment due to blockage or obstruction or impediment of the process stream. Many Class II processes involve materials which may cake-up or form blockages within the process equipment. When this occurs prompt action must be taken to restore the process. Industry has recognized that the risk to the operator is often too great to merely depend on the standard on-off equipment switch to be used as a single safeguard to prevent the restart of rotating equipment especially when the operator may be exposed to rotating components, as is often the case when the need arises to remove the impediments to the process flow. The isolation switch as addressed in (A)(2) is treated as an additional protection level of protection used in accordance with a administrative control. Typically the actions under this administrative control include, a determination that a blockage has occurred within the process; stopping of the process using the standard equipment controls, use of the isolation switches under a non-running/non load condition; verification that the isolation has been made, then opening the equipment as appropriate to correct the processing problem. Once the problem has been corrected, the equipment is restored to it closed operating condition, the isolation switch re-closed, the process rechecked, and then the process is restarted.

Again, it is important to recognize that the isolation switch is not an operating switch and thus a comparison to other switches used for control in a Division 1 or Division 2 location is not a valid comparison. By design and application there is no transfer of electrical energy under load when the isolation switch is used, as the mechanical equipment is off and at rest. Further it is most important that the isolation switch be locally visible and accessible to permit prompt resolution to the process impairment.

Industry needs to have these isolation switches and our Code panel needs to continue to recognize the significant safety purpose for having these isolation switches and for not treating them as general equipment controls. Aside from the dusttight issue that was discussed the texts in (A) (1) and (A) (2) serve important design roles. These texts need to be retained. Eliminating the complete aspect addressed by Isolation Switches under (A) (2) would be a major disservice to industrial users and by implication could result in the possible application of using only a single means of control with life threatening potentials.

WIRFS, M.: See my explanation of negative vote on Comment 14-25.

14-27 Log #575 NEC-P14 **Final Action: Reject**
(502.120(B))

Submitter: William M. Lewis, Martinsville, IN
Comment on Proposal No: 14-64
Recommendation: The proposal should be rejected.
Substantiation: The submitter provided no technical justification nor record of safety issues resulting from the existing text.
Panel Meeting Action: Reject
Panel Statement: The panel agrees with the original proposal but has allowed for delayed implementation. See panel action on Comment 14-28.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:

COSPOLICH, J.: This should become effective with the 2008 NEC.

14-28 Log #1872 NEC-P14 **Final Action: Accept in Principle**
(502.120(B)(2))

TCC Action: The Technical Correlating Committee directs that the panel action be modified to editorially correct the use of the term "provided" so that the last portion of the first sentence reads "…or shall be installed in dusttight enclosures."
Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 14-64
Recommendation: Revise text to read as follows:

2) Coils and Windings. Where not located in the same enclosure with switching mechanisms, control transformers, solenoids, and impedance coils shall be provided with tight metal housings without ventilating openings or in dusttight enclosures.

Substantiation: With the addition of the defined term "dusttight" clearly coils and windings should be located within this type of enclosure. However, the historical precedence of permitting the use of a tight metal housing has existed without being cited as an unsafe condition. No justification has been offered to delete the current practice and this text should therefore be retained.
Panel Meeting Action: Accept in Principle
Revise 502.120(B)(2) to read:
(2) Coils and Windings. Where not located in the same enclosure with switching mechanisms, control transformers, solenoids, and impedance coils shall be provided with tight metal housings without ventilating openings or shall be provided in dusttight enclosures. Effective January 1, 2011, only dusttight enclosures shall be permitted.
Panel Statement: The panel has provided time for manufacturers to transition their equipment to dusttight.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:

COSPOLICH, J.: This should become effective with the 2008 NEC.

14-29 Log #550 NEC-P14 **Final Action: Reject**
(502.125(B))

Submitter: Edward M. Briesch, Underwriters Laboratories Inc.
Comment on Proposal No: 14-65
Recommendation: The panel action should be to accept Proposal 14-65.
Substantiation: It makes no sense to require dusttight boxes, fittings and wiring systems and permit dust entrance into a motor or generator. There is a greater likelihood of an ignition source being present in the motor enclosure than in a raceway, conduit fitting or junction box. Furthermore, the Exception is vague, unenforceable and permits a construction in a Class II location that appears to be suitable only for a Class III location. The Panel Statement, fails to address the basic issue of why boxes, fittings and wiring systems need to be capable of excluding dust but motors and generators do not. The requirement for dusttight enclosures for other types of equipment in Class II, Division 2 was accepted by the Panel in the actions taken on Proposals 14-63, 14-64, 14-69 and 14-73.
Panel Meeting Action: Reject
Panel Statement: The commenter has provided no additional information or substantiation to convince the panel that the current requirement and exception do not adequately cover rotating equipment in Class II Division 2 locations. The panel notes the text in in the panel action was not correct. The panel confirms its intent to reject the proposal.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:
BRIESCH, E.: The panel action should be to accept Comment 14-29 and accept Proposal 14-65. It makes no sense to require dustight boxes, fittings and wiring systems and permit dust entrance into a motor or generator. There is a greater likelihood of an ignition source being present in the motor enclosure than in a raceway, conduit fitting or junction box. Furthermore, the exception is vague, unenforceable and permits a construction in a Class II location that appears to be suitable only for a Class III location. The panel statement still fails to address the basic issue of why boxes, fittings, and wiring systems need to be capable of excluding dust, but motors and generators do not. The requirement for dustight enclosures was accepted on other types of equipment by the panel in the actions taken on Proposal 14-63; -64; -69 and -73.
COOK, D.: The requirements throughout Article 502 recognize that electrical equipment is capable of igniting combustible dust. The special requirements in Article 502 should provide reasonable assurance the electrical system will not become a source of ignition in these environments. To require the wiring method and termination box at a motor be dusttight and allow the entrance of dust for the motor or generator is beyond logic. It is impossible to understand how conductors in a raceway or box; transformers and capacitors; switches, breakers or motor controllers; luminaires; plugs and receptacles; and other electrical equipment could ignite dust but motors and generators could operate in the same environment and not be ignition capable. While I agree that a delayed effective date would be needed to allow manufacturers time to develop the equipment and have it evaluated, rejection of the proposal and comment to evolve motors and generators seem irresponsible. If the current product standards for "dusttight" enclosures cannot be met my motors and generators, possibly the product standards should be adjusted. The current requirements to "minimize" rather than "exclude" the entrance of dust are impossible to consistently evaluate in the field. Owner/operators, installers, and enforcers have no standard to determine an acceptable amount of dust that can safely be allowed to enter the enclosure. If an acceptable amount could be determined, there would be no way to measure that amount in the field.

14-30 Log #576 NEC-P14 **Final Action: Accept**
(502.125(B))

Submitter: William M. Lewis, Martinsville, IN
Comment on Proposal No: 14-65
Recommendation: The proposal should be rejected.
Substantiation: The submitter provided no technical justification nor record of safety issues that would justify deleting the exception.
Panel Meeting Action: Accept
Panel Statement: The panel has confirmed its rejection of Proposal 14-65. See Comment 14-29.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:
BRIESCH, E.: See my explanation of negative vote on Comment 14-29.
COOK, D.: See my explanation of negative vote on Comment 14-29.

14-31 Log #577 NEC-P14 **Final Action: Reject**
(502.130(B)(2))

Submitter: William M. Lewis, Martinsville, IN
Comment on Proposal No: 14-69
Recommendation: The proposal should be rejected.
Substantiation: The submitter provided no technical justification nor record of safety issues that would justify deleting the exception.
Panel Meeting Action: Reject
Panel Statement: See Comment 14-32.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-32 Log #1873 NEC-P14 **Final Action: Reject**
(502.130(B)(2))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 14-69
Recommendation: The action taken by the Panel should have been to reject this proposal and retain the current text.
Substantiation: The action taken by the Panel should have been to reject this proposal. The current text in 502.130 (B)(2) addresses "Luminaries…where NOT of a type identified for Class II locations,…" and specifically that apparatus as defined in the proposed deleted text addresses this permitted apparatus. The new proposed text to provide dusttight enclosures which would be of a type that is identified for Class II locations, would not be of a type that is not identified Class II locations. Therefore this proposal needs to be rejected.
Panel Meeting Action: Reject
Panel Statement: The commenter has not provided any additional information to justify rejecting the proposal.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
WECHSLER, D.: The action taken by the Panel should have been to reject this original proposal 1873 by accepting this comment.
While it is probably a good goal for the next code cycle to reconsider an editorial rewrite of Article 502 to correct a number of seemingly conflicting texts, the proposed action on this proposal does not make any sense.
The current text in 502.130 (B)(2) addresses "Luminaries…where NOT of a type identified for Class II locations,…". With the proposed action "dusttight" would have replaced the design qualifier wording. However "dusttight" is identified for Class II locations. Therefore what the Panel action would do is provide no ability to use anything but an identified luminary and if is the case, the code already has this provision. The existing text follows the same format as that for Class II, Division 1. Improvement has not been made by the proposed action and until a more complete fix can be made we should stay with the current text.

14-33 Log #458 NEC-P14 **Final Action: Reject**
(502.140(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-71
Recommendation: Accept as revised:
(3) Be connected to terminals ~~in an approved manner~~ in accordance with 110.14 ~~and 501.45~~. Alternatively, delete (3).
Substantiation: Proposal provides specificity. Panel statement that reference to 110.14 is not necessary because it already applies, also makes (3) unnecessary. The requirements of 110.14 and this section, worded differently may cause confusion.
Panel Meeting Action: Reject
Panel Statement: The reference to 110.14 is not necessary because it applies throughout the Code.
CMP-14 notes that the complete wording of 502.140(3) was not shown.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
COOK, D.: The submitter and the panel statement both clarify that nothing in 502.140(3) is different than the general requirements in Chapters 1 through 4. NEC 90.3 states the requirements in Chapters 5, 6, and 7 supplement or modify the general rules. The CMP-14 statement indicates there is no reason to include a reference to the general requirements for termination included in 110.14 and I agree with that statement. The current text requires the cord to be terminated in an approved manner which is required for all installations in 110.2. The submitter's alternate recommendation was to delete item 3 completely. Since the text does not supplement or modify the general requirements in Chapters 1 through 4, that recommendation should be accepted.

14-33a Log #CC1400 NEC-P14 **Final Action: Accept**
(502.150(B))

TCC Action: To be consistent with the panel action on Comment 14-28 and to correct the errors noted in the negative voting, the Technical Correlating Committee directs that the panel action be modified as follows:
Revise item (B)(1) of the panel action to read:
"(1) Contacts. Enclosures shall comply with 502.150(A)(2), or contacts shall have tight metal enclosures designed to minimize the entrance of dust and shall have telescoping or tight-fitting covers and no openings through which, after installation, sparks or burning material might escape or shall be installed in dusttight enclosures, effective January 1, 2011, only dusttight enclosures shall be permitted."
The Exception remains as shown in the panel action.
Revise Item (B)(2) of the panel action to read:
"(2) Transformers and Similar Equipment. The windings and terminal connections of transformers, choke coils, and similar equipment shall comply with 502.120(B)(2)."
Revise Item (B)(3) of the panel action to read:
"(3) Resistors and Similar Equipment. Resistors, resistance devices, thermionic tubes, rectifiers, and similar equipment shall comply with 502.120(B)(3)".

Submitter: Code-Making Panel 14,
Comment on Proposal No: 14-73
Recommendation: Revise 502.150(B) to read as follows:
(B) Class II, Division 2. In Class II, Division 2 locations, signaling, alarm, remote-control, and communications systems; and meters, instruments, and relays shall comply with 502.150(B)(1) through (B)(5).

(1) Contacts. Contacts shall be provided in dusttight Eenclosures. shall comply with 502.150(A)(2), or contacts shall have tight metal enclosures designed to minimize the entrance of dust and shall have telescoping or tight-fitting covers and no openings through which, after installation, sparks or burning material might escape.

Exception: In nonincendive circuits, enclosures shall be permitted to be of the general-purpose type.

(2) Transformers and Similar Equipment. The windings and terminal connections of tTransformers, choke coils, and similar equipment shall comply with 502.120(B)(2)be provided with tight metal enclosures without ventilating openings.

(3) Resistors and Similar Equipment. Resistors, resistance devices, thermionic tubes, rectifiers, and similar equipment shall comply with 502.120(B)(3) 502.130(A)(3).

Exception: Enclosures for thermionic tubes, nonadjustable resistors, or rectifiers for which maximum operating temperature will not exceed 120°C (248°F) shall be permitted to be of the general-purpose type.

Items (4) and (5) remain unchanged by this Panel Comment
Substantiation: This comment correlates 502.150(B) with previous actions on Comment 14-28 and removes some redundancy in the code.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 2
Explanation of Negative:

BRIESCH, E.: The text of the recommendation for Comment 14-33a provided with the ballot from NFPA is not what was agreed upon and accepted by the panel at the ROC meeting. Comment 14-33a modifies the panel action to accept Proposal 14-73. The following text is what I believe, based on my notes, was accepted as Comment 14-33a and correlates with the action taken on comment 14-28.

(B) Class II, Division 2. In Class II, Division 2 locations, signaling, alarm, remote-control, and communications systems; and meters, instruments, and relays shall comply with 502.150(B)(1) through (B)(5).

(1) Contacts. Enclosures shall comply with 502.150(A)(2), or contacts shall have tight metal enclosures designed to minimize the entrance of dust and shall have telescoping or tight-fitting covers and no openings through which, after installation, sparks or burning material might escape or shall be provided in dusttight enclosures, effective January 1, 2011, only dusttight enclosures shall be permitted.

Exception: In nonincendive circuits, enclosures shall be permitted to be of the general-purpose type.

(2) Transformers and Similar Equipment. The windings and terminal connections of transformers, choke coils, and similar equipment shall comply with 502.120(B)(2) ~~be provided with tight metal enclosures without ventilating openings.~~

(3) Resistors and Similar Equipment. Resistors, resistance devices, thermionic tubes, rectifiers, and similar equipment shall comply with 502.120(B)(3) ~~502.130(A)(3)~~.

~~Exception: Enclosures for themionic tubes, nonadjustable resistors, or rectifiers for which maximum operating temperature will not exceed 120°C (248°F) shall be permitted to be of the general purpose type.~~

COOK, D.: The text included in Comment 14-33a is not the text CMP-14 developed and approved at the meeting. The purpose of this panel comment was to extend the January 1, 2011 effective date used on Comment 14-28 for required dusttight ratings to the enclosures in 502.150. That would correlate with the allowance provided by Comment 14-28. The 2005 NEC describes an enclosure that minimizes the entrance of dust. Proposal 14-73 revised that requirement and required the enclosure to be "dusttight". During discussion of Comment 14-28, CMP-14 agreed to an effective date to allow equipment manufacturers time to develop dusttight enclosures and allow time for those enclosures to be evaluated as dusttight. Additional revisions were included to remove redundancy in this section. The text was developed in a Microsoft Word document during the panel meeting. Obviously the transfer of text from the Word document to the Filemaker database failed to include the text that was approved at the meeting. I agree with the action taken at the meeting in Redondo Beach, but do not agree with the recommendation included with the ballot. While chairing the meeting I was not able to save a copy of the 14-33a text, but assume other panel members may have the exact text that was voted on during the meeting. I would voted affirmative for that text.
Comment on Affirmative:

NEAGLE, J.: The recommendation made by CMP-14 includes several typos, accepting this recommendation would accept these typos into the NEC text.

In Item (B)(1), the capital "E" should be deleted from the word "enclosures", and the word should be immediately followed by a comma, not a period.

In Item (B)(2), the capital "T" should be deleted from the word "transformers."

WECHSLER, D.: My notes from this action in part agree with the comments of Ed Briesch, but with some differences.

In brief summary, my notes reflect that following discussions the Committee action focused on a "principle" which was the aspect of 'how tight' a metal enclosure was, and that dusttight provided this definition. However the metal enclosure had been an accepted NEC practice without any problem over many years of use and it was concluded that a good fix to allow for implementation was to do as was done in Comment 14-28. Comment 14-28 caused a sentence to be added to the end of the existing text which read, "Effective January 1, 2011 only dusttight enclosures shall be permitted". The Committee action for this Committee generated Comment (14-33a) to accept is actually based upon the "accept in principle" "See action on Comment 14-28" and was to apply the time implementation sentence to the end of the existing text. Since the former action on the proposal 14-73 was to accept, the Committee comment began with the proposal text. The committee actually agreed not to accept the proposal text but as was done in 14-28 accept in principle regarding the metal enclosure as the principle but with the action of 14-28. This is why the text appears in the ballot action. Missing however were the editorial strikeouts, etc which is the point correctly identified by Ed Briesch. However adding the new sentence "Effective January 1, 2011 only dusttight enclosures shall be permitted" does not work for this 502.150(B)(1) paragraph because enclosures may still comply with 502.150(A)(2) (a condition found in the first part of this clause) and there was no action in this cycle to change 502.150(A)(2). Therefore, to correct just this portion of the action, the Committee Comment should read as follows:

{502.150}

(B) Class II, Division 2. In Class II, Division 2 locations, signaling, alarm, remote-control, and communications systems; and meters, instruments, and relays shall comply with 502.150(B) (1) through (B)(5).

(1) Contacts. Enclosures shall comply with 502.150(A)(2), or contacts shall either be in dusttight enclosures or have tight metal enclosures* designed to minimize the entrance of dust and shall have telescoping or tight-fitting covers and no openings through which, after installation, sparks or burning material might escape. *Effective January 1, 2011, only dusttight enclosures shall be permitted.

Exception: In nonincendive circuits, enclosures shall be permitted to be of the general-purpose type.

Additional actions taken under this same Committee Comment deal with (B)(2) and (B)(3).

In the case of (B)(2) my notes again reflect the Committee focus on the text reading "provided with tight metal enclosures without ventilating openings". In the proposal phase Proposal 14-73 suggested replacement of metal without ventilating openings with the term "dust" which would have resulted in the phrase "..shall be provided with dusttight enclosures.". In the comment phase this action was suggested as again deleting the "metal…" phrase and replacing this with "shall comply with 502.120(B)(2). However my notes again suggest some discussion that 502.120 (B)(2) might not be the appropriate reference since this was a different section and that if this was a correct reference that Committee action at the next NEC cycle to address Article 502 would best resolve this issue. Therefore the Committee action was to follow the actions taken in (B)(1) which would read as follows:

(2) Transformers and Similar Equipment. The windings and terminal connections of transformers, choke coils, and similar equipment shall comply with 502.120(B)(2). be provided with tight metal enclosures without ventilating openings or in dusttight enclosures. Effective January 1, 2011, only dusttight enclosures shall be permitted.

For (B)(3), the Comment was to correct the reference from 502.130(A)(3) to 502.120(B)(3) as this was an editorial error. An examination of the NEC record while reflecting that this was indeed an error does not support that the revision to reference 502.120(B)(3), but rather it should be to 502.150(A)(3). Going back to the 1999 NEC the section in question was 502-14 (b)(3) and it referred to (a)(3). In the 2002 NEC, this same section became 502.14 (B)(3) and the reference back was to 502.14(A)(3). Thus the correct reference back would be to 502.150(A)(3) with the following corrected:

(3) Resistors and Similar Equipment. Resistors, resistance devices, thermionic tubes, rectifiers, and similar equipment shall comply with 502.120(B)(3) 502.130(A)(3) 502.150(A)(3).

Exception: Enclosures for thermionic tubes, nonadjustable resistors, or rectifiers for which maximum operating temperature will not exceed 120°C (248°F) shall be permitted to be of the general-purpose type.

14-34 Log #578 NEC-P14 **Final Action: Reject**
(502.150(B))

Submitter: William M. Lewis, Martinsville, IN
Comment on Proposal No: 14-73
Recommendation: The proposal should be rejected.
Substantiation: The submitter provided no technical justification nor record of safety issues that would justify deleting the exception.
Panel Meeting Action: Reject
Panel Statement: See Panel Comment 14-33a (Log #CC1400).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-35 Log #1874 NEC-P14 **Final Action: Reject**
(502.150(B))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 14-73
Recommendation: The action taken by the Panel should have been to reject this proposal.
Substantiation: The submitter's substantiation is insufficient to warrant the extent of the changes proposed. The specific term "dusttight" is not applicable to the enclosures for (2) Transformers and Similar Equipment and would, in essence, require that a new type of equipment be created and approved. There is no substantiation for the removal of the Exception to (3) Resistors and Similar Equipment which presently allows general purpose enclosure types under specific conditions.
Panel Meeting Action: Reject
Panel Statement: See Panel Comment 14-33a (Log #CC1400).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 503 CLASS III LOCATIONS

14-36 Log #126 NEC-P14 **Final Action: Accept in Part**
(503.30(A) Exception)

TCC Action: The Technical Correlating Committee directs that the Exception to 503.30(A), be revised to read as follows:
"Exception: The specific bonding means shall be required only to the nearest point where the grounded circuit conductor and the grounding electrode are connected together on the line side of the building or structure disconnecting means as specified in 250.32(B), provided the branch-circuit overcurrent protection is located on the load side of the disconnecting means."
This action correlates the exception with the revised text of 250.32 as accepted by Code-Making Panel 5 in Comment 5-58.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-81
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action on Proposal 5-119. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
Panel Statement: See panel action on Comment 14-18.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-37 Log #428 NEC-P14 **Final Action: Reject**
(503.130(B))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-83
Recommendation: Accept proposal revised:
A luminaire (fixture) that ~~may be~~ is likely to be exposed to physical damage shall be protected by a suitable guard.
Substantiation: Panel statement is that this requirement covers luminaires that are subject to damage on an intermittent basis or changing conditions. The text does not reflect those conditions. The word "may" includes unforeseeable future conditions. This section doesn't correlate with 110.27(B) which uses the phrase "likely to be exposed to physical damage". Many "not permitted" uses in the code simply state: "where subject to physical damage" without qualifiers of continuous or intermittent basis or different conditions.
Panel Meeting Action: Reject
Panel Statement: The panel continues to reject the proposal and concludes that the word "may" is correct.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-38 Log #459 NEC-P14 **Final Action: Reject**
(503.140(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-84
Recommendation: Accept as revised:
(3) Be connected to terminals ~~in an approved manner~~ in accordance with 110.14 ~~and 503.145.~~ Alternatively, delete (3).
Substantiation: Proposal provides specificity. Panel statement that reference to 110.14 is not necessary because it already applies, also makes (3) unnecessary. The requirements of 110.14 and this section, worded differently, may cause confusion.
Panel Meeting Action: Reject
Panel Statement: The reference to 110.14 is not necessary because it applies throughout the Code.
CMP-14 notes that the complete wording of 503.140(3) was not shown.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
COOK, D.: The submitter and the panel statement both clarify that nothing in 503.140(3) is different than the general requirements in Chapters 1 through 4. NEC 90.3 states the requirements in Chapters 5, 6, and 7 supplement or modify the general rules. The CMP-14 statement indicates there is no reason to include a reference to the general requirements for termination included in 110.14 and I agree with that statement. The current text requires the cord to be terminated in an approved manner which is required for all installations in 110.2. The submitter's alternate recommendation was to delete item 3 completely. Since the text does not supplement or modify the general requirements in Chapters 1 through 4, that recommendation should be accepted.

ARTICLE 504 INTRINSICALLY SAFE SYSTEMS

14-39 Log #127 NEC-P14 **Final Action: Accept**
(504.2)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-86
Recommendation: The Technical Correlating Committee directs the panel to reconsider the proposal and revise the Fine Print Note so that it does not contain mandatory text. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Delete the words "to be" in FPN (b).
In 504.2, definition of Simple Apparatus, FPN(b) will read:
(b) sources of stored energy consisting of single components in simple circuits with well-defined parameters, for example, capacitors or inductors, whose values are ~~to be~~ considered when determining the overall safety of the system;
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-40 Log #128 NEC-P14 **Final Action: Accept**
(504.30(A)(1) Exception No. 3 (New))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-88a
Recommendation: The Technical Correlating Committee directs the panel to reconsider the proposal relative to the comments expressed in the voting that the Exception, as worded, covers requirements outside the Scope of Article 504. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action on Comment 14-41.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-41 Log #635 NEC-P14 **Final Action: Accept in Principle**
(504.30(A)(1) Exception No. 3 (New))

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-88a
Recommendation: ISA supports W. Lawrence's affirmative comment on this proposal.
Substantiation: W. Lawrence's comment completely addresses the required revisions to this section.
Panel Meeting Action: Accept in Principle
Revise Exception No. 3 to read:
Exception No. 3 : Intrinsically safe circuits in a Division 2 or Zone 2 location shall be permitted to be installed in a raceway, cable tray or cable along with nonincendive field wiring circuits when installed in accordance with 504.30(B).
Add a new Exception No. 4 and fine print note to read:
Exception No. 4: Intrinsically safe circuits passing through a Division 2 or Zone 2 location to supply apparatus that is located in a Division 1, Zone 0, or Zone 1 location shall be permitted to be installed in a raceway, cable tray, or cable along with nonincendive field wiring circuits when installed in accordance with 504.30(B).
FPN: Nonincendive field wiring circuits are described in 501.10(B)(3), 502.10(B)(3), 503.10(B)(3), 505.15(C)(1)(g), and 506.15(C)(7).
Panel Statement: The panel action overrides the action on Proposal 14-88a. The fine print note is added for scope clarification and correlation.

Number Eligible to Vote: 14
Ballot Results: Affirmative: 14
Comment on Affirmative:
NEAGLE, J.: The two exceptions suggested in the panel action do not include Zones 20, 21, or 22. These exceptions make reference to 504.30(B) for two specific installation scenarios, but do not account for all possible installation scenarios where intrinsically safe circuits and nonincendive field wiring circuits may be installed together. There is no need to qualify the location of the circuits in question as long as they are separated in accordance with the referenced section. We may be better served by a single exception that states: "Intrinsically safe circuits shall be permitted to be installed in a raceway, cable tray, or cable along with nonincendive field wiring circuits when installed in accordance with 504.30(B)." retaining the suggested FPN.

14-42 Log #129 NEC-P14 **Final Action: Accept**
(504.30(A)(2))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-89
Recommendation: The Technical Correlating Committee directs the panel to reconsider the proposal and revise both the new FPN to (1) and the existing FPN No. 1 to item (5) to comply with the NEC Style Manual. Both FPNs contain recommendations and interpretations in the form of a "preferred method" and the text "generally considered acceptable". FPNs shall only contain explanatory information. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Delete the fine print note to 504.30(A)(2)(2).
Revise 504.30(A)(2)(2) to read:
"(2) Separation from conductors of nonintrinsically safe circuits by use of a grounded metal partition 0.91 mm (0.0359 in.) or thicker."
Revise existing FPN No. 1 to 504.30(A)(2)(5) to read:
"FPN No. 1: The use of separate wiring compartments for the intrinsically safe and nonintrinsically safe terminals is a typical ~~the preferred~~ method of complying with this requirement."
Panel Statement: The panel notes that the TCC's direction to reconsider should have been directed at FPN to 504.30(A)(2)(2), not (1).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-43 Log #1251 NEC-P14 **Final Action: Accept in Principle**
(504.50(A))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 14-22
Recommendation: Reject the Panel's action on 504.50(A) and keep the original proposed text.
Substantiation: The Panel rejected the original proposal indicating "…because connection to an equipment grounding conductor is not always the appropriate method to accomplish the requirement of 504.50(A)." The Grounding and Bonding Task Group recognizes that in certain instances supplemental bonding to a grounding electrode may be required. However, the requirements for connection to a grounding electrode can be found in 504.50(B) as well as the FPN to 504.50(A). The requirements in 504.50(A) apply only to connection to the equipment grounding conductor. Applying the definitions of Equipment Grounding Conductor and Grounded in Proposal 5-6, 504.50(A) should be revised as indicated in the original proposed text.
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr. The following is the minority affirmative comment by one Task Group member during the Task Group's results balloting:
"Revise the first paragraph of the substantiation as follows:
The Panel rejected the original proposal indicating "…because connection to an equipment grounding conductor is not always the appropriate method to accomplish the requirement of 504.50(A)." The Grounding and Bonding Task Group recognizes that in certain instances supplemental bonding to a grounding electrode may be required. However, the requirements for connection to a grounding electrode can be found in 504.50(B) as well as information is provided in the FPN to 504.50(A). The requirements in 504.50(A) apply only to connection to the equipment grounding conductor. Applying the definitions of Equipment Grounding Conductor and Grounded in Proposal 5-6, 504.50(A) should be revised as indicated in the original proposed text.
Reason for suggested change, "Fine Print Notes are not permitted to contain requirements."
Panel Meeting Action: Accept in Principle
Revise 504.50 to read:
"(A) Intrinsically Safe Apparatus, Enclosures, ~~Associated Apparatus,~~ and Raceways. Intrinsically safe apparatus, ~~associated apparatus, cable shields,~~ enclosures, and raceways, if of metal, shall be ~~grounded~~ connected to the equipment grounding conductor.
(B) Associated Apparatus and Cable Shields. Associated apparatus and cable shields shall be grounded in accordance with the required control drawing. See 504.10(A).
_FPN: Supplementary connection(s) ~~bonding~~ to the grounding electrode may be needed for some associated apparatus, for example, zener diode barriers, if specified in the control drawing. See ANSI/ISA RP 12.06.01-2003 ~~2002~~, Wiring Methods for Hazardous (Classified) Locations Instrumentation Part 1: Intrinsic Safety."
Designate current (B) as (C). Delete current (C) and its exception.
Panel Statement: The panel split 504.50(A) into two parts so that the term "equipment grounding conductor" can be applied correctly as the task group recommended. With this change, the language of the fine print note was modified to be consistent with (A) and (B).
This action supercedes the action on Proposal 14-91 and incorporates the action from Proposal 14-92.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 505 CLASS I, ZONE 0, 1, AND 2 LOCATIONS

14-44 Log #1 NEC-P14 **Final Action: Reject**
(505)

Submitter: Steven R. Carlson, Pfizer Global Manufacturing
Comment on Proposal No: 14-101
Recommendation: Clarify the use of IEC (European) rated equipment for Zone use in the United States. Within the pharmaceutical industry, many suppliers are of EU origin and rate their equipment according to IEC standards.
Substantiation: Using a different Zone rating from EU source creates confusion and ultimately will lead to misinterpretation of what is acceptable. For instance, if a piece of equipment carries an EU Class 1 Zone 2 designation, it would be acceptable for US Zone 2 installations. Having separate requirements causes added expense and an uncompetitive position for US industry.
Panel Meeting Action: Reject
Panel Statement: The comment does not include a recommendation and does not comply with Section 4.4.5 of the Regulations Governing Committee Projects. The panel notes that IEC, European, and NEC equipment requirements are not the same. Electrical equipment used in hazardous (classified) locations in the United States is subject to the OSHA 29 CFR 1910 requirements.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-45 Log #1188 NEC-P14 **Final Action: Reject**
(505.7(A))

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 14-109
Recommendation: Reject Proposal 14-109 and the requirement for a "Qualified Registered Professional Engineer" should be maintained.
Substantiation: The proposal did not include any substantiation for the removal of the requirement for a "Qualified Registered Professional Engineer". It did not include any documentation for how many installations have been completed in the United States and did not document any training programs that are available to develop "qualified persons". A "Qualified Registered Professional Engineer" is needed to provide the necessary direction and oversight so that only "qualified persons" are involved in all aspects of the design, AHJ approval, and installation of these systems.
Panel Meeting Action: Reject
Panel Statement: The panel concludes that the text incorporated in Article 506 is satisfactory to require that qualified persons be involved in the classification, design, and selection of equipment and methods for zone classification for combustible dusts. There is a need that qualified individuals be involved at all levels of the project. The panel concludes that it is not practical to require a single individual to oversee projects in zone areas. These projects require a variety of qualified specialists to properly engineer, design, and implement these installations. As such, the panel agrees with modifying the requirements in Article 505 as stated.

Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 3
Explanation of Negative:

COOK, D.: I agree with the panel statement that qualified persons are required for every part of an electrical installation installed in hazardous locations. This would include the area classification, design, equipment selection, installation, inspection, operation and maintenance. While it is possible for individuals to be qualified for more than one of those activities, it is not likely that many individuals are qualified as defined in NEC Article 100 for all of those functions. The current requirement in 505.7 requires oversight or supervision of the area classification, equipment selection and wiring selection by a person that has multiple qualifications. That person must have skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training on the hazards involved. Based on the fact that CMP-14 is only aware of one project where Article 505 was utilized for the complete installation, it is very difficult to believe that an abundance of truly qualified persons are available for area classification and equipment and wiring selection. This requires the Professional Engineer to practice within the limits of his or her qualifications. The supervision of an Article 505 project might include the delegation of specific components of the area classification and equipment and wiring selection to other qualified professionals. Based on the registration criteria, I would assume the PE has the knowledge and ability to determine which aspects of each specific project that would require delegation to others. Most other parties involved in electrical installations are required to be licensed and/or qualified in some way. I am not aware of any other registration or license that includes the responsibility for self-limitation of the individual to activities which the person is qualified to perform. The current requirement in 505.7(A) does not prohibit qualified persons that are not Registered Professional Engineers from actively participating in electrical installation using Article 505. It simply requires those persons involved in area classification and selection of equipment and wiring to be under the supervision of the qualified Registered PE. This requirement should be retained in Article 505 and added to all electrical installations within hazardous locations.

O'MEARA, M.: Although I agree with the panel's position reflected in the panel statement that it isn't practical to require a single individual to oversee projects in zone areas, I am convinced that the panel action does not help to improve the situation. The proposed changes will still allow a single individual to oversee these installations, as long as he/she is "qualified". How this individual becomes "qualified" is not addressed, and the new text does not accomplish the panel's intentions to have a qualified team of individuals bring their individual expertise together to properly oversee the installation. By staying with a "qualified registered professional engineer", we can rest assured that the engineer that is supervising the classification, selection and installation of equipment in zone areas will pull together the proper experts for each aspect of the installation to ensure that when it receives his/her approval all concerns have been addressed and the installation is safe.

WIRFS, M.: I vote negative to panel action to reject the comment and accept the comment to reject the original proposal.

This submitter agrees that the original substantiation was insufficient and I agree. As stated before:

The original substantiation that similar language was fully considered for Article 506 is insufficient. I personally feel that it was NOT properly or fully addressed during the previous code cycle when Article 506 was introduced and the panel was inconsistent in not including similar language. A companion proposal for the 2008 NEC (14-148) has addressed this oversight. During panel discussion it was suggested that some compromise had been struck within the panel to include this provision in return for consideration of passage of the new Article 505 when it was first introduced and that some "time limit" applied. I again I believe that principles have no time limit and I am disappointed that any panel member would compromise those opinions or principles based on this premise. There is no "time limit" on my opinion or my original voting on this subject and I still maintain that this provision has the same validity that it did when it was first introduced with Article 505. This is a step forward to a higher standard of responsibility and certification of the most important issue with the application of this article. The submitter did not provide any technical or convincing argument to remove or modify this provision.

14-46 Log #130 NEC-P14 **Final Action: Accept in Part**
(505.8(I))

TCC Action: The Technical Correlating Committee directs that FPN No. 1 of 505.8(K) be deleted in accordance with the direction given to the panel in Comment 14-46. The Technical Correlating Committee intends that the use of Annex A be consistent throughout the code.

In addition, the Technical Correlating Committee directs that the following references be added to Annex A of the NEC.

"Combustible Gas Detectors, Performance Requirements - ANSI/ISA 12.13.01"

"Gas and Vapor Detector Sensors - ANSI/UL 2075".

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-119
Recommendation: The Technical Correlating Committee directs the panel to reconsider this proposal and to relocate the reference into Annex A to be consistent with other parts of the Code. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
Panel Statement: See panel action on Comment 14-5.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-47 Log #634 NEC-P14 **Final Action: Reject**
(505.8(I))

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-117
Recommendation: The panel statement indicates that the referenced standard contained in the recommendation is not currently published. The referenced standard will be published and publicly available prior to the ROC meeting.
Substantiation: The standard referenced, ISA TR12.13.03 will be published prior to the ROC meeting.
Panel Meeting Action: Reject
Panel Statement: This standard has not been published and, therefore, cannot be referenced.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-48 Log #132 NEC-P14 **Final Action: Accept**
(505.9(D)(1))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-125
Recommendation: The Technical Correlating Committee directs the panel to reconsider the proposal and place the example text of the recommendation into a Fine Print Note. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
In 505.9(D)(1), delete the last sentence and insert the following fine print note:
FPN: As an example, such a marking might be "–30°C to +40°C."
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-49 Log #1795 NEC-P14 **Final Action: Reject**
(505.15(B)(g))

Submitter: Robert L. Seitz, Artech Engineering
Comment on Proposal No: 14-129
Recommendation: Revise original proposal to read:

(g) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, and where the cable is not subject to physical damage, listed TC-ER cable, with suitable overall jacket of suitable material, a basket weave conductive armor beneath the outer jacket, shall be permitted to be installed where all of the following conditions are met:

(1) Maximum length is 3 meters
(2) Has separate grounding in accordance with 250.122
(3) Maximum conductor size is #14awg.
(4) Use is restricted to shielded pair (single or multiple pair) instrument cables or multiple conductor control cable
(5) Termination fittings listed for the application are used
(6) Termination fittings provide continuity with conductive armor
(7) Cable is installed according to the requirements of Article 336.10(7) Exception.

Substantiation: All substantiation stated in original proposal still holds. The primary issue is to provide an installation such that the connecting cable to devices and equipment that is subject to removal or overhaul is not subject to damage when disconnected from the device or equipment. MC-HL cable is very frequently and easily damaged by the activity because it cannot be moved clear of the work area sufficiently. The damage to the cables include crimped and broken armor due to over bending, deformation of the armor, damage to the jacket and other compromise to the cable configuration by the work activities and tools and equipment employed in the removal or repair activities.

The AHJ in Alaska has become aware of the damage that is done to MC-HL cable when disconnected from its equipment or end device and has expressed concern.

This submitter has been told by members of the CMP that proposal of use of a cable that already has a listing and which has a conductive sheath would be worthy of consideration for installation in a Class I, Zone 1 area.

Shipboard cable as originally proposed is available with dual listing as Shipboard cable and TC-ER cable. It is available with a conductive metal sheath that is called armor (basket weave and other). My comment on proposal modifies the original proposal to change from shipboard cable to TC-ER cable which is permitted by Chapter 3. The submitter had submitted a proposal to add Shipboard cable in Article 310 for special application.

Extra hard usage cord is allowed by Article 505.17 but extra hard usage cord is only available in a power cord configuration. Instrumentation and control configurations are not available. Request for consideration of the original proposal to only consider TC-ER in instrument and control cable configurations is proposed to fill this gap.

By restricting to instrument and control cable and to #14 AWG available fault current is greatly restricted.

While MC-HL cable can have crush and impact resistance as much as 10 times that required for, TC-ER cable has actually crush and impact resistance as much as 5 times that required for MC-HL cable.

Use of basket tray will allow protection to close proximity of the end device yet provide means to allow the cable and tray to be easily relocated out of the way during removal and overhaul activities.

Allowance of up to 3 meters of TC-ER cable would allow installation of an increase safety junction box near the equipment or device at a distance sufficient to permit moving the cable out of the way when necessary. This increased safety junction box would be a splice point between the MC-HL cable and TC-ER cable.

This proposal was made with the basic intent to provide a safer, more durable installation that can be made with only MC-HL cable. Problems similar to those experienced with MC-HL cable have been observed with conduit installations in Division 1 areas where conduit connections had to be removed when removing or overhauling equipment. Conduit runs damaged under such circumstances eventually have to be replaced. A tough cable, with a flexible armor and sufficient flexibility to be moved out of the way will enhance the safety of an installation.

Panel Meeting Action: Reject

Panel Statement: The substantiation is insufficient for the introduction of TC-ER Cable.

The conditions of maintenance and supervision for the installations referenced are not in accordance with 505.15(B)(1)(b) for Type MC-HL cable. The sight plan must account for the foreseeable use, including maintenance. Qualified maintenance persons must not exceed the minimum bending radius restrictions found in 330.12 for Type MC and MC-HL cable. Similar restrictions exist for TC-ER, including a minimum bending radius requirement in 336.24. The reasons for the cited damage to the referenced MC-HL cable will similarly risk damage to TC-ER, or any other cable.

By shipboard cable, it is assumed that the submitter refers to Marine Shipboard Cable. The submitter has provided no information regarding installation and use restrictions in the regulations that permit Marine Shipboard Cable in a Zone 1 location, nor how the regulations are similar to or different from the requirements for Type TC-ER in Article 336.

The statement regarding crush testing is incorrect. Cables are listed to minimum requirements in a consensus standard. The minimum crush requirements for Type TC-ER cable as found in ANSI/UL 1277, Electrical Power and Control Tray Cable with Optional Fiber Optic Members, is 33 percent lower than the minimum requirement in UL 2225, Cables and Cable-Fittings for Use in Hazardous (Classified) Locations.

The proposed wording requires termination fittings listed for the application. There are no published requirements for the construction and performance of Type TC-ER termination fittings for Class I, Zone 1. Currently listed Marine Shipboard Cable fittings are for installation and use offshore according to US Coast Guard Electrical Engineering Regulations found in the Code of Federal Regulations (CFR).

The requirement for the "armor" to provide continuity with the termination fitting does not address the CMP-14 statement regarding the need for mechanical protection.

The proposal requires a maximum length of 3 meters. The proposed wording references installation practices per 336.10(7). CMP-14 did previously reject the proposed installation of TC-ER cable in this manner. No substantiation has been provided to demonstrate satisfaction of the stated concerns.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-50 Log #131 NEC-P14 **Final Action: Accept in Part**
(505.15(B)(1) and (c))

TCC Action: The Technical Correlating Committee directs that FPN No. 2 of 505.15(B)(1)(b) and FPN No. 2 of 505.15(B)(1)(c) be deleted in accordance with the direction given to the panel in Comment 14-50. The Technical Correlating Committee intends that the use of Annex A be consistent throughout the code.

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 14-121

Recommendation: The Technical Correlating Committee directs the panel to reconsider this proposal and to relocate the reference in the FPNs into Annex A to be consistent with other parts of the Code. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept in Part

Panel Statement: See panel action on Comment 14-5.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-51 Log #133 NEC-P14 **Final Action: Accept**
(505.15(B)(1)(f))

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 14-128

Recommendation: The Technical Correlating Committee directs the panel to reconsider the action on this proposal and remove the redundant reference to Article 352 since this is already covered by 90.3. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See panel action on Comment 14-53.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-52 Log #1385 NEC-P14 **Final Action: Accept**
(505.15(B)(1)(f))

Submitter: William Wagner, Certification Solutions

Comment on Proposal No: 14-128

Recommendation: This Proposal should be Accepted as originally proposed.

(f) Rigid nonmetallic conduit ~~complying with Article 352~~ shall be permitted where encased in a concrete envelope a minimum of 50 mm (2 in.) thick and provided with not less than 600 mm (24 in.) of cover measured from the top of the conduit to grade.

Substantiation: As noted in the TCC action on this proposal, this is a redundant reference to Article 352 as it is already covered by 90.3. Additionally, with the panel actions taken on Proposals 8-53 and 8-78, it is also an incorrect reference, as Article 352 now only pertains to Type PVC rigid nonmetallic conduit. Types HDPE and RTRC, which were formerly covered by Article 352, are now covered by Articles 353 and 355, respectively.

Panel Meeting Action: Accept

Panel Statement: See panel action on Comment 14-53.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-53 Log #357 NEC-P14 **Final Action: Accept**
(505.15(B)(1)(f))

Submitter: Code-Making Panel 8,

Comment on Proposal No: 14-128

Recommendation: CMP-8 recommends that CMP-14 accept this proposal in principle with the revised text:

(f) Type PVC Conduit and Type RTRC Conduit ~~Rigid nonmetallic conduit complying with Article 352~~ shall be permitted where encased....

Substantiation: CMP-8 recommends that CMP-14 Accept in Principle Proposal 14-128 with the proposed revised wording based on CMP-8's actions on Proposals 8-53 and 8-78. This revision also addresses the NEC Style Manual.

This comment has been balloted through CMP-8 with the following ballot results:

12 Eligible to Vote
11 Affirmative
1 Negative

Mr. R. Loyd voted negatively stating: "Proposal 14-128 was to Reject. No comment necessary, CMP-8 has no substantiation for recommending that CMP-14 reverse their action. Note: UL does not recognize any RTRC nonmetallic conduit as comparable to Schedule 80 PVC which is suitable for use where subject to physical damage."

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-54 Log #549 NEC-P14 **Final Action: Accept in Principle**
(505.15(C)(1))

TCC Action: The Technical Correlating Committee directs that the FPN added in the panel action for 505.15(C)(1)(g) be deleted. This action is consistent with the Technical Correlating Committee direction given to place product standards references in annex A. The Technical Correlating Committee intends that the use of Annex A be consistent throughout the code.

Submitter: Edward M. Briesch, Underwriters Laboratories Inc.

Comment on Proposal No: 14-33a

Recommendation: Revise text to read as follows:

(C) Class I, Zone 2.

(1) General. In Class I, Zone 2 locations, the wiring methods in (C)(1)(a) through (C)(1)(h~~g~~) shall be permitted.

(a) All wiring methods permitted by 505.15(B).

(b) Types MI, MC, MV, or TC cable with termination fittings, or in cable tray systems and installed in a manner to avoid tensile stress at the termination fittings. Single conductor Type MV cables shall be shielded or metallic-armored.

(c) Type ITC cable as permitted in 727.4.
(d) Type PLTC cable in accordance with the provisions of Article 725, or in cable tray systems. PLTC shall be installed
in a manner to avoid tensile stress at the termination fittings.
(e) Enclosed gasketed busways, enclosed gasketed wireways.
(f) Threaded rigid metal conduit, threaded steel intermediate metal conduit.
(g) In industrial establishments with restricted public access where the conditions of maintenance and supervision ensure that only qualified persons service the installation and where metallic conduit does not provide sufficient corrosion resistance, Reinforced Thermosetting Resin Conduit (RTRC) marked with suffix -XW, factory elbows, and associated fittings in accordance with 355.6, and Schedule 80 PVC Conduit, factory elbows and associated fittings, in accordance with 352.6 shall be permitted. Where seals are required for boundary conditions as defined in 505.16(C)(1)(b), the Zone 1 wiring method shall extend into the Zone 2 area to the seal which shall be located on the Zone 2 side of the Zone 1 – Zone 2 boundary.
(h) ~~(g)~~ Nonincendive field wiring shall be permitted using any of the wiring methods permitted for unclassified locations. Nonincendive field wiring systems shall be installed in accordance with the control drawing(s). Simple apparatus, not shown on the control drawing, shall be permitted in a nonincendive field wiring circuit, provided the simple apparatus does not interconnect the nonincendive field wiring circuit to any other circuit.
FPN: Simple apparatus is defined in 504.2. Separate nonincendive field wiring circuits shall be installed in accordance with one of the following:
(1) In separate cables
(2) In multiconductor cables where the conductors of each circuit are within a grounded metal shield
(3) In multiconductor cables where the conductors of each circuit have insulation with a minimum thickness of 0.25 mm (0.01 in.)

Substantiation: Since Zone 2 locations as defined in Article 505 and Division 2 locations are technically the same, these wiring methods should be included in 505.15(C)(1) as well as in 501.10(B)(1).
Panel Meeting Action: Accept in Principle
Add a new item (g) to read:
"(g) In industrial establishments with restricted public access where the conditions of maintenance and supervision ensure that only qualified persons service the installation and where metallic conduit does not provide sufficient corrosion resistance, Reinforced Thermosetting Resin Conduit (RTRC), factory elbows, and associated fittings all marked with suffix -XW and Schedule 80 PVC Conduit, factory elbows, and associated fittings shall be permitted. Where seals are required for boundary conditions as defined in 505.16(C)(1)(b), the Zone 1 wiring method shall extend into the Zone 2 area to the seal, which shall be located on the Zone 2 side of the Zone 1 – Zone 2 boundary."
Add a fine print note to 505.15(C)(1)(g) to read: FPN: For additional information on RTRC-XW, see ANSI/UL 1684A, Supplemental Requirements for Extra-Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.
Also, add ANSI/UL 1684A, Supplemental Requirements for Extra-Heavy Wall Reinforced Thermosetting Resin Conduit (RTRC) and Fittings, to Annex A.
Panel Statement: This change correlates with the action on Comment 14-8. A fine print note has been added to provide a correlation between RTRC-XW and the specific product standard. A reference has been added to Annex A to the appropriate product standard. See also panel action on Comment 14-5.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-55 Log #134 NEC-P14 **Final Action: Accept in Part**
(505.16, FPN 3 (New))

TCC Action: The Technical Correlating Committee directs that FPN No. 3 of 505.16 be deleted in accordance with the direction given to the panel in Comment 14-55. The Technical Correlating Committee intends that the use of Annex A be consistent throughout the code.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-130
Recommendation: The Technical Correlating Committee directs the panel to reconsider this proposal and to relocate the reference in the FPNs into Annex A to be consistent with other parts of the Code. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
Panel Statement: See panel action on Comment 14-5.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-56 Log #135 NEC-P14 **Final Action: Accept in Part**
(505.17)

TCC Action: The Technical Correlating Committee directs that FPN No. 2 of 505.17(6) be deleted in accordance with the direction given to the panel in Comment 14-56. The Technical Correlating Committee intends that the use of Annex A be consistent throughout the code.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-133
Recommendation: The Technical Correlating Committee directs the panel to reconsider this proposal and to relocate the reference in FPN No. 2 into Annex A to be consistent with other parts of the Code. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
Panel Statement: See panel action on Comment 14-5.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-57 Log #460 NEC-P14 **Final Action: Reject**
(505.17(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 14-134
Recommendation: Accept as revised:
(3) Be connected to terminals ~~in an approved manner~~ in accordance with 110.14 ~~and 503.145.~~ Alternatively, delete (3).
Substantiation: Proposal provides specificity. Panel statement that reference to 110.14 is not necessary because it already applies also makes (3) unnecessary. The requirements of 110.14 and this section, worded differently, may cause confusion.
Panel Meeting Action: Reject
Panel Statement: The reference to 110.14 is not necessary because it applies throughout the Code.
CMP-14 notes that the complete wording of 505.17(3) was not shown.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13 Negative: 1
Explanation of Negative:
COOK, D.: The submitter and the panel statement both clarify that nothing in 505.17(3) is different than the general requirements in Chapters 1 through 4. NEC 90.3 states the requirements in Chapters 5, 6, and 7 supplement or modify the general rules. The CMP-14 statement indicates there is no reason to include a reference to the general requirements for termination included in 110.14 and I agree with that statement. The current text requires the cord to be terminated in an approved manner which is required for all installations in 110.2. The submitter's alternate recommendation was to delete item 3 completely. Since the text does not supplement or modify the general requirements in Chapters 1 through 4, that recommendation should be accepted.

14-58 Log #136 NEC-P14 **Final Action: Accept in Part**
(505.25(A) Exception)

TCC Action: The Technical Correlating Committee directs that the Exception to 505.25(A), be revised to read as follows:
"Exception: The specific bonding means shall be required only to the nearest point where the grounded circuit conductor and the grounding electrode are connected together on the line side of the building or structure disconnecting means as specified in 250.32(B), provided the branch-circuit overcurrent protection is located on the load side of the disconnecting means."
This action correlates the exception with the revised text of 250.32 as accepted by Code-Making Panel 5 in Comment 5-58.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-137
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action on Proposal 5-119. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
CMP-14 accepts the TCC direction to reconsider the action on Proposal 14-137. CMP-14 recognizes that CMP-5 actions on Proposal 5-119 have revised the application of 505.25(A) Exception. However, the text in 505.25(A) Exception remains correct.
Panel Statement: The text continues to reference applicable requirements: 250.32 (A), (B), and (C). No additional action is required from CMP-14 for correlation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 506 ZONE 20, 21, AND 22 LOCATIONS FOR COMBUSTIBLE DUSTS, FIBERS AND FLYINGS

14-59 Log #137 NEC-P14 **Final Action: Accept in Part**
(506.2)

TCC Action: The Technical Correlating Committee directs that the FPN to the term "Dusttight" in 506.2 be deleted since the term dusttight is utilized throughout the NEC and the reference to the nonincendive equipment standard appears in the definitions that apply to nonincendive equipment.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-139a
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
The panel has accepted the direction of the TCC to reconsider the comments made during voting on the proposal. The referenced standards have now been published and the original action on the proposal stands.
The panel recommends that the standard also be added to the list in Annex A, as well as be retained in this fine print note.
Panel Statement: See panel statement on Comment 14-5.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-60 Log #632 NEC-P14 **Final Action: Accept**
(506.2)

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-143
Recommendation: The panel statement indicates that the standard covering the protection techniques specified in the recommendation is not currently published. The referenced standard has since been published and is publicly available. The original proposal should be approved as written.
Substantiation: This standard referenced, ISA 61241-18, was published on June 27, 2006.
Panel Meeting Action: Accept
Panel Statement: The action is to accept Proposal 14-143 in its entirety. The Panel recommends that the standard also be added to the list in Annex A, as well as be retained in this fine print note. See panel statement on Comment 14-5.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-61 Log #633 NEC-P14 **Final Action: Accept**
(506.2)

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-140
Recommendation: The panel statement indicates that the standard covering the protection technique specified in the recommendation ("tD") is not currently published. The referenced standard for type of protection "tD" has since been published and is publicly available. The original proposal should be approved as written.
Substantiation: ISA 61241-1 (type of protection "tD") is published.
Panel Meeting Action: Accept
Panel Statement: The action is to accept Proposal 14-140 in its entirety. The panel recommends that the standard also be added to the list in Annex A, as well as be retained in this fine print note. See panel statement on Comment 14-5.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-62 Log #710 NEC-P14 **Final Action: Accept**
(506.2)

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-139a
Recommendation: The explanations of negative votes indicates that the standards covering the protection techniques specified in the recommendation ("pD" & "iD") are not currently published. The referenced standard for type of protection "iD" has since been published and is publicly available. The referenced standard for type of protection "pD" will be published and publicly available prior to the ROC meeting. The original proposal should be approved as written.
Substantiation: ISA 61241-11 (type of protection "iD") is published. ISA 61241-2 (type of protection "pD") will be published prior to the ROC meeting.
Panel Meeting Action: Accept
Panel Statement: The action is to accept Proposal 14-139a in its entirety. The panel recommends that the standard also be added to the list in Annex A, as well as be retained in this fine print note. See panel statement on Comment 14-5. This is consistent with the panel's action on Comment 14-59.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-63 Log #631 NEC-P14 **Final Action: Accept in Part**
(506.8)

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-149
Recommendation: The panel statement indicates that the standard covering the protection techniques specified in the recommendation is not currently published. The referenced standard has since been published and is publicly available. The original proposal should be approved as written.
Substantiation: The standard referenced, ISA 61241-18, was published on June 27, 2006.
Panel Meeting Action: Accept in Part
Panel Statement: The action is to accept Proposal 14-149 without the fine print note. The panel rejects the fine print note because it already is identified in the definitions section of this article, in accordance with Comment 14-60.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-64 Log #909 NEC-P14 **Final Action: Accept in Principle**
(506.8)

Submitter: Nicholas P. Ludlam, FM Approvals
Comment on Proposal No: 14-150a
Recommendation: Revise as follows:
506.8 Protection Techniques. Acceptable protection techniques for electrical and electronic equipment in hazardous (classified) locations shall be as described in 506.8(A) through 506.8~~(F)~~(H).
Substantiation: With the addition of pressurization "pD" and intrinsic safety "iD" the references in the leading paragraph are incorrect.
Panel Meeting Action: Accept in Principle
Revise 506.8 to read:
506.8 Protection Techniques. Acceptable protection techniques for electrical and electronic equipment in hazardous (classified) locations shall be as described in 506.8(A) through 506.8~~(F)~~(J).
Panel Statement: The panel has corrected the references to include all new additional protection methods.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-65 Log #914 NEC-P14 **Final Action: Reject**
(506.8(B) and (G))

Submitter: Nicholas P. Ludlam, FM Approvals
Comment on Proposal No: 14-150a
Recommendation: Revise as follows:
(B) Pressurized. This protection technique shall be permitted for equipment in zone 21, and Zone 22 locations for which it is identified.
~~(G) Protection by pressurization "pD", This protection technique shall be permitted for equipment in Zone 21 and Zone 22 locations for which it is identified [ROP 14-150a].~~
Substantiation: Combine the two definitions for protection techniques. Pressurized equipment protected by "iP" will also be marked with the Zone of use.
Panel Meeting Action: Reject
Panel Statement: The two protection techniques defined in 506.2, whilst similar, are not considered identical and are covered by different product standards.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-66 Log #911 NEC-P14 **Final Action: Reject**
(506.8(C) and (H))

Submitter: Nicholas P. Ludlam, FM Approvals
Comment on Proposal No: 14-150a
Recommendation: Revise as follows:
(C) Intrinsic Safety. This protection technique shall be permitted for equipment in Zone 20, Zone 21, and Zone 22 locations for which it is identified. Installation of intrinsically safe apparatus and wiring shall be in accordance with the requirements of Article 504.
~~(H) Protection by intrinsic safety "iD". This protection technique shall be permitted for equipment in Zone 20, Zone 21, and Zone 22 locations for which it is listed. [ROP 14-150a].~~
Substantiation: Combine the two definitions for protection techniques. Intrinsically safe equipment protected by "iD" will also be marked with the Zone of use.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 14-65.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-67 Log #630 NEC-P14 **Final Action: Accept**
(506.8(G))

TCC Action: The Technical Correlating Committee directs that neither the FPN nor the reference in Annex A be added. The panel has not clearly identified the standard or its title. In addition, references in Annex A are where products are required to be listed by the Code, which does not appear to be the requirement in this section. The Technical Correlating Committee intends that Annex A be used consistently throughout the Code.
Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-150
Recommendation: The panel statement indicates that the standard covering the protection technique specified in the recommendation ("tD") is not currently published. The referenced standard for type of protection "tD" has since been published and is publicly available. The original proposal should be approved as written.
Substantiation: ISA 61241-1 (type of protection "tD) is published.
Panel Meeting Action: Accept
Panel Statement: The action is to accept Proposal 14-150 in its entirety. The Panel recommends that the standard also be added to the list in Annex A, as well as be retained in this fine print note. See panel statement on Comment 14-5.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-68 Log #637 NEC-P14 **Final Action: Accept**
(506.8(J) and (K))

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-150a
Recommendation: The explanation of negative votes indicates that the standards covering the protection techniques specified in the recommendation ("pD & "iD") are not currently published. The referenced standard for type of protection "iD" has since been published and is publicly available. The referenced standard for type of protection "pD" will be published and publicly available prior to the ROC meeting. The original proposal should be approved as written.
Substantiation: ISA 61241-11 (type of protection "iD") is published. ISA 61241-2 (type of protection "pD") will be published prior to the ROC meeting.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-69 Log #138 NEC-P14 **Final Action: Accept in Part**
(506.8(J) & (K))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-150a
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
The panel has accepted the direction of the TCC to reconsider the comments made during voting on the proposal.
Panel Statement: The referenced standards have now been published and the original action on the proposal stands.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-70 Log #915 NEC-P14 **Final Action: Accept**
(506.9)

Submitter: Nicholas P. Ludlam, FM Approvals
Comment on Proposal No: 14-153a
Recommendation: Delete existing Table 506.20(F) and replace with the proposed table as shown below and relocate to 506.9, renumber table and references to align.

Table 506.9(C)(2)(2) Types of Protection Designation

Designation	Technique	Zone*
iaD	Protection by intrinsic safety	20
ibD	Protection by intrinsic safety	21
[iaD]	Associated apparatus	Unclassified**
[ibD]	Associated apparatus	Unclassified**
maD	Protection by encapsulation	20
mbD	Protection by encapsulation	21
pD	Protection by pressurization	21
tD	Protection by enclosures	21

*Does not address use where a combination of techniques is used.
**Associated apparatus is permitted to be installed in a hazardous (classified) location if suitably protected using another type of protection.

Delete clause 506.20(F)

~~(F) Types of Protection Allowed. The types of protection allowed in Zones 20, 21, and 22 are shown in Table 506.20(F).~~
Substantiation: The modification to Table 506.20(F) proposed as panel Proposal 14-153a shown above as 506.9(C)(2)(2) provides additional information that was omitted in the initial panel Proposal 14-153a and the suggested alternative is aligned with that shown in proposed for 505.9(C)(2)(4). If the table is modified as shown, then the information provided in 506.20(F) is incorrect. Relocating this table to 506.9, Equipment Requirements, aligns the positioning with the existing information provided in 505 and will help users familiar with 505 to locate the similar information in 506.
Panel Meeting Action: Accept
Also, in 506.9(C)(2)(2), change the table reference to Table 506.9(C)(2)(2).
Panel Statement: The additional action corrects the cross-reference.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-71 Log #139 NEC-P14 **Final Action: Accept in Part**
(506.9(C)(1) & (2) (New))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-150b
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
The panel has accepted the direction of the TCC to reconsider the comments made during voting on the proposal.
Panel Statement: The referenced standards have now been published, and the original action on the proposal stands.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-72 Log #638 NEC-P14 **Final Action: Accept**
(506.9(C)(1) & (2) (new))

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-150b
Recommendation: The explanation of negative votes indicates that the standards covering the protection techniques specified in the recommendation are not currently published. The referenced standards for type of protection "iD", "tD", "maD", and "mbD" have since been published and are publicly available. The referenced standard for type of protection "pD" will be published and publicly available prior to the ROC meeting. The original proposal should be approved as written.
Substantiation: ISA 61241-11 (type of protection "iD") is published. ISA 61241-18 (type of protection "maD" and "mbD") is published. ISA 61241-1 (type of protection "tD") is published. ISA 61241-2 (type of protection "pD") will be published prior to the ROC meeting.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-73 Log #140 NEC-P14 **Final Action: Accept in Part**
(506.15(A)(3))

TCC Action: The Technical Correlating Committee directs that FPN No. 2 of 506.15(A)(3) be deleted in accordance with the direction given to the panel in Comment 14-73. The Technical Correlating Committee intends that the use of Annex A be consistent throughout the code.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-152
Recommendation: The Technical Correlating Committee directs the panel to reconsider this proposal and to relocate the reference in the FPNs into Annex A to be consistent with other parts of the Code. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
Panel Statement: See panel action on Comment 14-5.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-74 Log #141 NEC-P14 **Final Action: Accept in Part**
(506.20 & Table 506.20(F) (New))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-153a
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
The panel has accepted the direction of the TCC to reconsider the comments made during voting on the proposal.
Panel Statement: The referenced standards have now been published. The panel action on Comment 14-70 correctly modifies the table for correlation with Table 505.9(C)(2)(4).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-75 Log #629 NEC-P14 **Final Action: Accept in Principle**
(506.20 & Table 506.20(F) (New))

Submitter: Eliana Beattie, ISA
Comment on Proposal No: 14-153a
Recommendation: The explanation of negative votes indicates that the standards covering the protection techniques specified in the recommendation are not currently published. The referenced standards for type of protection "iD", "tD", "maD", and "mbD" have since been published and are publicly available. The referenced standard for type of protection "pD" will be published and publicly available prior to the ROC meeting. The original proposal should be approved as written.

Additionally, modify the proposed Table 506.20(F) to align with the format of Table 505.9(C)(2)(4) as shown below. Additionally, provide the missing information for Associated Apparatus and the notes relating to combination of techniques and for Associated Apparatus protected by another type of protection.

Table 506.20(F) Types of Protection Designation

Designation	Technique	Zone*
iaD	Protection by intrinsic safety	20
ibD	Protection by intrinsic safety	21
[laD]	Associated apparatus	Unclassified**
[lbD]	Associated apparatus	Unclassified**
maD	Protection by encapsulation	20
mbD	Protection by encapsulation	21
pD	Protection by pressurization	21
tD	Protection by enclosures	21

*Does not address use where a combination of techniques is used.
**Associated apparatus is permitted to be installed in a hazardous (classified) location if suitably protected using another type of protection.

Substantiation: ISA 61241-11 (type of protection "iD") is published. ISA 61241-18 (type of protection "maD" and "mbD") is published. ISA 61241-1 (types of protection "tD") is published. ISA 61241-2 (type of protection "pD") will be published prior to the ROC meeting.

Modifications to Table 506.20(F) provide critical information on the designation, technique and applicable zone for which these techniques relate.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 14-70.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-76 Log #142 NEC-P14 **Final Action: Accept in Part**
(506.25(A) Exception)

TCC Action: The Technical Correlating Committee directs that the Exception to 506.25(A), be revised to read as follows:

"Exception: The specific bonding means shall be required only to the nearest point where the grounded circuit conductor and the grounding electrode are connected together on the line side of the building or structure disconnecting means as specified in 250.32(B), provided the branch-circuit overcurrent protection is located on the load side of the disconnecting means."

This action correlates the exception with the revised text of 250.32 as accepted by Code-Making Panel 5 in Comment 5-58.

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-155
Recommendation: It was the action of the Technical Correlating Committee that this proposal be reconsidered and correlated with the action on Proposal 5-119. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Part
CMP-14 accepts the TCC direction to reconsider the action on Proposal 14-155. CMP-14 recognizes that CMP-5 actions on Proposal 5-119 have revised the application of 506.25(A) Exception. However, the text in 506.25(A) Exception remains correct.
Panel Statement: The text continues to reference applicable requirements: 250.32(A), (B), and (C). No additional action is required from CMP-14 for correlation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 511 COMMERCIAL GARAGES, REPAIR AND STORAGE

14-77 Log #1946 NEC-P14 **Final Action: Accept**
(511.3(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 14-156
Recommendation: Accept the proposal, except in 511.3(A) change "unclassified" to "permitted to be unclassified."
Substantiation: The proposed text is now fully in accordance with the existing NEC text. The submitter respectfully disagrees with CMP 14 relative to editorial merit. The existing NEC syntax is one of the most difficult passages in the entire code, because there are two parallel subsections, each of which overlap the other. For example, you may have a ventilated floor that suggests a lack of classification and a pit that does suggest classification. When this first appeared in the ROP I spent 4 days trying to sort out exactly what went where, finally working long hours over the telephone with Marshall Klein on the 30A Committee. The comment also brings in a more well-rounded selection of extracted material, which provides essential context and assures comprehensive coverage. In the end, we came up with a product that he suggested go into the NEC Handbook as the guide text to 511.3. Please revisit this proposal on its merits.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-78 Log #1947 NEC-P14 **Final Action: Reject**
(511.4(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 14-159
Recommendation: Accept the proposal.
Substantiation: The submitter agrees that the boundary seal referenced in the substantiation for this proposal was erroneously described, and that it would be explosionproof. The reason for the 501.15(A)(4) reference is that historically these areas have been described as Division 1. The Panel may choose to apply a 501.15(B)(2) seal instead. This is a difficult call because the location is generally too rich for ignition, but that richness contributes to an ignition-capable mixture within the conduit system. Clearly the 514.8 seal is a Div. 1 seal. The submitter would appreciate a technical response from CMP 14 on this issue relative to the expected hazardous vapor content within a below grade raceway at these locations.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its prior action, recognizing the difference between an aircraft hangar or dispensing facility, with its large quantities of fuel, and a repair garage, with much smaller quantities. As such, the panel concludes that the area below the repair garage floor is normally not capable of accumulating enough fuel to justify sealing the conduit at its emergence.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-79 Log #143 NEC-P14 **Final Action: Accept**
(511.16(A))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-164
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting in accordance with 4.1.1 of the NEC Style Manual. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Delete the reference to Article 250 in 511.16(A).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 513 AIRCRAFT HANGARS

14-80 Log #144 NEC-P14 **Final Action: Accept (513.16(A))**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-170
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting in accordance with 4.1.1 of the NEC Style Manual. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Delete the reference to Article 250 in 513.16(A).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-81 Log #399 NEC-P14 **Final Action: Accept (513.16(A))**

Submitter: Daniel Leaf, Seneca, SC
Comment on Proposal No: 14-170
Recommendation: Accept the proposal.
Substantiation: Same as proposal. Many sections requiring grounding do not add the phrase "in accordance with Article 250." If grounding is done, it generally has to comply with Article 250 since 250.1(1)(2)(3)(4) is inclusive.
Panel Meeting Action: Accept
Delete the reference to Article 250 in 513.16(A).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 514 MOTOR FUEL DISPENSING FACILITIES

14-82 Log #145 NEC-P14 **Final Action: Accept (514.16)**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 14-181
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to 4.1.1 of the NEC Style Manual. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Delete the reference to Article 250 in 514.16(A).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 515 BULK STORAGE PLANTS

14-83 Log #358 NEC-P14 **Final Action: Accept in Principle (515.7(A))**

Submitter: Code-Making Panel 8,
Comment on Proposal No: 14-184
Recommendation: CMP-8 recommends that CMP-14 accept this proposal in principle with the revised text:

(A) Fixed Wiring. All fixed wiring above Class I locations shall be in metal raceways, ~~or PVC~~ Schedule 80 ~~rigid nonmetallic~~ PVC conduit, Type RTRC conduit listed for and identified for use in areas of physical damage per 355.10(F), ~~or equivalent,~~ or MI, TC, or MC cable.

Substantiation: CMP-8 recommends CMP-14 Accept in Principle Proposal 14-184 with the proposed revision. Type RTRC conduit listed for and identified for use in areas of physical damage per 355.10(F) is the only type RTRC conduit equivalent to Schedule 80 PVC conduit. 355.10(F) is referenced based on the Panel 8 action on Proposal 8-78.

This comment has been balloted through CMP-8 with the following ballot results:

12 Eligible to Vote
12 Affirmative

Mr. R. Loyd voted affirmatively stating: "Proposal 14-184 was to Accept in Principle. I agree with Mr. Burns' recommendation to revise the panel action, however, there is no fiber glass conduit equal to Schedule 80 PVC conduit and I believe omitting the reference to RTRC would make the text more user friendly."

Panel Meeting Action: Accept in Principle
Revise 515.7(A) to read: All fixed wiring above Class I locations shall be in metal raceways, Schedule 80 PVC Conduit, Type RTRC marked with suffix -XW, MI, TC or MC cable.
Panel Statement: The revised text correlates with the panel action on Comment 14-8 and meets the intent of the commenter.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

ARTICLE 516 SPRAY APPLICATION, DIPPING, AND COATING PROCESSES

14-84 Log #1252 NEC-P14 **Final Action: Accept in Principle (516.10(A)(6), 516.10(B)(4) and 516.10(C)(4)(b))**

TCC Action: The Technical Correlating Committee directs that the FPN added by the panel be revised to read as follows:

"FPN: For more information on grounding and bonding for static electricity purposes, see NFPA 33 - Standard for Spray Application Using Flammable or Combustible Materials, NFPA 34 - Standard for Dipping and Coating Processes Using Flammable or Combustible Liquids and NFPA 77 - Recommended Practice on Static Electricity."

This action corrects the implied mandatory reference to NFPA 33, 34, and 77 by the FPN accepted by the panel.

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 14-22
Recommendation: Reject the Panel's action on 516.10(A)(6), 516.10(B)(4) and 516.10(C)(4)(b) and modify the text as follows:

Revise 516.10(A)(6) as follows:

(6) Grounding. All electrically conductive objects in the spray area, except those objects required by the process to be at high voltage, shall be ~~adequately~~ electrically bonded and grounded. This requirement shall apply to paint containers, wash cans, guards, hose connectors, brackets, and any other electrically conductive objects or devices in the area.

Revise 516.10(B)(4) as follows:

(4) Electrostatic Equipment. All electrically conductive objects in the spraying area shall be ~~adequately~~ electrically bonded and grounded. This requirement shall apply to paint containers, wash cans, and any other electrical conductive objects or devices in the area. The equipment shall carry a prominent, permanently installed warning regarding the necessity for this grounding feature.

Revise 516.10(C)(4)(b) as follows:

(b) All electrically conductive objects within the powder-coating area shall be ~~adequately~~ electrically bonded and grounded. The powder-coating equipment shall carry a prominent, permanently installed warning regarding the necessity for grounding these objects.

Substantiation: The term "adequately grounded" is not defined and appears to be in conflict with 3.2.1 of the NEC Style Manual which states, "The NEC shall not contain references or requirements that are unenforceable or vague." Also, the Panel statement indicates that "Any paint can, wash can, bracket, etc. that was sitting on a grounded concrete floor would be considered grounded but would not likely be adequately grounded." The definition of "Grounded (Grounding)" in Proposal 5-9 is "Connected to ground or to a conductive body that extends the ground connection." A paint can "sitting" on a grounded concrete floor would not likely be considered "connected" as required by the definition. However, to address the Panel's concerns the term "adequately grounded" should be changed to "electrically bonded and grounded" which is consistent with the terminology used in other spray application, dipping and coating process standards including NFPA 33-2003, *Standard for Spray Application Using Flammable and Combustible Materials*, and NFPA 34-2003, *Standard for Dipping and Coating Processes Using Flammable or Combustible Liquids*.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr. The following is the minority negative ballot comment by one Task Group member during the Task Group's results balloting:

"4. Comment (include proposed new wording, or identification of wording to be deleted):

Reject the Panel's action on 516.10(A)(6), 516.10(B)(4) and 516.10(C)(4)(b) and modify the text as follows:

Revise 516.10(A)(6) as follows:

(6) Bonding ~~Grounding~~. All electrically conductive objects in the spray area, except those objects required by the process to be at high voltage, shall be ~~adequately~~ bonded ~~grounded~~. This requirement shall apply to paint containers, wash cans, guards, hose connectors, brackets, and any other electrically conductive objects or devices in the area.

Revise 516.10(B)(4) as follows:

(4) Electrostatic Equipment. All electrically conductive objects in the spraying area shall be ~~adequately~~ bonded ~~grounded~~. This requirement shall apply to paint containers, wash cans, and any other electrical conductive objects or devices in the area. The equipment shall carry a prominent, permanently installed warning regarding the necessity for this bonding requirement ~~grounding feature~~.

Revise 516.10(C)(4)(b) as follows:

(b) All electrically conductive objects within the powder-coating area shall be ~~adequately~~ bonded ~~grounded~~. The powder-coating equipment shall carry a prominent, permanently installed warning regarding the necessity for bonding ~~grounding~~ these objects.

5. Statement of Problem and Substantiation for Comment:

The term "adequately grounded" is not defined and appears to be in conflict with 3.2.1 of the NEC Style Manual which states, "The NEC shall not contain references or requirements that are unenforceable or vague."

As indicated in the Panel statement, these sections refer to electrostatic painting operations and thus the goal is to have conductive objects "bonded" and not "grounded". CMP-5 accepted a revised definition for "Bonding (Bonded)" in Proposal 5-2. The accepted definition reads, "Connected to establish electrical continuity and conductivity." CMP-5 also accepted a change to the definition of "Grounded" in Proposal 5-9. The accepted definition reads, "Grounded (Grounding) Connected to ground or to a conductive body that extends the ground connection." The definition of the term "Ground" has been revised in Proposal 5-8 as "The earth." So, it does not seem Panel 14's intent is to have the language in these sections mean, "All electrically conductive objects" such as paint containers, wash cans, and any other electrical conductive objects "shall be adequately connected to earth."

Also, the Panel statement indicates that "Any paint can, wash can, bracket, etc. that was sitting on a grounded concrete floor would be considered grounded but would not likely be adequately grounded." A paint can "sitting" on a grounded concrete floor would not likely be considered "connected" as required by the definition.**"**

Panel Meeting Action: Accept in Principle

Add a fine print note to each of these three sections to read:

FPN: Criteria for grounding for this purpose can be found in NFPA 33 and NFPA 34. See also NFPA 77.

Panel Statement: The panel reconsidered the language and determined that "adequately grounded" is the proper term for this concept and added a fine print note to refer the user to more detailed documents.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-85 Log #1253 NEC-P14 **Final Action: Accept (516.10(C)(1))**

Submitter: Neil F. LaBrake, Jr., Syracuse, NY

Comment on Proposal No: 14-22

Recommendation: Continue to accept the Panel's actions on 516.10(C)(1) as modified by proposal 14-191.

Substantiation: The CMP-14 revisions to the proposal have been made for clarity and continue to be consistent with the Grounding and Bonding Task Group's original initiatives.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-86 Log #146 NEC-P14 **Final Action: Accept (516.16)**

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 14-193

Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to 4.1.1 of the NEC Style Manual. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Delete the reference to Article 250 in 516.16(A).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

ARTICLE 517 HEALTH CARE FACILITIES

15-2 Log #400 NEC-P15 **Final Action: Reject (517.2)**

Submitter: Daniel Leaf, Seneca, SC

Comment on Proposal No: 15-3

Recommendation: Accept the proposal.

Substantiation: Ungrounded circuits may be supplied from an isolating (isolation) transformer with a grounded secondary such as a 2-wire 240 volt circuit from a 120/240 volt secondary which is grounded. The proposal should be judged on merit, not conformance to other standards.

Panel Meeting Action: Reject

Panel Statement: Proposal 15-3 suggests additional language that would expand the definition beyond its current scope. The existing definition includes language: "...and its ungrounded circuit conductors", which clearly indicates the secondary circuit conductors must be ungrounded.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-3 Log #431 NEC-P15 **Final Action: Reject (517.2)**

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 15-5

Recommendation: Accept proposal.

Substantiation: See proposal substantiation. Proposal should be judged on merit not whether it conforms to other standards.

Panel Meeting Action: Reject

Panel Statement: The terms "isolation", "isolating" and "isolated" are used to state the purpose, performance and condition of the specific equipment and/or system. The terms are clearly understood in their context as used.

It is the intent of the panel to use extracted material whenever possible in order to maintain consistency between documents. In this case, the source document is NFPA 99.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-4 Log #1634 NEC-P15 **Final Action: Accept in Principle (517.2)**

TCC Action: The Technical Correlating Committee directs that the FPN following the title of Article 517 be revised to read as follows:

"FPN: Rules that are followed by a reference in brackets contain text that has been extracted from NFPA 99-2002, Standard for Health Care Facilities and NFPA 101-2006, Life Safety Code. Only editorial changes were made to the extracted text to make it consistent with this Code."

This revision is necessary to accommodate the addition of extract material from NFPA 101.

Submitter: Marvin J. Fischer, Monroe Township, NJ

Comment on Proposal No: 15-6

Recommendation: Accept Proposal 15-6.

Substantiation: It is not within the scope of the National Electrical Code project to define the various types of health care facilities that exist within the U.S. This is the responsibility of the T/C on Safety to Life.

Panel Meeting Action: Accept in Principle

Revise Ambulatory Health Care Facility to read as follows:

Ambulatory Health Care Occupancy. A building or portion thereof used to provide services or treatment simultaneously to four or more patients that provides, on an outpatient basis, one or more of the following:

(1) treatment for patients that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others;

(2) anesthesia that renders the patients incapable of taking action for self-preservation under emergency conditions without the assistance of others;

(3) emergency or urgent care for patients who, due to the nature of their injury or illness, are incapable of taking action for self-preservation under emergency conditions without the assistance of others. [101:3.3.168.1]

Panel Statement: The panel understands that the intent of the submitter is to correlate with the definition from LSC 101. The panel agrees with the submitter.

The panel requests the Standards Council to review and clarify the ownership of definitions common to NFPA 99, LSC 101 and NFPA 70.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-5 Log #1635 NEC-P15 **Final Action: Reject (517.2)**

Submitter: Marvin J. Fischer, Monroe Township, NJ

Comment on Proposal No: 15-7

Recommendation: Accept Proposal 15-7.

Substantiation: NFPA Standards Council has written that it wants one definition of a term used in NFPA documents. It is not within the scope of the National Electrical Code project to define the parameters of an anesthetizing location.

Panel Meeting Action: Reject

Panel Statement: The panel action on Proposal 15-1 retains the existing definition for "Anesthetizing Location" contained in NFPA 70. This action is consistent with provisions of the NFPA Glossary of Terms, Section 2.1.2(b) for Secondary Definitions.

NFPA 70, as an international document, should continue to recognize the use of flammable anesthesia.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-6 Log #1636 NEC-P15 **Final Action: Accept in Principle (517.2)**

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-8
Recommendation: Accept Proposal 15-8.
Substantiation: Term "critical branch" originated in the 1960s by the T/C on Essential Electrical Systems (NFPA 76A) when it established requirements for essential electrical systems in health care facilities.
Panel Meeting Action: Accept in Principle
Revise Critical Branch to read as follows:
Critical Branch. A subsystem of the emergency system consisting of feeders and branch circuits supplying energy to task illumination, special power circuits, and selected receptacles serving areas and functions related to patient care and that are connected to alternate power sources by one or more transfer switches during interruption of normal power source. [99:3.3.26]
Panel Statement: The panel understands that the intent of the submitter is to correlate with the definition from NFPA 99. The panel agrees with the submitter.
The panel requests the Standards Council to review and clarify the ownership of definitions common to NFPA 99, LSC 101 and NFPA 70. The NFPA Glossary of Terms currently indicates that NFPA 70 is the responsible document for this definition.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-7 Log #1637 NEC-P15 **Final Action: Reject (517.2)**

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-9
Recommendation: Accept Proposal 15-9.
Substantiation: Conform to NFPA Standards Council policy on one definition for a term. Not within the scope of the National Electrical Code project to define parameters of a critical (patient) care area.
Panel Meeting Action: Reject
Panel Statement: There are sufficient differences between the definitions and, as such, an extract reference is not appropriate.
The panel action on Proposal 15-1 retains the existing definition for "Critical Care Area" contained in NFPA 70. This action is consistent with the provisions of NFPA Glossary of Terms, Section 2.1.2(b) for Secondary Definitions.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
SEABURY, III, J.: The proposal should be Accepted in Principle. NFPA 99 should be responsible for this term.

15-8 Log #1638 NEC-P15 **Final Action: Accept (517.2)**

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-10
Recommendation: Accept Proposal 15-10.
Substantiation: T/C on Safe Use of Electricity in Patient Care Areas of Health Care Facilities created and defined term "electrical life support equipment" in 1980s. Question NFPA Glossary of Terms assignment of responsibility for this term.
Panel Meeting Action: Accept
Panel Statement: The panel requests the Standards Council to review and clarify the ownership of definitions common to NFPA 99, LSC 101 and NFPA 70.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-9 Log #1639 NEC-P15 **Final Action: Reject (517.2)**

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-11
Recommendation: Correlate use of term "Emergency System" in Article 700 with same term as used in Article 517.
Substantiation: Term "emergency system" was created and defined by the T/C on Essential Electrical Systems in the 1960s. Both Article 517 and Article 700 use the term. Article 517 uses the term in the same way that NFPA 99 uses the term. Article 700 has a different meaning for the term, correlation is required.
Panel Meeting Action: Reject
Panel Statement: The term "Emergency System" as applied in Article 517 is not in conflict with use of the term in Article 700. There is correlation between the appropriate parts of each article by means of reference(s) in each to the other.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:
SEABURY, III, J.: Correlation of the term "Emergency System" is required by the Technical Correlating Committee. 517.2 and NFPA 99 define this term as it relates to healthcare facilities. 700.1 has a much broader definition.

15-10 Log #1640 NEC-P15 **Final Action: Reject (517.2)**

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-12
Recommendation: Accept Proposal 15-12.
Substantiation: 1. Term "equipment system" was created and defined by the T/C on Essential Electrical Systems in the 1960s. Both Article 517 and Article 700 use the term, and use the term in the same way. Question NFPA Glossary of Terms assignment of responsibility for this term.
2. Article 700 has a different meaning for the term. Correlation is required.
Panel Meeting Action: Reject
Panel Statement: There are sufficient differences between the definitions and, as such, an extract reference is not appropriate.
Use of the defined term "Equipment System" is unique to Article 517 in NFPA 70. It is not used in Article 700 as a defined system or portion of a system. Correlation is not needed.
The panel requests the Standards Council to review and clarify the ownership of definitions common to NFPA 99, LSC 101 and NFPA 70.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-11 Log #1641 NEC-P15 **Final Action: Accept in Principle (517.2)**

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-13
Recommendation: Accept Proposal 15-13.
Substantiation: Term "essential electrical system" was originated in the 1960s by the T/C on Essential Electrical Systems (NFPA 76A) when it established requirements for essential electrical systems in health care facilities. Question NFPA Glossary of Terms assignment of responsibility for this term.
Panel Meeting Action: Accept in Principle
Revise Essential Electrical System to read as follows:
Essential Electrical System. A system comprised of alternate sources of power and all connected distribution systems and ancillary equipment, designed to ensure continuity of electrical power to designated areas and functions of a health care facility during disruption of normal power sources, and also to minimize disruption within the internal wiring system. [99 3.3.44]
Panel Statement: The panel understands that the intent of the submitter is to correlate with the definition from NFPA 99. The panel agrees with the submitter.
The panel requests the Standards Council to review and clarify the ownership of definitions common to NFPA 99, LSC 101 and NFPA 70. The NFPA Glossary of Terms currently indicates that NFPA 70 is the responsible document for this definition.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-12 Log #1642 NEC-P15 **Final Action: Reject (517.2)**

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-14
Recommendation: Accept Proposal 15-14.
Substantiation: T/C on Safe Use of Inhalation Anesthetics created and defined the term "flammable anesthetizing location" in 1930s. Question NFPA Glossary of Terms assignment of responsibility for this term.
Panel Meeting Action: Reject
Panel Statement: This definition is not in the body of NFPA 99. The submitter references material contained in an informative annex and since the annex is not mandatory text, an extract is not appropriate.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-13 Log #1643 NEC-P15 **Final Action: Accept in Principle (517.2)**

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-15
Recommendation: Accept Proposal 15-15.
Substantiation: T/C on Safe Use of Electricity in Patient Care Areas of Health Care Facilities created and defined term "general care area" in 1970s. Term was revised for 2005 edition of NFPA 99.
Not within the scope of the National Electrical Code project to determine parameters of a general (patient) care area.

Panel Meeting Action: Accept in Principle

Revise General Care Areas to read as follows:

General Care Areas. Patient bedrooms, examining rooms, treatment rooms, clinics, and similar areas in which it is intended that the patient will come in contact with ordinary appliances such as a nurse-call system, electric beds, examining lamps, telephones, and entertainment devices. [99:3.3.138.2]

Panel Statement: The panel understands that the intent of the submitter is to correlate with the definition from NFPA 99. The panel agrees with the submitter.

The panel requests the Standards Council to review and clarify the ownership of definitions common to NFPA 99, LSC 101 and NFPA 70.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-14 Log #1644 NEC-P15 **Final Action: Reject (517.2)**

Submitter: Marvin J. Fischer, Monroe Township, NJ

Comment on Proposal No: 15-17

Recommendation: Accept Proposal 15-17.

Substantiation: 1. Standards Council has stated that it wants one definition for a term used in NFPA documents. There should not be differences in definitions between same term used by two NFPA documents (per NFPA Standards Council).

2. It is not within the scope of the National Electrical Code project to define parameters of a health care facility.

Panel Meeting Action: Reject

Panel Statement: There are sufficient differences between the definitions and, as such, an extract reference is not appropriate.

The panel action on Proposal 15-1 retains the existing definition for "Critical Care Area" contained in NFPA 70. This action is consistent with the provisions of NFPA Glossary of Terms, Section 2.1.2(b) for Secondary Definitions.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-15 Log #1645 NEC-P15 **Final Action: Accept (517.2)**

TCC Action: The Technical Correlating Committee understands that the panel action results in "[NFPA 99: 3.3.96]" being added to the definition of "Life Safety Branch".

Submitter: Marvin J. Fischer, Monroe Township, NJ

Comment on Proposal No: 15-19

Recommendation: Accept Proposal 15-19.

Substantiation: Term "life safety branch" originated in the 1960s by the T/C on Essential Electrical Systems (NFPA 76A) when it established requirements for essential electrical systems in health care facilities.

Panel Meeting Action: Accept

Panel Statement: The panel requests the Standards Council to review and clarify the ownership of definitions common to NFPA 99, LSC 101 and NFPA 70.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-16 Log #1646 NEC-P15 **Final Action: Accept in Principle in Part (517.2)**

Submitter: Marvin J. Fischer, Monroe Township, NJ

Comment on Proposal No: 15-22

Recommendation: Accept in Part Proposal 15-22. Revise definition of "patient care area" as recommended by Mr. Erickson in his negative vote.

Substantiation: Standards Council has stated that it wants one definition for a term used in NFPA documents. Not within the scope of the National Electrical Code project to define parameters of a patient care area.

Panel Meeting Action: Accept in Principle in Part

Revise Patient Care Area to read as follows:

Patient Care Area. Any portion of a health care facility wherein patients are intended to be examined or treated. Areas of a health care facility in which patient care is administered are classified as general care areas or critical care areas, ~~either of which may be classified as a wet location.~~ The governing body of the facility designates these areas in accordance with the type of patient care anticipated and with the following definitions of the area classification.

FPN: Business offices, corridors, lounges, day rooms, dining rooms, or similar areas typically are not classified as patient care areas.

Revise Wet Locations to read as follows:

Wet Locations. Those spaces within patient care areas where a procedure is performed and that are normally subject to wet conditions while patients are present. These include standing fluids on the floor or drenching of the work area, either of which condition is intimate to the patient or staff. Routine housekeeping procedures and incidental spillage of liquids do not define a wet location.

Panel Statement: The panel accepts the submitter's recommendation pertaining to the definition of patient care area.

The panel rejects the submitter's recommendation to remove reference to governing bodies.

The panel rejects the changes to the definition to wet locations and provides alternate text that better defines the location. This text addresses the submitter's desire to better correlate with NFPA 99.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-17 Log #2329 NEC-P15 **Final Action: Accept in Principle (517.2)**

Submitter: Marcus Sampson, Lysistrata Electric

Comment on Proposal No: 15-4

Recommendation: The panel should review the merits of this proposal.

The term "Wet Locations" should should be change to "Wet Procedure Areas" to clearly differentiate the condition.

Substantiation: While inspectors and installers familiar with the long-time NEC classifications of patient care areas in health care facilities (may) understand the distinction between "Location, Wet" as defined in Article 100 and and "Wet Locations" as used in Article 517, adopting this proposal eliminates an unnecessarily subtle nuance.

Code requirements should not be esoteric.

Users should find clear, readily understood terms that are used consistently throughout the document. This minor change would result in a better understanding of the meaning of the term. For consistency and clarity, "Patient Care Areas" should be divided into three other types of AREAS - not two types of "areas" and one type of "location."

517.18 General Care Areas

517.19 Critical Care Areas

517.20 Wet Procedure Areas

While the panel's response indicates that the change would not comply with the NEC Style Manual for extracted text, Article 517 is not made up entirely of extractions from NFPA 99. The submitter did indicate that this proposal was also sent to that committee.

Panel Meeting Action: Accept in Principle

Change the title of "Wet Locations" to "Wet Procedure Locations".

Panel Statement: The panel agrees with the submitter to change the title of the definition. The panel replaces the word "areas" with "locations" because it is a location within an area.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-17a Log #CC1500 NEC-P15 **Final Action: Accept (517.2, 517.20, 517.20(A) and 517.60)**

Submitter: Code-Making Panel 15,

Comment on Proposal No: 15-4

Recommendation: Change the terms "wet location" to "wet procedure location" and "wet locations" to "wet procedure locations" in Section 517.2, 517.20, 517.20(A) and 517.60.

Substantiation: This is required as the title was changed. See panel action and statement in Comment 15-17.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-18 Log #1257 NEC-P15 **Final Action: Accept (517.13(B) Exception No. 1, 517.18.(B), 517.19(B)(2), and 517.19(D))**

Submitter: Neil F. LaBrake, Jr., Syracuse, NY

Comment on Proposal No: 15-2

Recommendation: Continue to accept the following portions of the TCC Grounding and Bonding Task Group proposal 15-2 as modified and revised by the actions of CMP-15 for which the TCC Grounding and Bonding Task Group agrees with the CMP-15 editorial revisions to the Sections 517.13(B) Exception No. 1, 517.18(B), 517.19(B)(2), and 517.19(D).

Substantiation: TCC Grounding and Bonding Task Group understands the revisions to the proposal have been made for clarity and continue to be consistent with the Grounding and Bonding Task Group's original initiatives.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other th an "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-19 Log #783 NEC-P15 **Final Action: Accept in Principle in Part (517.13(B) Exception No. 2)**

Submitter: David G. Humphrey, Midlothian, VA
Comment on Proposal No: 15-28
Recommendation: Revise text to read as follows:

Luminaires (light fixtures) more than 2.3 m (7 1/2 ft) above the floor and switches located outside of the patient vicinity shall ~~not be required to be grounded by an insulated equipment grounding conductor.~~ be permitted to be grounded by the metal raceway system, or metallic cable armor, or sheath assembly complying with 517.13(A).

Substantiation: The existing text of 517.13(B) Exception No. 2 permits the omission of an insulated equipment grounding conductor for luminaires more than 7 1/2 ft above the floor and switches located outside of the patient vicinity. A literal reading of 517.13(B)(would require an insulated "copper" equipment grounding conductor with Exception No. 2 merely permitting this copper conductor to be uninsulated. 517.13(A) requires a metal raceway system, or metallic cable armor, or sheath assembly qualifying as an equipment ground return path in accordance with 250.118 as a wiring method for fixed electric equipment in patient care areas. The proposed text revision would both reinforce the requirements of 517.13(A) and clarify that an insulated equipment grounding conductor, copper or otherwise for luminaires located more than 7 1/2 ft above the floor or switches located outside of the patient vicinity is optional.

Panel Meeting Action: Accept in Principle in Part

Revise Exception No. 2 to read as follows:

Exception No. 2: Luminaires (light fixtures) more than 2.3 m (7 1/2 ft.) above the floor and switches located outside of the patient vicinity shall ~~not be required to be grounded by an insulated equipment grounding conductor.~~ be permitted to be connected to an equipment grounding return path complying with 517.13(A).

Panel Statement: The panel accepts the removal of the wording referring to an insulated equipment grounding conductor.

The panel rejects reference to specific wiring system methods and instead references to an equipment grounding return path complying with 517.13(A).

The revised wording provides clarity while meeting the submitter's intent.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-20 Log #1422 NEC-P15 **Final Action: Hold (517.17(B))**

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 15-29
Recommendation: NEMA recommends that Proposal 15-29 be Accept as written.
Substantiation: In order to provide the reliability in the essential electrical system that the CMP wants, multiple levels of GFP (ground fault protection) must be provided for the following reasons:

1. Ground faults are the most common form of faults in a operating electrical system. Multiple levels of GFP on both the normal and alternate source sides of the system are needed to isolate such faults as close to their point of occurrence as possible, thus providing a level of selective coordination and yielding the minimum disruption to the essential electrical system. It would seem that minimizing such disruption is even more important when a ground fault has occurred.

2. Closing a transfer switch or a generator into a ground fault presents the real possibility of damaging the transfer switch, or generator, or both, thus potentially decreasing system reliability.

As Mr. Wiseman pointed out in his negative comment, the panel statement is incorrect. The proposed deletion does not establish a conflict. The conflict is in the existing language since the additional level of ground-fault protection is prohibited in portions of the essential electrical system that could be fed from the alternate power source, while Article 700 actually permits ground-fault protection at the source. There is no substantiation that deviating from the requirement in Article 700 for ground-fault protection enhances the reliability of the system.

The panel statement suggests that most generators are small and, therefore, the risk of burn-down is not an issue. That statement may be accurate, but has no relevance to this discussion since the requirement for ground-fault protection is triggered by the size of the service disconnect in 230.95 or the feeder in 215.10. Therefore, the smaller generators which do not include a feeder disconnect rated 1000A or greater are not required to have ground-fault protection.

There has been no evidence presented or substantiation presented in the panel statement that supports rejecting this proposal.

Panel Meeting Action: Hold
Panel Statement: The panel holds both Proposal 15-29 and Comment 15-20.

The panel contents that this issue requires further review, study and discussion to understand the complexity in terms of coordination and protection (including energy produced by standby generator). The panel cannot adequately address these issues at this time and therefore recommends to place the proposal and comment on hold and create a task group to research further.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-21 Log #2233 NEC-P15 **Final Action: Hold (517.17(B))**

Submitter: Eugene E. Morgan, Clakamas County, Building Codes Divison
Comment on Proposal No: 15-29
Recommendation: Panel 15 should reconsider the merits of this proposal. The submitter's intent could be met and clarified with a revision of existing and new text, rather than a deletion as originally proposed:

517.15(B) Feeders. Revise last sentence of main paragraph as follows and add new text:

The additional levels of ground-fault protection shall not be ~~installed as follows~~: required on the following systems:

(1) On the load side of an essential electrical system transfer switch, where the alternate power source is 750 kVA or less

(2) Between the on-site generating unit(s) described in 517.35(B) and the essential electrical system transfer switch(es), where the alternate power source is 750 kVA or less

(3) On electrical systems that are not solidly grounded wye systems with greater than 150 volts to ground but not exceeding 600 volts phase-to-phase

Essential electrical systems where the alternate power source is rated over 750 kVA, and the system is designed under qualified engineering supervision, shall be permitted to have ground-fault protection. Where the alternate power source is 750 kVA or less, ground-fault detection shall be provided in accordance with 700.7(D), and shall include detection at the second level of feeders as specified in this section.

Substantiation: I respectfully disagree with the panel's action and statement on three points:

(1) The original submittal, and the comment submitted herewith are not in conflict with 700.7(D), which provides for ground-fault detection. Article 700 provides for ground-fault detection, but it does not prohibit the use of ground-fault protection.

(2) Section 700.26 states that ground-fault protection shall not be required, but it is not prohibited.

(3) There is a trend toward larger regional hospitals with generators that exceed 1 megawatt of output. The original proposal gave the example of an 8 megawatt installation. In the jurisdiction that I serve, there is a new hospital generator system installation rated at 4.5 megawatts. The argument that a majority of hospitals have smaller alternate power sources does not answer the need for safety in the newer, larger installations. In the 4.5 megawatt system installed locally, the available fault current at the first transfer switch is 51,800 amps. The potential for a system meltdown in the event of a fault actually exceeds the fault current and potential damage from the utility transformers.

There should be some valid point at which ground-fault protection is needed. It is true that small alternate power sources should have ground-fault detection, and not ground-fault protection. The distinction between systems over 750 kVA (typically 1 megawatt or larger), and those 750 kVA or under, distinguishes between systems where available fault current would be significant. With the revision outlined above, the provision for an engineer to utilize ground-fault protection is available, but it is clearly at the engineer's discretion and not mandatory. This is also an opportunity to point out that Section 700.7(D) provides for ground-fault detection, which should always be installed when ground-fault protection is not an option.

Panel Meeting Action: Hold
Panel Statement: The panel holds both Proposal 15-29 and Comment 15-21.

The panel contents that this issue requires further review, study and discussion to understand the complexity in terms of coordination and protection (including energy produced by standby generator). The panel cannot adequately address these issues at this time and therefore recommends to place the proposal and comment on hold and create a task group to research further.

Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-22 Log #2352 NEC-P15 **Final Action: Hold (517.17(B))**

Submitter: Alan Manche, Square D Company
Comment on Proposal No: 15-29
Recommendation: The Panel should reconsider Proposal 15-29 and Accept it.
Substantiation: In order to provide the reliability in the essential electrical system that the CMP wants, multiple levels of GFP (ground fault protection) must be provided, once the first level is provided, for the following reasons:

1. Ground faults are the most common form of faults in an operating electrical system. Multiple levels of GFP on both the normal and alternate source sides of the system are needed to isolate such faults as close to their point of occurrence as possible, thus providing a level of selective coordination and yielding the minimum disruption to the essential electrical system. It would seem that minimizing such disruption is even more important when a ground fault has occurred.

2. Closing a transfer switch or a generator into a ground fault presents the real possibility of damaging the transfer switch, or generator, or both, thus potentially decreasing system reliability.

As Mr. Wiseman pointed out in his negative comment, the panel statement is incorrect. The proposed deletion does not establish a conflict. The conflict is in the existing language since the additional level of ground-fault protection is prohibited in portions of the essential electrical system that could be fed from the alternate power source, while NEC 700 actually permits ground-fault protection at the source. There is no substantiation indicating a need to amend NEC Article 700 for NEC 517 installations nor is there substantiation that disallowing a properly installed ground-fault protection system will enhance the reliability of the system.

The panel statement suggests that most generators are small and therefore the risk of burn-down is not an issue. That statement may be accurate but has no relevance to this discussion since the requirement for ground-fault protection is triggered by the size of the service disconnect in 230.95 or the feeder in 215.10. Therefore, the smaller generators which do not include a feeder disconnect rated 1000A or greater are not required to have ground-fault protection, and this revision would have no impact on them.

There has been no evidence presented or substantiation presented in the panel statement that supports rejecting this proposal.

Panel Meeting Action: Hold

Panel Statement: The panel holds both Proposal 15-29 and Comment 15-21.

The panel contents that this issue requires further review, study and discussion to understand the complexity in terms of coordination and protection (including energy produced by standby generator). The panel cannot adequately address these issues at this time and therefore recommends to place the proposal and comment on hold and create a task group to research further.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-23 Log #2051 NEC-P15 **Final Action: Hold**
(517.17(B)(2))

Submitter: Hugh O. Nash, Jr., Nash Lipsey Burch

Comment on Proposal No: 15-29

Recommendation: Continue to reject 15-29 which applies to 517.17 Ground-Fault Protection. Add the following sentence to 517.17(B)(2):

For solidly grounded wye-emergency systems of more than 150 volts to ground and circuit-protective devices rated 1000 or more, refer to 700.7(D).

(Note: The intent is to refer to the language in the 2005 edition. If this wording is deleted, the entire text of 517.17(B)(2) shall be added here.)

Substantiation: Regardless of the size of the alternate source, ground-fault interruption on the alternate source overcurrent device can cause interruption of the alternate source feed to health care facility essential system loads. Automatic disconnecting should not be provided under any circumstances. 517.17(B) states, "The additional levels of ground-fault protection shall not be installed as follows: (1) On the load side of the essential electrical system transfer switch, (2) Between the onsite generating unit as described in 517.35(B) and the essential electrical system transfer switch(es). For many years, 517.17 warned against placing GFP interruption between the alternate source and the transfer switch(es). This warning has now become a prohibition. There are documented instances where GFP interrupted the normal source and the alternate source, leaving critical care areas without normal or alternate power.

Panel Meeting Action: Hold

Panel Statement: The panel holds both Proposal 15-29 and Comment 15-21.

The panel contents that this issue requires further review, study and discussion to understand the complexity in terms of coordination and protection (including energy produced by standby generator). The panel cannot adequately address these issues at this time and therefore recommends to place the proposal and comment on hold and create a task group to research further.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-24 Log #831 NEC-P15 **Final Action: Reject**
(517.18(B))

Submitter: Daniel Eagle, Sacred Heart Medical Center

Comment on Proposal No: 5-34

Recommendation: The NEC job is to make sure electrical equipment is installed safely. Its job is not to give us a false since of security. If the indicator light burns out on the outlet, and the hospital staff panic and unplug a working outlet. The patient is being put into an unknown risk. I am sure, the hospital staff is trained to verify the systems that they are plugging in are working correctly. The manufacture of the outlets will say the lights will burn for hundreds or hours without a problem. I have seen the cleaning process short out indicator lights on equipment before.

Substantiation: The NEC job is to make sure electrical equipment is installed safely. Its job is not to give us a false since of security. If the indicator light burns out on the outlet, and the hospital staff panic and unplug a working outlet. The patient is being put into an unknown risk. I am sure the hospital staff is trained to verify the systems that they are plugging in, are working correctly. The manufacture of the outlets will say the lights will burn for hundreds or hours without a problem. I have seen the cleaning process short out indicator lights on equipment before.

Panel Meeting Action: Reject

Panel Statement: No recommended text is provided with the comment as required by 4-3.3(c) of the Regulations Governing Committee Projects.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-26 Log #2163 NEC-P15 **Final Action: Accept**
(517.18(B) and 517.19 (B) (2))

Submitter: Susan B. McLaughlin, SBM Consulting, Ltd. / Rep. NFPA Health Care Section Executive Board

Comment on Proposal No: 15-34

Recommendation: Reject this Proposal.

Substantiation: In reviewing this new requirement, the NFPA Health Care Section Executive Board is of the opinion that the need for indicator lights on receptacles should not become a minimum standard. Panel 15 appears to have reacted to a proposal based on one reported incident. Is the fix a mechanical one or is there a better way to resolve the issue with better staff training, panel schedules, etc.? All newly installed critical care outlets are required to have the circuit number labeled on the front so that staff can quickly determine if the outlets are on the same circuit. If a hospital wants to install devices with illuminated faces or indicator lights, they are permitted to do so as this exceeds the Code. A code is a set of standards that shall have substantial justification behind the need and should not be changed as a result of a few isolated instances where the staff may not have been properly trained on the environment in which they are working.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-27 Log #2103 NEC-P15 **Final Action: Accept**
(517.18(B) and 517.19 (B)(2))

Submitter: Stephen J. Grose, The Washington State Society for Healthcare Engineering

Comment on Proposal No: 15-34

Recommendation: Reject this proposal.

Substantiation: In reviewing this new requirement, it is the opinion of the Washington State Society for Healthcare Engineering that the need for indicator lights on receptacles should not become a minimum standard. One reported incident should not justify a new code without careful consideration and a significant review of incident locations facilities emergency preparation and response. Most hospitals have tied critical equipment into UPS sources that will initiate alarms when activated allowing for a period of time to react without jeopardizing patient safety. Best practices would stipulate panel labeling at the outlet and multiple breakers to feed one room to offset just this issue. Code revision based on this incident will set a precedent that would make code revisions reactive and not proactive raising the already high costs to build and operate our facilities. The primary responsibility of healthcare engineering is to ensure the environmental health and safety of the patients, facilities, and staff we serve. If the code recommendation could not be off set by effective emergency plans, staff training, and following existing code standards, I would support this code. A proactive review of the incident should show one of these tree elements were missing.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-25 Log #264 NEC-P15 **Final Action: Accept**
(517.18(B) and 517.19(B)(2))

Submitter: Stanley J. Folz, Morse Electric, Inc.

Comment on Proposal No: 15-34

Recommendation: Delete the text as amended by the CMP.

Substantiation: I am in agreement with all of the negative comments from the CMP-15 members.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-28 Log #795 NEC-P15 **Final Action: Accept**
(517.18(B) and 517.19(B)(2))

Submitter: Douglas S. Erickson, American Society for Healthcare Engineering (ASHE)
Comment on Proposal No: 15-34
Recommendation: Reject this proposal.
Substantiation: In reviewing this new requirement, the American Society for Healthcare Engineering is of the opinion that the need for indicator lights on receptacles should not become a minimum standard. Panel 15 appears to have reacted to a proposal based on one reported incident. Is the fix a mechanical one or is there a better way to resolve the issue with better staff training, panel schedules, etc? All newly installed critical care outlets are required to have the circuit number labeled on the front so that staff can quickly determine if the outlets are on the same circuit. If a hospital wants to install devices with illuminated faces or indicator lights, they are permitted to do so as this exceeds the Code. A code is a set of standards that shall have substantial justification behind the need and should not be changed as a result of a few isolated instances where the staff may not have been properly trained on the environment in which they are working.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-29 Log #1031 NEC-P15 **Final Action: Reject**
(517.18(B) and 517.19(B)(2))

Submitter: Philip Kercher, Sacred Heart Medical Center
Comment on Proposal No: 5-34
Recommendation: I am opposed to this proposed new text, which requires a receptacle to have an indication light. As a healthcare Facility Manager for 24 years, my experience indicates no significant added value from this proposal.
Substantiation: Strongly opposed to the proposal.
Panel Meeting Action: Reject
Panel Statement: No recommended text is provided with the proposal as required by 4-3.3(c) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-30 Log #1476 NEC-P15 **Final Action: Accept**
(517.18(B) and 517.19(B)(2))

Submitter: Chad E. Beebe, Washington State Department of Health / Rep. NFPA HCS Codes & Standards Review Committee
Comment on Proposal No: 15-34
Recommendation: Reject this proposal.
Substantiation: In reviewing this new requirement, the codes and standards review committee is of the opinion that the need for indicator lights on receptacles should not become a minimum standard. Panel 15 appears to have reacted to a proposal based on one reported incident. Is the fix a mechanical one or is there a better way to resolve the issue with better staff training, panel schedules, etc. All newly installed critical care outlets are required to have the circuit number labeled on the front so that staff can quickly determine if the outlets are on the same circuit. If a hospital wants to install devices with illuminated faces or indicator lights, they are permitted to do so as this exceeds the code. A code is a set of standards that shall have substantial justification behind the need and should not be changed as a result of a few isolated instances where the staff may not have been properly trained on the environment in which they are working.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-31 Log #1695 NEC-P15 **Final Action: Accept**
(517.18(B) and 517.19(B)(2))

Submitter: Michael Kelly, Sacred Heart Medical Center
Comment on Proposal No: 15-34
Recommendation: Reject proposed language in its entirety.
Substantiation: There is insufficient data to support this change. There is only one incident reported.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-32 Log #2148 NEC-P15 **Final Action: Accept**
(517.18(B) and 517.19(B)(2))

Submitter: Matthew Campbell, Washington State Department of Health: Construction Review Services
Comment on Proposal No: 15-34
Recommendation: Reject this Proposal.
Substantiation: In reviewing this new requirement, it is our opinion that the need for indicator lights on receptacles should not become a minimum standard. Panel 15 appears to have reacted to a proposal based on one reported incident. Is the fix a mechanical one or is there a better way to resolve the issue with better staff training, panel schedules, etc. All newly installed critical care outlets are required to have the circuit number labeled on the front so that staff can quickly determine if the outlets are on the same circuit. If a hospital wants to install devices with illuminated faces or indicator lights, they are permitted to do so as this exceeds the Code. A code is a set of standards that shall have substantial justification behind the need and should not be changed as a result of a few isolated instances where the staff may not have been properly trained on the environment in which they are working.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-33 Log #700 NEC-P15 **Final Action: Reject**
(517.26)

TCC Action: See the Technical Correlating Committee action on Comment 15-35.
Submitter: Michael J. Johnston, Plano, TX
Comment on Proposal No: 15-43
Recommendation: This proposal should be rejected. Restore the language in this section to the text in the 2005 NEC as follows:
517.26 Application of Other Articles. The essential electrical system shall meet the requirements of Article 700, except as amended by Article 517.
Substantiation: Nothing is gained by this revision as proposed. In fact, much is lost as a result of this action. The consequences of accepting this change are far reaching as indicated in the statement to the negative by Mr. Morgan representing Electrical Code Enforcement. Another significant consequence of this change is that selective coordination of overcurrent protective devices used in emergency systems will be lost for the critical care branch, which, in a hospital, is an extremely important part of the emergency system, for obvious reasons. The proposal reduces current requirements without adequate substantiation. The submitter correctly made the point about Article 700 being applicable to the life safety branch, but removing the requirement for selective coordination required by 700.27 goes against the fundamental concepts of NFPA 99 and its objectives to maintain continuity of power for patient care electrical systems, especially the critical care branch. I strongly suggest reconsidering the original action on this proposal and its intended or unintended consequences.
Panel Meeting Action: Reject
Panel Statement: The panel upholds its position on Proposal 15-43.
The life safety branch of the health care facility is comparable to the emergency system of commercial (and other) building types, since both provide power for life safety systems. The critical branch of the health care facility serves patient care related circuits and equipment, and thus it is not appropriate to apply Article 700.
Emergency power supply systems need to be governed by one entity. The panel requests the Standards Council and the TCC to review scopes and charges of NFPA 99, NFPA 110, Articles 517 and 700 as it pertains to emergency power systems.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 8 Negative: 4
Explanation of Negative:
MORGAN, E.: I strongly disagree with the Panel action and statement on this comment. The original Proposal 15-43 removes some extremely important installation requirements from the critical branch of the emergency system. This action effectively removes requirements such as: 700.3 Equipment approval for use on emergency systems; 700.4 Acceptance test, maintenance and periodic testing of the critical branch; 700.9(A) Identification of boxes and enclosures for critical branch feeders and circuits; 700.9(D) Fire Protection of feeders in buildings over 75 ft. in height; 700.12(B)(5) Auxiliary power supply provisions where the generator set may require more than 10 seconds to develop full power; and 700.27 Selective coordination of overcurrent devices. These all have a significant impact on the safe design, installation and inspection of critical branch systems. Good design alone cannot be enforced by an Authority Having Jurisdiction if the requirements are not part of Article 517, or incorporated by reference to Article 700.
The Panel Statement fails to acknowledge the primary reason for this change is to avoid the requirement for selective coordination of the critical branch overcurrent devices. This appears to be a contradiction of the actions of Panels 13 and 20. In Article 700 and new Article 585, those Panels each reaffirmed the

necessity and practicability of selective coordination to minimize and localize power outage when there is a short circuit or overcurrent. The critical branch of a health care facility emergency system must have continuity of operation as one of its' highest priorities. Removing the Article 700 requirements has no apparent benefit other than cost saving. If the Panel's intent was to avoid the requirement for selective coordination (and I object to that concept), then at a minimum the other safe installation requirements as outlined in the above paragraph should be incorporated into Article 517.

It should be noted that the editors of the NEC 2005 Handbook © consider the requirements of Article 700 to apply to the critical branch of the essential electrical system. Quoting from the commentary following the definition in 517.2: "Emergency System. Emergency systems in occupancies other than health care are installed primarily for life safety and building evacuation. The emergency systems in hospitals are for life safety systems as well as maintenance of power for critical patient care systems."

The Panel statement requests "the Standards Council and the TCC to review scopes and charges of NFPA 99, NFPA 110, Articles 517 and 700 as it pertains to emergency systems." If this request is accepted, I would also ask that consideration be given to the apparent discrepancy between Article 700 emergency systems and Article 517 emergency systems that would be created by this change.

TALKA, D.: See my explanation of negative vote on Comment 15-35.

WHITE, A.: See my explanation of negative vote on Comment 15-35.

WISEMAN, J.: NEMA disagrees with the panel action. The panel action results in the removal of the critical branch from the requirements for emergency systems found in Article 700. The critical branch includes task illumination and selected receptacles for critical care areas, isolated power systems, patient care areas, nurse call systems, blood banks, bone banks, tissue banks, telephone equipment rooms, and task illumination for cardiac test labs, coronary care units, emergency rooms, and intensive care units.

15-34 Log #1352 NEC-P15 **Final Action: Reject**
(517.26)

Submitter: Tim Janof, Sparling
Comment on Proposal No: 15-43
Recommendation: Revise text to read as follows:

517.26 Application of Other Articles. The life safety branch of the emergency system ~~essential electrical system~~ shall meet the requirements of Article 700, except as amended by Article 517. The critical branch shall not be required to meet the requirements of Article 700. The equipment branch shall not be required to meet the requirements of Article 701.

Substantiation: I support the panel's action on Article 517.26 and propose to further clarify that the Equipment System is not required to comply with Article 701. I support the notion that the Life Safety branch is analogous to the Article 700 branch, and I believe the same principle should be extended to the Equipment Branch, in that it is analogous to Article 701 branch. While I do not support the requirement for selective coordination in Articles 700 and 701, if they are to remain in the Code, limiting the requirement to the life safety branch in healthcare facilities is sensible.

When selective coordination is considered, most people first envision a patient on an operating room table. This is perhaps the most emotionally charged scenario depicted by those who support the requirement for selective coordination. When one examines this situation, however, one finds that the requirement for selective coordination is difficult to justify. UL, Article 517, and NFPA 99 already have provisions that result in safe health care facilities:

- UL requires that critical medical equipment have integral batteries. Heart-lung machines, for example, typically have 1-hour batteries, which is plenty of time for hospital personnel to find and turn on a breaker that may have tripped inadvertently.
- The NEC requires redundancy in electrical systems in healthcare facilities. For example, facilities with critical care functions are required to have a back-up emergency power system, such as a diesel generator. The NEC also requires that power be provided from two separate power branches to each patient care area, including critical care areas and operating rooms. Power must be fed from both a normal and emergency power branch, or from two separate transfer switches. If there were an outage in one branch of power, the other branch would still be available. The only scenarios in which both branches of power would not be available involve some sort of catastrophic event, such as an emergency generator failure, fire, or earthquake, which the requirement for selective coordination would not prevent. The NEC's power system redundancy requirements have an excellent track record of supporting the healthcare environment.
- NFPA 99 requires that operating rooms and other anesthetizing locations have lighting with integral 90-minute battery back-up.

If there were evidence that a lack of selective coordination has resulted in injury or loss of life within healthcare facilities, I would fully support the requirement for selective coordination. But given the lack of any such case history, I can see no justification for requiring that owners pay the additional cost and sacrifice the additional space for a system that will not result in any patient benefit. Healthcare capital development budgets are limited and money not used for marginal electrical reliability benefits can be directly used for additional beds or medical equipment. I am now aware of any data that demonstrates that lives have been lost or that patients were injured due to a lack of selective coordination in healthcare facilities.

Panel Meeting Action: Reject
Panel Statement: The panel does not agree with submitter's substantiation relative to UL requirements that critical medical equipment have integral batteries.

The equipment branch should not be excluded from the requirements of Article 701.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-35 Log #2269 NEC-P15 **Final Action: Reject**
(517.26)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

In addition, the Technical Correlating Committee directs that Proposal 15-43 be reported as "Reject" since the panel no longer appears to have consensus on the issue.

Submitter: James Wiseman, Schneider Electric / Square D
Comment on Proposal No: 15-43
Recommendation: The panel should reconsider the action taken on this proposal, Accept in Principle, and relocate 517.26 to become 517.3, reading as follows:

517.3 Other Articles. The life safety branch of the emergency system shall meet the requirements of Article 700, except as amended by Article 517. The critical branch shall not be required to meet the requirements of Article 700.

Substantiation: We support the attempt at clarifying the portions of the healthcare electrical system to which the requirements of Article 700 apply. But the attempt did not go quite far enough. For many years, there has been confusion because Article 517 uses the "emergency" term differently than it is used in Article 700. Several attempts have been made, starting with the 1999 NEC edition, to minimize the confusion and still comply with rules for referencing other NEC Articles. Each has retained some portion of the problem.

The Recommendation and Substantiation in Proposal 15-43 are entirely consistent with the stance taken by the CMP (CMP-17, at that time) during the 2002 cycle. The ROC for that cycle, in Log #206 (Comment 17-15, on Proposal 17-10 covering the definition of Emergency System in 517-3) includes the following sentence as a part of the Panel Statement: "The panel's intent is that Article 700 apply only to the 'Life safety branch.'" Unfortunately, they took no further action within Article 517 to clear up the confusion for items such as sizing of generators or the number of transfer switches.

The problem with leaving 517.26 as it is proposed in Proposal 15-43 is that, due to 517.26 being under Part III of Article 517, it leaves the "Equipment System" branch in question. Since Part III covers Essential Electrical Systems, it addresses not only the "Emergency System" but also the "Equipment System." If the section is to stay as 517.26, the last sentence should be changed to read "Neither the critical branch nor the equipment system shall be required to meet the requirements of Article 700." Moving the section to become 517.3 not only eliminates this confusion, but also matches Article 517 with other Articles in using the.3 number for "Other Articles".

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 7 Negative: 5
Explanation of Negative:

MORGAN, E.: I strongly disagree with the Panel action on this proposal. There is not sufficient substantiation in either Proposal 15-43 or Comment 15-35 to justify such a change. Throughout NFPA 99 and NEC Article 517, the critical branch is considered an inseparable part of the emergency system. By definition, the critical branch serves such important functions as task illumination, special power circuits, and selected receptacles related to patient care. A more complete list of the locations served by these circuits is in NFPA 99, Section 4.4.2.2.2.3. It includes locations such as coronary care, intensive care, postoperative recovery rooms, hemodialysis rooms and emergency rooms.

Removal of the requirement to comply with Article 700 is more than an editorial change. It would literally remove requirements such as: Identification of boxes, enclosures and panels as part of the emergency system (700.9); the requirement for audible and visual signals for the alternate power source (700.7); and the periodic testing required by 700.4.

Removing the critical branch from requirements of Article 700 may also be mistakenly seen by some designers and installers of smaller facilities as eliminating the requirements for emergency systems in 517; such as separation from other circuits, and mechanical protection.

SHELLY, B.: The critical branch, as defined by Article 517, is a subsystem of the emergency system and therefore, part of the essential electrical system (Article 517.30(B)(2)). The assurance of these systems to be reliable shall require the components of Article 700 for the proper performance, maintenance and testing. The Proposal 15-43 should be rejected.

TALKA, D.: The panel debated long and hard on this item due to the significance of the result of the action as well as its controversial nature. One thing the panel did agree on whas that there needs to be a clear path established regarding which documents owns the responsibility of the involved part of the code, that is NFPA 70, NFPA 99, NFPA 101, etc. Until such time as that responsibility has been made clear, it is desirable to not take action on this significant proposed code revision. Once the responsibility has been confirmed, the lead document will take the proper action and the other documents will follow suit. Changing the NEC now allows the risk of creating more confusion and setting the stage for years of unintended actions in design and installations of and within healthcare facilities.

WHITE, A.: As the phrase implies, the critical branch of a health care facilities emergency electrical system provides service to critical patient care areas and functions. Removing the provisions of Article 700 does nothing to improve the performance of the critical branch. Some of these important provisions include:

- Testing (acceptance, load and operational)
- Battery Maintenance
- Selective Coordination
- Transfer Switch Specifications
- Fuel Supply Specifications
- Signaling (battery carrying load, nonfunctioning battery charger, ground fault)
- Emergency Illumination
- Emergency Receptacle Power
- Physical Separation of Normal and Critical Circuits
- Identification (circuit, box, enclosure, panel)

Removing the requirements of Article 700 potentially undermines this critically important system.

WISEMAN, J.: NEMA disagrees with the panel action. The panel action results in the removal of the critical branch from the requirements for emergency systems found in Article 700. The critical branch includes task illumination and selected receptacles for critical care areas, isolated power systems, patient care areas, nurse call systems, blood banks, bone banks, tissue banks, telephone equipment rooms, and task illumination for cardiac test labs, coronary care units, emergency rooms, and intensive care units.

15-51 Log #1827 NEC-P15 **Final Action: Reject (517.26)**

TCC Action: See the Technical Correlating Committee action on Comment 15-35.
Submitter: Eugene E. Morgan, Clakamas County, Building Codes Divison
Comment on Proposal No: 15-43
Recommendation: The Panel 15 should reconsider its action. Proposal 15-43 should be rejected, leaving existing text as is.
Substantiation: Throughout NFPA 99 and NEC Article 517, the critical branch is considered an inseparable part of the emergency system. By definition, the critical branch serves such important functions as task illumination, special power circuits, and selected receptacles related to patient care. A more complete list of locations served by those circuits is in NFPA 99, 4.4.2.2.2.3. It includes locations such as coronary care, intensive care, postoperative recovery rooms, hemodialysis rooms and emergency rooms.

Removal of the requirements to comply with Article 700 is more than an editorial change. It would literally remove requirements such as: Identification of boxes, enclosures and panels as part of the emergency system (700.9); the requirement for audible and visual signals for the alternate power source (700.7); and the periodic testing required by 700.4.

Removing the requirements of Article 700 from the critical branch may be mistakenly seen by some designers and installers of smaller facilities as eliminating the requirements for emergency systems in Article 517; such as separation from other circuits, and mechanical protection.

The only apparent reason for removing the critical branch from the requirements of Article 700 would be a possible cost saving, which in my view, does not justify the change. The critical branch should remain as a recognizable, integral part of the emergency system.
Panel Meeting Action: Reject
Panel Statement: The panel notes the print line is incorrect; it should be 517.26.

The panel upholds its position on Proposal 15-43.

The life safety branch of the health care facility is comparable to the emergency system of commercial (and other) building types, since both provide power for life safety systems. The critical branch of the health care facility serves patient care related circuits and equipment, and thus it is not appropriate to apply Article 700.

Emergency power supply systems need to be governed by one entity. The panel requests the Standards Council and the TCC to review scopes and charges of NFPA 99, NFPA 110, Articles 517 and 700 as it pertains to emergency power systems.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

MORGAN, E.: I believe the Panel accepted Proposal 15-43 without sufficient substantiation as required by the NFPA Regulations Governing Committee Projects, Section 4.3.3(d). The statement by the submitter is an opinion, not substantiation of a problem or requirement that needed change. Yet, the Panel overlooked the substantiation provided in Comments 15-33 and 15-51 regarding the negative consequences of the action.

I also strongly disagree with the Panel Statement "The critical branch of the health care facility serves patient care related circuits and equipment, and thus it is not appropriate to apply Article 700." This implies that egress lighting for ambulatory patients, staff and visitors to exit a building is more important than continuity of power for surgeries in process, for patients who may be on life support, for patients in critical care, or the other many patient-related lights and receptacles served by the critical branch.

As noted in my negative vote on Comment 15-33, the reason for the original proposal is to avoid selective coordination of critical branch circuit overcurrent devices as required by Section 700.27. The effort to avoid this requirement seems to be in conflict with action taken by Panels 13 and 20, in their actions on Article 700 and the new Article 585.

The Panel statement requests "the Standards Council and the TCC to review scopes and charges of NFPA 99, NFPA 110, Articles 517 and 700 as it pertains to emergency systems." If this request is accepted, I would also ask that consideration be given to the apparent discrepancy between Article 700 emergency systems and Article 517 emergency systems that would be created by this change

WHITE, A.: See my explanation of negative vote on Comment 15-35.

WISEMAN, J.: NEMA disagrees with the panel action. The panel action results in the removal of the critical branch from the requirements for emergency systems found in Article 700. The critical branch includes task illumination and selected receptacles for critical care areas, isolated power systems, patient care areas, nurse call systems, blood banks, bone banks, tissue banks, telephone equipment rooms, and task illumination for cardiac test labs, coronary care units, emergency rooms, and intensive care units.

15-36 Log #1647 NEC-P15 **Final Action: Reject (517.30(B)(4))**

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-47
Recommendation: Accept in Part Proposal 15-47. Correlate 517.30(B)(4) with 517.41(B).
Substantiation: Section 517.41(B) identifies text as extracted from NFPA 99, 4.5.2.2.1.
Panel Meeting Action: Reject
Panel Statement: No recommended text is provided with the comment as required by 4-3.3(c) of the Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-37 Log #1386 NEC-P15 **Final Action: Accept in Principle (517.30(C)(3))**

Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 15-57
Recommendation: This Proposal should continue to be Accepted as follows:

(1) Nonflexible metal raceways, Type MI cable, or Schedule 80 rigid ~~nonmetallic~~ PVC conduit. Nonmetallic raceways shall not be used for branch circuits that supply patient care areas.

(2) Where encased in not less than 50 mm (2 in.) of concrete, Schedule 40 rigid ~~nonmetallic~~ PVC conduit, flexible nonmetallic or jacketed metallic raceways, or jacketed metallic cable assemblies listed for installation in concrete. Nonmetallic raceways shall not be used for branch circuits that supply patient care areas.
Substantiation: The only type of rigid nonmetallic conduit that is currently listed in Schedule 40 and Schedule 80 dimensions is rigid PVC conduit. As each of the rigid nonmetallic conduit Articles require the conduit to be listed, this revision would not inadvertently eliminate any other conduit type. Additionally, with the renaming of Article 352 as a result of panel action on Proposal 8-53, this revision would help to clarify where the applicable requirements are located. Therefore, the references in 517.30(C)(3) should be revised as noted above.
Panel Meeting Action: Accept in Principle

Change 517.30(C)(3) to read as follows:

(1) Nonflexible metal raceways, Type MI cable, or Schedule 80 ~~rigid nonmetallic~~ PVC conduit. Nonmetallic raceways shall not be used for branch circuits that supply patient care areas.

(2) Where encased in not less than 50 mm (2 in.) of concrete, Schedule 40 ~~rigid nonmetallic~~ PVC conduit, flexible nonmetallic or jacketed metallic raceways, or jacketed metallic cable assemblies listed for installation in concrete. Nonmetallic raceways shall not be used for branch circuits that supply patient care areas.
Panel Statement: This correlates with action on Comment 15-41.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-38 Log #1648 NEC-P15 **Final Action: Reject (517.30(C)(3))**

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-53
Recommendation: Accept Proposal 15-53.
Substantiation: NFPA 99, section 4.4.2.2.4.4 is only stating performance criteria for the emergency system wiring (i.e., some mechanical protection in raceway), but referencing NFPA 70 for the installation requirements as to what type of wiring protection can be used.

Panel Meeting Action: Reject
Panel Statement: Mechanical protection of the emergency system is an installation standard of NFPA 70, not a performance criteria. NFPA 99 contains performance criteria, and correctly contains the reference to NFPA 70, rather than the reverse as the comment suggests.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-39 Log #2045 NEC-P15 **Final Action: Hold**
(517.30(C)(3))

Submitter: Phil Simmons, National Armored Cable Manufacturers
Comment on Proposal No: 15-54
Recommendation: Revise 517.30(C)(3) as follows:

(3) Mechanical Protection of the Emergency System. The wiring of the emergency system in hospitals shall be mechanically protected. Where installed as branch circuits in patient care areas, the installation shall comply with the requirements of 517.13(A) and 517.13(B). The following wiring methods shall be permitted:

(1) Nonflexible metal raceways, Tpe MI cable, or Schedule 80 rigid PVC conduit. Nonmetallic raceways shall not be used for branch circuits that supply patient care areas.

(2) Where encased in not less than 50 mm (2 in.) of concrete, Schedule 40 rigid PVC conduit, flexible nonmetallic or jacketed metallic raceways, or jacketed metallic cable assemblies listed for installation in concrete. Nonmetallic raceways shall not be used for branch circuits that supply patient care areas.

(3) Listed flexible metal raceways and listed metal-sheathed cables. ~~assemblies in any of the following:~~
~~a. Where used in listed prefabricated medical headwalls~~
~~b. In listed office furnishings~~
~~c. Where fished into existing walls or ceilings, not otherwise accessible and not subject to physical damage~~
~~d. Where necessary for flexible connection to equipment.~~

(4) Flexible power cords of appliances or other utilization equipment connected to the emergency system.

(5) Secondary circuits of Class 2 or Class 3 communication or signaling systems with or without raceways.

FPN: See 517.13 for additional grounding requirements in patient care areas.
Substantiation: Listed Type AC and Type MC cables are more than adequate to provide mechanical protection of the emergency systems in hospitals and should be accepted for that purpose. In fact, Code Panel 15 made that appropriate conclusion in its Panel Statement on Proposal 15-42 for the 2005 NEC. CMP 15 stated in part, "Types AC and MC cables that are listed provide adequate physical and mechanical protection for the emergency system of health care facilities." We agree with the Panel's conclusion. However, we feel the Panel inappropriately, and without technical justification for such action, limited the use of Type MC and AC cables as shown in the 2005 NEC.

Adequate documentation on the rigorous testing Type AC and MC cables must pass to be listed was submitted with Proposal 15-42. This documentation, plus the satisfactory field experience of CMP-15 members, no doubt led to the conclusion reached by the Panel in processing the 2005 NEC.

Type AC and MC cables are required to satisfactorily pass brutal treatment during the listing process. The testing includes crushing, bending and elongating. The tests the cables must satisfactorily pass are no doubt harsher than would be expected during installation of the cables.

The UL Fact-Finding Report on Nail Penetration of Types AC and MC Cable Installed Parallel to Framing Members (provided) show the cable is more resistant to damage from nails and screws than is Electrical Metallic Tubing. Type MC and AC cables need to be accepted for mechanical protection of the emergency system in hospitals to be treated equally.

It should be noted that items (3)(1) and (3)(2) in the list of accepted uses of listed flexible metal raceways and listed metal-sheathed cables seem to be incorrect as the wiring methods used in the construction of listed equipment by the manufacturer is controlled by the UL Safety Standard that regulates the construction of such equipment. See also 90.7 for an explanation of field examination or evaluation of listed equipment.

The information in this comment should not be considered a new concept as the issue has been before the Panel during the processing of both the 2005 and 2008 NECs.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Hold
Panel Statement: The panel intends to hold the comment only.

The proposed revision(s) dealing with AC cable and unrestricted use constitutes new material that has not had the benefit of public review during this cycle and cannot be considered at this stage of the Code-making cycle. Refer to 4.4.6.2.2 of the Regulations Governing Committee Projects.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 11 Negative: 1
Explanation of Negative:

SEABURY, III, J.: The proposal should be Accepted. Its contents are not new material. The material was reviewed during the last code cycle, as well as this code cycle dealing with original Proposal 15-54.

15-40 Log #147 NEC-P15 **Final Action: Accept**
(517.30(C)(3)(4) and 517.30(C)(3)(2))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 15-57
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 8-53. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider and correlate with the action on Proposal 8-53.

See panel action and statement on Comment 15-41.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-41 Log #359 NEC-P15 **Final Action: Accept**
(517.30(C)(3)(4) and 517.30(C)(3)(2))

Submitter: Code-Making Panel 8,
Comment on Proposal No: 15-57
Recommendation: CMP-8 recommends that CMP-15 accept this proposal in principle with the revised text:

(1) Nonflexible metal raceways, Type MI cable, or Schedule 80 ~~rigid nonmetallic~~ PVC conduit. Nonmetallic raceways shall not be used for branch circuits that supply patient care areas.

(2) Where encased in not less than 50 mm (2 in.) of concrete, Schedule 40 ~~rigid nonmetallic~~ PVC conduit, flexible nonmetallic or jacketed metallic raceways, or jacketed metallic cable assemblies listed for installation in concrete. Nonmetallic raceways shall not be used for branch circuits that supply patient care areas.
Substantiation: CMP-8 recommends that CMP-15 Accept in Principle Proposal 15-57 with the proposed revised wording. The word "rigid" was also deleted in addition to "nonmetallic" to correlate with the action taken by CMP-8 on Proposal 8-53.

This comment has been balloted through CMP-8 with the following ballot results:
12 Eligible to Vote
11 Affirmative
1 Negative

Mr. J. Dabe voted negatively stating: "CMP-8 recommends that CMP-15 reconsider this proposal and Accept in Principle. CMP-15 should add RTRC to the wiring methods in both (1) and (2)."

Mr. R. Loyd voted affirmatively stating: "Proposal 15-57 was to Accept. I agree with Mr. Burns' recommendation to revise the panel action."
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-42 Log #1649 NEC-P15 **Final Action: Reject**
(517.32(H) (New))

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-62
Recommendation: Accept Proposal 15-62.
Substantiation: Responsibility for what systems or equipment is to be connected to the Life Safety Branch is Health Care Facilities project. If wording is not clear, proposal should be submitted to NFPA 99 to clarify.
Panel Meeting Action: Reject
Panel Statement: As stated in the action on Proposal 15-62, it is unclear what additional functions of the fire alarm combination system is intended in NFPA 99:4.4.2.2.2.2(8). Connection of fire alarm to the life safety branch is already covered under NFPA 70, 517.32(C)(1).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-43 Log #1650 NEC-P15 **Final Action: Reject**
(517.32(H) (New))

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-63
Recommendation: Reject Proposal 15-63.
Substantiation: Proposal is outside the scope of the National Electrical Code project. Responsibility of what equipment is to be connected to the Life Safety Branch is the T/C on Electrical Systems of the Health Care Facility Project. Proposal should be submitted to NFPA 99.

Panel Meeting Action: Reject
Panel Statement: The option of connecting control systems and accessories for life safety system operation is a design function that should be permitted, whether it is contained in NFPA 99 text or not.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-44 Log #1651 NEC-P15 **Final Action: Reject**
(517.32(I) (New))

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-64
Recommendation: Reject Proposal 15-64.
Substantiation: Proposal is outside the scope of the National Electrical Code project. Responsibility of what equipment is to be connected to the Life Safety Branch is the T/C on Electrical Systems of the Health Care Facility Project.
Panel Meeting Action: Reject
Panel Statement: Additional safety to persons working in the generator system vicinity and panels is achieved with this change. Electrical safety for personnel performing maintenance, tests or examining equipment is within the scope of NFPA 70.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-45 Log #148 NEC-P15 **Final Action: Accept**
(517.34(B)(5))

TCC Action: The Technical Correlating Committee understands that the panel action on this comment results in Proposal 15-70 being rejected.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 15-70
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Retain original Code text of 517.34(B)(5).
Panel Statement: The panel accepts the direction of the TCC to reconsider the comments expressed in the voting.
Previous action on Proposal 15-70 has been reconsidered, and is hereby withdrawn. 2005 NFPA 70 language is restored: 517.34(B)(5) Automatically operated doors.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-46 Log #1652 NEC-P15 **Final Action: Reject**
(517.34(B)(5))

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-70
Recommendation: Accept Proposal 15-70.
Substantiation: Concur with Panel 15 action. Automatically operated doors, other than those in means of egress, can be connected to Equipment System per 4.4.2.2.3.5 in NFPA 99, or 517.34(B)(9) in Article 517.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 15-45.
Automatic doors used for egress are required to be connected to the life safety branch per 517.32(D). There are many applications for non-egress automatic doors within a hospital, Article 517.34(D)(5) provide for the continued operation of these doors in an off-normal situation while not further burdening the life safety branch.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-47 Log #1653 NEC-P15 **Final Action: Reject**
(517.35(C))

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-71
Recommendation: Accept in Principle Proposal 15-71. Change reference to A.4.4.1.1.1.2(5) so that extract reference should read:
"[NFPA 99, A.4.4.1.1.1.2(5)]."
Substantiation: Correct reference from NFPA 99 is text as listed in Annex A of NFPA 99.
Panel Meeting Action: Reject
Panel Statement: This text is not in the body of NFPA 99. The submitter references material contained in an informative annex and since the annex is not mandatory text, an extract is not appropriate.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-48 Log #1654 NEC-P15 **Final Action: Accept in Principle**
(517.40(A) Exception)

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-72
Recommendation: Accept Proposal 15-72 using text included in negative vote of Mr. Erickson.
Substantiation: Agree with negative vote of D. Erickson.
Panel Meeting Action: Accept in Principle
Change the extract reference [NFPA 99: 17.3.1.4.2, 18.3.4.1.2]" to [NFPA 99: 17.3.4.2.2(3), 18.3.4.2.2(3)]"
Panel Statement: The panel corrects the extract reference.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-49 Log #1655 NEC-P15 **Final Action: Accept in Part**
(517.40(B))

TCC Action: The Technical Correlating Committee directs that the sentence added by the panel in the panel action text be modified to read as follows:
"For those nursing homes and limited care facilities…".
This revision will correct the grammatical inconsistency in the sentence.
Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-73
Recommendation: Accept Proposal 15-73.
Substantiation: 1. I agree with negative vote of Mr. Erickson.
2. Responsibility for specifying which type of essential electrical system is required for a health care facility is the responsibility of the Health Care Facility project. Referenced change was made in NFPA 99-2005 edition to requirements for nursing homes.
Panel Meeting Action: Accept in Part
Change 517.40(B) to read as follows:
(B) Inpatient hospital care facilities. Nursing homes and limited care facilities that admit patients who need to be sustained by electrical life support equipment, the essential electrical system from the source to the portion of the facility where such patients are treated shall comply with requirements of Part III, 517.30 through 517.35.
Panel Statement: The panel accepts the submitter's text.
The panel rejects the extract reference "[NFPA 99: 17.3.4.2.4, 18.3.4.2.4]" because the entire paragraph is not extracted material.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-50 Log #712 NEC-P15 **Final Action: Reject**
(517.42)

Submitter: Burton R. Klein, Burton Klein Associates
Comment on Proposal No: 15-77
Recommendation: Accept Proposal 15-77.
Substantiation: NFPA 99, section 4.5.2.2.2, already uses the term "Emergency System" for the items listed in 517.42. The list in 517.42 is the same as that in NFPA 99, section 4.5.2.2.2. This issue is not related to that of subdividing the "emergency system" in nursing homes into 2 branches.
Panel Meeting Action: Reject
Panel Statement: Section 517.40(B) requires that Nursing Homes which incorporate "Inpatient Hospital Care Facilities"
must have an Essential Electrical System meeting the requirements of 517.30 through 517.35. Within those requirements, Section 517.31 addresses requirements of the emergency system, including automatic connection to alternate power after interruption of the normal power source. The submitter's concerns are addressed in existing code language.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-52 Log #1656 NEC-P15 **Final Action: Reject**
(517.44(C))

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-83
Recommendation: Accept Proposal 15-83.
Substantiation: Although Panel 15 has extracted text that is "recommended" in NFPA 99 [A.4.4.1.1.2(5)], and made it mandatory, it is still based on text in another NFPA document, and thus subjected to "Extract Policy." Not clear, however, whether this action is acceptable under NFPA Standards Council policy on "Extract Policy".
Panel Meeting Action: Reject
Panel Statement: This text is not in the body of NFPA 99. The submitter references material contained in an informative annex and since the annex is not mandatory text, an extract is not appropriate.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-53 Log #338 NEC-P15 **Final Action: Accept**
(517.61(B)(5))

Submitter: Michael J. Johnston, Plano, TX
Comment on Proposal No: 15-87
Recommendation: The proposal should have been rejected. Restore the original language as follows:

(5) Receptacles and Attachment Plugs. Receptacles and attachment plugs located above hazardous (classified) anesthetizing locations shall be listed for hospital use for services of prescribed voltage, frequency, rating, and number of conductors with provision for the connection of the grounding conductor. This requirement shall apply to attachment plugs and receptacles of the 2-pole, 3-wire grounding type for single-phase, 120-volt, nominal, ac service.

Substantiation: This section is specific to receptacles and attachment plugs used above a hazardous (classified) anesthetizing location. The type of receptacle used in these applications is a specific type that is listed for hospital use. These receptacles and attachment plug configurations are unique in design to allow only restricted compatibility and use, thus reducing hazards in these locations. While it is understood that many health care facilities no longer use flammable anesthetizing agents, the requirements in the NEC (an international electrical Code) still continues to include rules for facilities that use flammable anesthetics and are thus classified as hazardous locations in accordance with 517.60.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-54 Log #1657 NEC-P15 **Final Action: Reject**
(517.63(A))

Submitter: Marvin J. Fischer, Monroe Township, NJ
Comment on Proposal No: 15-93
Recommendation: Accept Proposal 15-93.
Substantiation: NFPA 99 reference to 700.12(E) in NFPA 70 was intended for the wiring of such lighting units, not for the requirement of installing battery-operated lights in anesthetizing locations. Responsibility for requiring battery-operated lights in anesthetizing locations for the purpose of providing lighting is a Health Care Facility project responsibility. Such lighting units are not for emergency exiting purposes; rather they are for evaluating patient condition, as well as eliminate need for anesthesiologist(s) to hold a flashlight while trying to assess patient condition.

A proposal to NFPA 99 may be in order to clarify this more.

Panel Meeting Action: Reject
Panel Statement: The reference in NFPA 99: 13.4.1.2.6.1(E) to NFPA 70, 700.12(E) is incorrect due to revision in numbering in the 2005 edition. NFPA 99: 13.4.1.2.6.1(E) refers to 517.63(A) which contains the correct reference to 700.12(F).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-55 Log #453 NEC-P15 **Final Action: Accept in Principle**
(517.71(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-99
Recommendation: Accept as revised:

"...by means of a wiring method ~~that meets the general requirements of this code~~ in accordance with 517.12.

Substantiation: "General requirements" is vague and can be perceived as including all wiring methods. The proposal has nothing to do with equipment wiring between parts, which may be cords, but conductors that connect to the power supply. The exception permits cords for such connections.

Panel Meeting Action: Accept in Principle

Revise 517.71(A) to read as follows:

517.71(A) Fixed and Stationary Equipment. Fixed and stationary X-ray equipment shall be connected to the power supply by means of a wiring method complying with applicable requirements of Chapters 1 through 4 of this *Code*, as modified by this Article. ~~that meets the general requirements of this *Code*.~~

Exception remains unchanged.

Panel Statement: The text change improves usability and satisfies the submitter's intent.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-56 Log #2050 NEC-P15 **Final Action: Hold**
(517.80 Exception No. 3 (New))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Hold" because it introduces a concept that has not had adequate public review in that the original proposal only applied to protection from raceways and the placement in 517.13(B) can be interpreted to extend that to requirements other than the protection via a raceway. The exception is not written to clearly indicate to what portion of the requirements the exception applies.

The action on Proposal 15-103 remains as printed in the Report on Proposals.

Submitter: Hugh O. Nash, Jr., Nash Lipsey Burch
Comment on Proposal No: 15-103
Recommendation: Delete 517.80 Patient Care Areas, including the FPN. Add an additional exception under 517.13(B).

Exception No. 3 shall read: Secondary circuits of Class 2 and Class 3 communications or signaling systems.

Substantiation: 517.80 has been a source of confusion for many years. Nurse call and other Class 2 and Class 3 communications systems at the patient bedside are intrinsically safe. This section has been misinterpreted by many AHJs. Some have interpreted this section to mean that nurse call wiring must be installed in metallic conduit for mechanical protection. This has never been the intent of 517.80, since nurse call systems are not a part of the emergency system. Some AHJs have required insulated green ground conductors and metallic conduit. 517.30(C)(3)(5) permits secondary circuits of Class 2 or Class 3 communication or signaling systems to be installed without mechanical protection. The proposed exception under 517.13(B) will make it clear that metal conduit and an insulated green ground conductor are not required for electrical safety.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3
Explanation of Negative:

MORGAN, E.: The Panel previously accepted Proposal 15-103, which gave sufficient language to clarify the intent and requirement of Section 517.80. However, this comment would delete all of 517.80 and establish a new Exception No. 3 to 517.13(B). I believe this is incorrect for several reasons:

This Comment would establish a new exception to a section dealing with the dual ground path requirement for receptacles and equipment in a patient care area. It is not an appropriate location for an exception dealing with Class 2 and Class 3 circuits.

Section 517.80 should not be deleted. Class 1 circuits would not be covered in the proposed Comment language. Class 1 circuits may produce up to 1,000 volt-amperes (33.3 amps at 30 volts). Class 2 and Class 3 circuits can produce power up to 100 volt-amperes (5 amps at 20 volts, or 1 amp at 100 volts). Refer to NEC Article 725 and Tables 11 and 12 in Chapter 9. While these low-power sources may not be of great concern in usual wiring applications, they can produce sufficient energy to be hazardous to a person with compromised resistance or health, particularly in a wet environment.

Finally, I believe that Comment 15-56 has introduced new material, and is indeed in conflict with the original Proposal 15-103. This Comment does not accomplish the same purpose as did the original proposal, nor is there adequate substantiation to enact such a change. I hereby request that the TCC review this material and determine whether the Panel action is appropriate or not.

TALKA, D.: Comment 15-56 was intended to be a modification of Proposal 15-103, which served to clarify the intent of 517.80 with respect to what communications, signaling, data fire alarm and other systems operating less than 120 volts nominal are intended to be enclosed in raceways and which addressed the apparent conflict with 517.30(C)(5). The 15-56 comment, as written, goes well beyond the original intent of Proposal 15-103 as it excludes from consideration circuits that should be subject to mechanical protection and grounding requirements. Further, Class 2 and 3 circuits are not necessarily intrinsically safe which is one of the main points of the substantiation. This action should revert back to the last point of panel consensus, as noted in 15-103 of the June 2007 ROP.

WHITE, A.: The removal of the requirements of communications circuits from 517 Part VI Communications, Signaling Systems, Data Systems, Fire Alarm Systems, and Systems less than 120 Volts, to 517 Part II, specifically 517.13, Grounding of Receptacles and Fixed Electric Equipment in Patient Care Areas, presents real utilization issues for code users. One would logically look to 517 Part VI communication, signaling systems and not to 517.13 patient care area receptacle and equipment grounding for guidance concerning communications and signaling systems.

Furthermore, the assertions that Class 2 and Class 3 communication circuits are intrinsically safe is simply incorrect, both Class 2 and 3 systems may be supplied by power supplies that are "not inherently power limited" [see 2005 NEC Table 11A].

15-57 Log #430 NEC-P15 **Final Action: Accept in Part**
(517.160(A)(1))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 15-105
Recommendation: Accept revised:

Such isolation shall be accomplished by means of one or more isolation transformers, ~~having no electrical connection between primary and secondary~~ by means of ~~motor~~ generator sets, or by means of electrically isolated batteries. Isolation transformers, motor-driven generators, and chargers for isolated batteries shall be supplied from the critical branch.

Substantiation: There is no need to describe characteristics of the transformer if specified as an isolation type which is defined. Generators other than motor-driven types may be suitable. "Suitably" is subjective and not specific. The definition of "isolated" in Article 100 pertains to accessibility while the intent appears to pertain to electrical separation. Proposal clarifies the supply system branch.

Panel Meeting Action: Accept in Part

Change 517.160(A)(1) to read as follows:

517.160(A)(1) Isolated Power Circuits. Each isolated power circuit shall be controlled by a switch that has a disconnecting pole in each isolated circuit conductor to simultaneously disconnect all power. Such isolation shall be accomplished by means of one or more isolation transformers, ~~having no electrical connection between primary and secondary windings,~~ by means of ~~motor~~ generator sets, or by means of ~~suitably~~ electrically isolated batteries.

Panel Statement: The panel accepts that part of the comment that improves readability of the section.

The panel rejects the submitter's second sentence as connection to the critical branch is already required by Section 517.33(A)(1).

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-58 Log #2270 NEC-P15 **Final Action: Reject**
(517.160(A)(5))

Submitter: James Wiseman, Schneider Electric / Square D

Comment on Proposal No: 15-106

Recommendation: The Panel should reconsider Proposal 15-106 and Reject it.

Substantiation: We disagree with the panel action and panel statement. While we certainly agree with the critical nature of these circuits, we do not agree that a change in color coding is desirable. The use of orange and brown in isolated power systems has been mandated by the NEC since 1978, at least. It is our contention that this long-standing use along with the low probability of intermixing, as cited below, "leaves no question as to the nature of their service" (quoting the Panel Statement.)

The submitter correctly notes that the NEC also uses orange as the color to identify the high leg of a 3-phase, 4-wire delta system, and also cites the practice of using orange and brown in 480Y/277 V systems. While the latter may be true, it is not a requirement of the NEC. But, more importantly, the probability of encountering either of the other two uses of the orange / brown color-coding in the same area occupied by conductors on an isolated power system is extremely low.

Properly designed and installed, isolated power systems have very few joints made up within junction boxes or other enclosures. And they are not installed in the same raceway with other systems. So the probability of an electrician being misled through the act of checking for voltage-to-ground on a brown or orange wire – an example of the potential problems that was cited during the Panel meeting – is very low. (That same approach for determining if a circuit is de-energized also would be ineffectual if used on the orange wire of a 4-wire delta system. Only through knowledge of the voltage systems in use in the area and the use of proper verification techniques can an electrician assure a circuit is not energized.)

Additionally, we are concerned that this change would significantly impact reasonable availability of properly color-coded conductors for isolated power systems. This has two components. The first is the obvious one of a striped conductor having lower commercial demand than a solid-colored one. The other issue is that isolated power systems typically are designed to use insulated conductors having a very low dielectric constant (as mentioned in 517.160(A)(6) FPN No. 2) in order to meet the requirements of NFPA 99 and expected performance requirements. Availability of such conductors with striped insulation should be assured before a change of this nature is considered.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its position on Proposal 15-106.

The requirement for color coding of isolation systems provides an additional level of safety. The unique color stripe provides identification for safety purposes.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

MORGAN, E.: I agree with the Panel action on Proposal 15-106, reaffirmed by action on Comment 15-58; requiring a "distinctive colored stripe other than white, green or gray" on secondary conductors of an Isolated Power System. However, the language may have fallen short of describing how the colored stripe must be provided. For example, in Section 200.6, identification of a grounded conductor size #6 AWG or smaller, reads in part: "…shall be identified by … by three continuous white stripes … along its entire length." It should be noted that the Panel statement on Proposal 15-106 indicated a concern about availability of wire: "… the recommended colors have been revised to ensure ready availability of colored striped conductors." It should be clear that the Panel intended the color stripe identification must be part of the insulation color identification as manufactured, not field-applied by tape or other means at the points of termination.

15-59 Log #1658 NEC-P15 **Final Action: Reject**
(517.160(B))

Submitter: Marvin J. Fischer, Monroe Township, NJ

Comment on Proposal No: 15-107

Recommendation: Accept Proposal 15-107.

Substantiation: Requirements in 517.160(B) are performance characteristics for line isolation monitors (e.g., level of hazard current at which alarm will be activated, use of lights to indicate LIM status). Wording is very much, if not identical, to that in NFPA 99.

Panel Meeting Action: Reject

Panel Statement: There are sufficient differences between the defined characteristics contained in NFPA 99 and NFPA 70, and therefore, an extract reference is not appropriate.

The panel requests the Standards Council to review and clarify the ownership of defined characteristics common to NFPA 99 and NFPA 70.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

ARTICLE 518 PLACES OF ASSEMBLY

15-60 Log #805 NEC-P15 **Final Action: Accept**
(518.4(A))

Submitter: John Kincaid, Systimax Solutions

Comment on Proposal No: 15-110

Recommendation: Continue to reject this proposal.

Substantiation: The submitter's substantiation does not address the fact the general-purpose cables are used in concealed spaces unless the concealed space is part of the air handling system; only then are plenum cables, which sit atop the cable substitution hierarchy, required.

It appears that the submitter is attempting to change the requirements for cables in an air handling system. Standards Council Decision 05-24 (SC#05-7-4) dated July 29, 2005 requires that the NEC Project maintain the status quo on issues related to plenum cables.

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-61 Log #1679 NEC-P15 **Final Action: Accept**
(518.4(A))

Submitter: Richard J. Rockosi, ARKEMA Chemicals

Comment on Proposal No: 15-110

Recommendation: Continue to reject this proposal.

Substantiation: The submitter's statement about "fluropolymers" (sic) is grossly inaccurate. Fluoropolymers are used to make the highest performing plenum cables available on the market today. The first plenum cables listed by UL in 1978 had fluoropolymer insulation. Their combustion toxicity was reviewed by the NFPA Toxicity Advisory Committee (see their report dated 5/21/84). A toxic hazard evaluation has been published; see Richard W. Bukowski, "Toxic Hazard Evaluation of Plenum Cables", *Fire Technology,* Vol. 21, No. 4, November 1985, p. 25.

Panel Meeting Action: Accept

Panel Statement: The panel makes no judgment about the technical accuracy of the commenter's substantiation, however, completely aside from toxicity issues, the panel reiterates the other reasons for rejection of the original proposal as outlined in the ROP.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-62 Log #1387 NEC-P15 **Final Action: Reject**
(518.4(C) Exception (New))

Submitter: William Wagner, Certification Solutions

Comment on Proposal No: 15-112

Recommendation: This Proposal should be Accepted as revised below:

Electrical nonmetallic tubing and rigid nonmetallic conduit are not recognized for use in other space used for environmental air in accordance with 300.22(C).

Exception: Phenolic Type RTRC rigid nonmetallic conduit shall be permitted for use in other space used for environmental air as covered in 300.22(C) if listed as having adequate fire-resistant and low smoke-producing characteristics.

Substantiation: This proposal was presented as a companion proposal to 3-92 (NEC 300.22). It was rejected due to insufficient technical substantiation. However, technical substantiation has now been developed to demonstrate the ability of these products to be safely used in these applications and is being presented to CMP-3 in support of revised proposal 3-92, CMP-8 in support of revised proposals 8-79 and 8-80, and CMP-15 in support of revised proposal 15-112.

The position of Underwriters Laboratories in relation to flame spread and smoke developed values for materials used in plenums was put forth in UL's Mr. Randy Laymon's letter dated December 15, 2004.

As a result of my initial proposal, and this UL position paper, FRE Composites (2005) Inc. undertook testing with Underwriters Laboratories of their phenolic RTRC products to both UL 2024 plenum and riser tests, and the ASTM E84 flame spread and smoke developed tests. As can be seen from the UL test data and reports, phenolic RTRC products, in a variety of trade sizes, were able to complete each of these testing programs with flame and smoke ratings significantly below the criteria established for products to be used in both plenum and riser applications.

The performance of these products, as demonstrated, is summarized as follows:

Test	Maximum Permitted Value	Maximum Test Value
Plenum (UL 2024) Flame	5.0 ft	2.0 ft
Plenum (UL 2024) Smoke Peak	0.50	0.10
Plenum (UL 2024) Smoke Avg.	0.15	0.02
Riser (UL 2024) Flame	12.0 ft	4.0 ft
Riser (UL 2024) Temperature	850.0˚F	371˚F
ASTM E84 Flame Spread Index (FSI)	25	5
ASTM E84 Smoke Developed Index (SDI)	50	0

Therefore, in consideration of the data generated by an independent, NRTL accredited test laboratory, and in conjunction with UL's stated position on this issue, these conduit products have conclusively demonstrated their ability to perform acceptably in both plenum and riser applications and I recommend their inclusion in NEC 355.10 in accordance with the revised proposal. It should be noted that this proposal has been slightly modified from its original version in order to delete the FPN indicating suggested acceptance criteria for these products. The development of appropriate flame and smoke criteria, along with the product's listing requirements is best left to the determination of the listing organization. However, regardless of which of the established flame and smoke criteria the listing organization chooses, phenolic RTRC has demonstrated its ability to perform safely.

Additionally, a reference to "phenolic" RTRC conduit has been added in order to limit this proposal to only that conduit type which was evaluated as part of the technical substantiation provided with this comment.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: Toxicity is not the only issue. Not only are the technical substantiations inadequate and not appropriate, no mechanical properties were provided. Physical protection is of paramount importance in assembly occupancies where temporary changes to the venue occur on a regular basis.

This action correlates with the action taken by CPM-3 on Comment 3-68 on Proposal 3-92.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

3-80 Log #149 NEC-P03 **Final Action: Accept**

(518.4(C) Exception and FPN (New))

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 15-112

Recommendation: It was the action of the Technical Correlating Committee that this proposal be sent to Code-Making Panel 3 for consideration in Article 300 during the public comment stage. The issues raised in the proposal are not unique to Article 518 and are more appropriately judged by Code-Making Panel 3 relative to general wiring methods. This action will be considered by Code-Making Panel 3 as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel rejects Proposal 15-112.

Panel Statement: This continues to be a proposal to be rejected based on Standards Council Decision 05-24 (SC #05-7-4). This decision relates to combustibles in plenums and would include cables in conduit as well as "plenum cables."

"1. Jurisdiction over combustibles in plenums. As the Council has indicated earlier in this decision, the Technical Committee on Air Conditioning, rather than the NEC Project, has, for many years, and should continue to have, primary jurisdiction for air distribution systems including the subject of combustibles, such as cables, in ducts, plenums and other air handling spaces (plenum spaces)."

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-81 Log #360 NEC-P03 **Final Action: Accept**

(518.4(C) Exception, FPN (New))

Submitter: Code-Making Panel 8,

Comment on Proposal No: 15-112

Recommendation: CMP-8 supports the action on this proposal by CMP-15.

Substantiation: CMP-8 supports the action on this proposal by CMP-15.

This comment has been balloted through CMP-8 with the following ballot results:

12 Eligible to Vote

12 Affirmative

Mr. R. Loyd voted affirmatively stating: "Proposal 15-112 was to Reject. I agree with Mr. Burns' recommendation to revise the panel action."

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-63 Log #318 NEC-P15 **Final Action: Reject**

(518.5)

Submitter: Code-Making Panel 6,

Comment on Proposal No: 15-116

Recommendation: Accept in principle Proposal 15-116 by deleting the last sentence of the 2005 text of 518.5 rather than by the action published for Proposal 15-116.

Substantiation: The general rule of Chapter 3 already requires that any neutral involving a circuit with a major portion of nonlinear load must be considered a current carrying conductor. 310.15(B)(4) specifies that neutrals of nonlinear loads are to be counted. Neutrals of linear loads are not directed to be counted as current carrying conductors.

The necessity of considering the neutral of even a linear load dimming system as a current carrying conductor should be under the control of CMP-15's expertise. The 2005 text of 518.5 served to require that even the neutral of a linear load dimming system be considered as a current carrying conductor. If CMP-15 has agreed that linear load dimming systems no longer need to be included, then the removal of their previous special rule seems the most appropriate and clear solution.

The inclusion of the words "or may use" would mean that all neutrals would have to be considered current carrying conductors.

If this comment is accepted, then CMP-15 may consider a fine print note forewarning of the 310.15(B)(4) requirements as related to nonlinear loads, including some dimming systems, to protect this special wiring installation.

This comment was balloted through CMP-6 with the following balloting results:

11 Eligible to Vote

10 Affirmative

1 Negative

Mr. Friedman voted negatively stating: "This comment does not indicate that CMP-15's action was incorrect. It only advised that the method of handling neutrals of nonlinear loads is covered in 310.15(B)(4).

However, CMP-15 decided that the best way to handle the proposal was to advise of the two different dimmer systems and when to count neutrals as current carrying conductors. This was done to be helpful to the users of phase control and sine wave dimmer systems.

Since the comment statement finds no fault with CMP-15's action, but only a different way it could have been done, I do not agree with the comment.

The CMP-6 comment should be that "CMP-6 supports CMP-15 action to clarify de-rating for neutral conductors of feeders used to supply phase control and solid state sine wave dimmer loads."

Panel Meeting Action: Reject

Panel Statement: Prior to 2005, there was only one type of solid state dimmer: the phase control type that presented a nonlinear load and required neutrals of feeders to be considered current carrying conductors. Furthermore that non-linearity was not due to traditional and recognizable reasons. This required special emphasis in Article 518 and 520. The emergence of new technology solid state sine wave dimmers that presents a linear load makes it necessary to draw a clear differentiation between the two types, and the associated special neutral requirements (or lack thereof) for each type of solid state dimmer. This cannot be left in an ambiguous state by simply leaving out the special neutral requirements for sine wave dimmers—it needs to be explicitly stated that such dimmers do not require the neutral to be considered a current-carrying conductor. The wording of the original panel action on the proposal accomplishes this. Finally, the wording "... or may use both phase-control and sine-wave dimmer... ' is needed to clearly require that systems using field-interchangeable plug-in phase-control and sine-wave dimmers must be treated as if the worst case use of phase control dimmers applies, even if the modules installed at time of system installation are sine wave modules.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-64 Log #150 NEC-P15 **Final Action: Accept**
(519 (New))

TCC Action: The Technical Correlating Committee advises that article scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee Accepts the panel action.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 15-121
Recommendation: The Technical Correlating Committee directs the following actions on this proposal.

The Technical Correlating Committee directs that the new Article be numbered as Article 522 to provide for proper placement and allow some additional open article numbers to remain.

Article scope statements and titles are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee is modifying the panel action on the scope to make it clear that the conductors covered by the article are control circuit conductors to read as follows:.

"519.1 Scope. This article covers the installation of control circuit power sources and control circuit conductors for electrical equipment, including associated control wiring in or on all structures, that are an integral part of a permanent amusement attraction."

The Technical Correlating Committee accepts the title of the new article.

The Technical Correlating Committee directs the panel to reconsider the proposal and clarify the intended application of wiring methods. The current text permits multi-conductor cable assemblies to be used, but allows conductors down to 30 AWG. It is unclear as to whether Chapter 3 wiring methods are required or some other method is intended. This action will be considered by Code-Making Panel 15 as a Public Comment.

The Technical Correlating Committee directs the Panel, in 519.28, to change the parenthetical reference to a Fine Print Note or remove it.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Renumber Article 519 to Article 522.

Revise scope to read as follows:

"522.1 Scope. This article covers the installation of control circuit power sources and control circuit conductors for electrical equipment, including associated control wiring in or on all structures, that are an integral part of a permanent amusement attraction."

Table 522.22 Conductor Ampacity Based on Copper Conductors with 60°C and 75°C Insulation in an Ambient Temperature of 30°C.

Conductor Size AWG	Ampacity	
	60°C	75°C
30	-	0.5
28	-	0.8
26	-	1
24	2	2
22	3	3
20	5	5
18	7	7
16	10	10

Note 1: For ambient temperatures, other than 30°C, use see Table 310.16 temperature correction factors.
Note 2: Ampacity adjustment for Conductors with 90°C or greater insulation shall be based on ampacities in the 75°C column.

Change 519.28 to read as follows:

522.28 Control Circuits in Wet Locations. Where wet contact ~~(immersion not included)~~ is likely to occur, ungrounded two-wire dc control circuits shall be limited to 30 volts maximum for continuous dc or 12.4 volts peak for dc that is interrupted at a rate of 10 to 200 Hz. ~~(Reference - Chapter 9, Table 11B).~~
Panel Statement: The panel accepts the direction of the TCC to review and act on this proposal.

The panel accepts renumbering of Article 519 to Article 522.

The panel accepts insertion of "control circuit" into Scope as directed.

Table 519.22 appears to have been inadvertently omitted during the Article 519 processing between ballot and publication of the ROP and replaced with proposed text of Section 505.2. Unrelated text has been inserted into the ROP which appears to be a transcription error (ROP page 574-575).
Panel 15 agrees that the parenthetical reference in 522.28 is inappropriate.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

15-65 Log #291 NEC-P15 **Final Action: Accept in Principle**
(519 (New))

Submitter: Code-Making Panel 3,
Comment on Proposal No: 15-121
Recommendation: Accept the change as proposed.
Substantiation: While there may be some similarities with Class 1, Class 2, and Class 3 circuits, it appears the Task Group that worked on this proposed new article has covered many of the same issues. For example, overcurrent protection of the circuit is similar to those found in 725.21(A)(2) for power sources other than transformers. A review of the sections within the new article reveals a thoroughness and attention to detail for this very special system of permanent amusement rides.

This comment was balloted through CMP-3 with the following results:
13 Eligible to Vote
12 Affirmative
1 Not Returned (J. Sleights)

Mr. T. Guida voted affirmatively stating: "It is understood that the panel has determined that 30 AWG conductors are acceptable as shown in 519.21. The wording of (A) is clear that these conductors are acceptable where a third party lists the component or assembly. The wording of (B) presents a problem because there are no cables defined in the NEC with 30 AWG conductors that are suitable for these circuits. Machine Tool Wire has a minimum conductor size of 22 AWG. Type TC and MC cables are 18 AWG and larger. Fixture wire is 18 AWG or larger. Cables with 30 AWG conductors are Type CM or CL2 for communication or Class 2 circuits. Appliance wiring Material (AWM) is not intended for evaluation other than as a component of a Listed product."

Mr. M. Sanders voted affirmatively stating: "The Technical Correlating Committee noted that 519.28 contained the parenthetical reference "(Reference - Chapter 9, Table 11B)" and noted it should either be a Fine Print Note or be deleted. The specific information for use in 519.28 eliminates the need to refer users to Chapter 9, Table 11(B), and is not needed and should be deleted as not all parts of this Table are to be mandatory."
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 15-64.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

15-66 Log #684 NEC-P15 **Final Action: Accept**
(519 (New))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 15-121
Recommendation: I agree with the Panel Action except the word "multi-conductor" should be changed to "multiconductor" in 519.20, in two places in 519.21(B), and in one place in 519.21(C).
Substantiation: This is an editorial correction for consistency. Multiconductor is not hyphenated. In the 2005 NEC, the word "multi-conductor" is only used in Articles 690 and 810 and Annex D. The word "multiconductor" is used in 31 Articles, Chapter 9, and Annex B. In the 2008 preprint, "multi-conductor" only appears 7 times whereas "multiconductor" appears 142 times.
Panel Meeting Action: Accept

Change "multi-conductor" to "multiconductor" in 519.20, in two places in 519.21(B), and in one place in 519.21(C).
Panel Statement: The change meets the submitter's intent.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ARTICLE 520 THEATERS, AUDIENCE AREAS OF MOTION PICTURE AND TELEVISION STUDIOS, AND SIMILAR LOCATIONS

15-67 Log #151 NEC-P15 **Final Action: Accept**
(520.51)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 15-133
Recommendation: The Technical Correlating Committee directs that the action on this proposal be correlated with the action taken on Proposal 15-134. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Change the last sentence of the present text to read as follows:

The neutral conductor of feeders supplying solid-state, 3-phase, 4-wire dimmer systems shall be considered a current-carrying conductor.
Panel Statement: The panel accepts the direction of the TCC to correlate with the action taken on Proposal 15-134.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

15-68 Log #1259 NEC-P15 **Final Action: Accept in Principle**
(520.81)

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 15-2
Recommendation: Continue to accept the following portions of the TCC Grounding and Bonding Task Group proposal 15-2 as modified and revised by the actions of CMP-15 for which the TCC Grounding and Bonding Task Group recommends that CMP-15 accept the revisions to 520.81 as proposed in Proposal 15-2. This retains the specific references to Parts VI and VII of Article 250 in the last sentence of this section.

Substantiation: The changes proposed to 520.81 were made as a part of the Task Group's work to meet the requirements of the NEC Style Manual Section 4.1.1 which does not permit a section to refer to an entire article, but does permit references to the appropriate parts of such articles.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.

Panel Meeting Action: Accept in Principle

Delete the last sentence of 520.81.

Panel Statement: The action satisfies the panel's contention that more than Part VI an Part VII of Article 250 apply to Section 520.81. This change complies with the NEC Style Manual, Section 4.1.1.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

ARTICLE 525 CARNIVALS, CIRCUSES, FAIRS, AND SIMILAR EVENTS

15-69 Log #152 NEC-P15 **Final Action: Accept (525.2)**

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 15-145

Recommendation: The Technical Correlating Committee directs that the panel clarify the panel action on this proposal in accordance with 2.2.2 of the NEC Style Manual to not contain the term being defined. The panel is also directed to correlate this proposal with the action taken on Proposal 15-144a. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on this proposal and accepts the definition of portable structure as modified by Comment 15-70.

See action and statement on Comment 15-70.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-70 Log #1359 NEC-P15 **Final Action: Accept (525.2. Operator, Portable Structures)**

Submitter: Mark R. Hilbert, Wolfeboro, NH

Comment on Proposal No: 15-144a

Recommendation: Accept the proposed new definitions in Principle, in Part.

Revise the proposed new definitions as follows:

Operator. ~~As used in this Article, the operator shall be t~~The individual responsible for starting, stopping and controlling an amusement ride or supervising a concession.

Portable Structures. Units designed to be moved including, ~~For the purposes of this Article the term portable structures shall include,~~ but not limited to, amusement rides, attractions, concessions, tents, trailers, trucks, and similar units.

Substantiation: Revising the proposed new definitions in the manner above will incorporate the directive from the TCC in Proposal 15-145 to follow the NEC Style Manual and not include the term being described in the definition. The language "for the purposes of this Article" was removed from both definitions as it is not necessary in these new definitions as they are only used in Article 525. Further, revising the definition of "Portable Structures" here will correlate with the panel action on proposal 15-145 to be more concise and accurately reflect the terms used in the industry with this proposal.

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-71 Log #1360 NEC-P15 **Final Action: Accept in Principle (525.11)**

TCC Action: The Technical Correlating Committee directs that the word "device" be inserted between "overcurrent" and "supplying" in the last sentence of the panel action. This action is consistent with the affirmative comment on vote indicating the needed editorial correction.

Submitter: Mark R. Hilbert, Wolfeboro, NH

Comment on Proposal No: 15-150

Recommendation: Revise text to read as follows:

525.11 Multiple Sources of Supply. Where multiple services or separately derived systems, or both, supply portable structures, the equipment grounding conductors of all the sources of supply that serve such structures separated by less than 3.7 m (12 ft) shall be ~~connected to the same grounding electrode system~~ bonded together at the portable structures. The bonding conductor shall be sized in accordance with Table 250.122 based on the largest overcurrent supplying the portable structures.

Substantiation: Revising the meeting action on this proposal as recommended will increase safety by using the shortest means possible to reduce the potential between the portable structures and will add clarity to this section by specifying how the conductor is to be sized as the recommended text in Proposal 15-150 provided no specific guidance on how to size the bonding conductor. Further, by requiring bonding of the grounding electrode systems, the implication is that a grounding electrode system must be installed when, in fact, there is no requirement to do so. Prior to the 2005 NEC, the frame of a vehicle mounted generator was recognized by 250.34 as a grounding electrode and, therefore, the frames of the vehicles could be bonded together to comply with the intent of 525.11. However, with the revision of that section in 2005, the vehicle frame is not recognized as serving as a electrode nor is it required to be connected to one. Accepting the text as proposed will provide an effective means of reducing the potential differences between portable structures while providing a prescriptive requirement for the installation.

Panel Meeting Action: Accept in Principle

Revise text to read as follows:

525.11 Multiple Sources of Supply. Where multiple services or separately derived systems, or both, supply portable structures, the equipment grounding conductors of all the sources of supply that serve such structures separated by less than 3.7 m (12 ft) shall be ~~connected to the same grounding electrode system~~ bonded together at the portable structures. The bonding conductor shall be copper and sized in accordance with Table 250.122 based on the largest overcurrent supplying the portable structures, but not smaller than No. 6 AWG.

Panel Statement: The panel is concerned that conductors smaller than No. 6 AWG copper will be subject to physical damage, therefore, a minimum size is defined.

The change satisfies the submitter's intent.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

Comment on Affirmative:

MORGAN, E.: I agree with the Panel action on Comment 15-71, but there is apparently an editorial change needed in the last sentence. The term "overcurrent" should be stated as "overcurrent device":

525.11 Multiple Sources of Supply. Where multiple services or separately derived systems, or both supply portable structures, the equipment grounding conductors of all the sources of supply that serve such structures separated by less than 3.7 m (12 ft.) shall be bonded together at the portable structures. The bonding conductor shall be copper and sized in accordance with Table 250.122 based on the largest overcurrent device supplying the portable structures, but not smaller than No. 6 AWG.

15-72 Log #1363 NEC-P15 **Final Action: Accept in Principle (525.11)**

Submitter: Mark R. Hilbert, Wolfeboro, NH

Comment on Proposal No: 15-150

Recommendation: Revise text to read as follows:

525.11 Multiple Sources of Supply. Where multiple services or separately derived systems, or both, supply portable structures, the equipment grounding conductors of all the sources of supply that serve such structures separated by less than 3.7 m (12 ft) shall be ~~connected to the same grounding electrode system~~ bonded together at the portable structures. The bonding conductor shall be sized in accordance with Table 250.122 based on the largest overcurrent supplying the portable structures.

Substantiation: Revising the meeting action on this proposal as recommended will increase safety by using the shortest means possible to reduce the potential between the portable structures and will add clarity to this section by specifying how the conductor is to be sized as the recommended text in proposal 15-150 provided no specific guidance on how to size the bonding conductor. Further, by requiring the bonding of the grounding electrode systems together the implication is that a grounding electrode system must be installed when, in fact, there is no requirement to do so. Prior to the 2005 NEC the frame of a vehicle mounted generator was recognized by 250.34 as a grounding electrode

and therefore the frames of the vehicles could be bonded together to comply with the intent of 525.11. However, with the revision of that section in 2005, the vehicle frame is not recognized as serving as a electrode nor is it required to be connected to one. Accepting the text as proposed will provide an effective means of reducing the potential differences between portable structures while providing a prescriptive requirement for the installation.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 15-71.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-73 Log #1361 NEC-P15 **Final Action: Reject**
(525.21(A))

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 15-152
Recommendation: Accept this Proposal in Principle and revise as follows:
525.21 Rides, Tents and Concessions.
(A) Disconnecting Means. Each ride and concession shall be provided with a disconnecting means in accordance with (1); or (2) ~~or (3)~~.
(1) A fused disconnect switch or circuit breaker located within sight and within 1.8 m (6 ft) of the operator's station. The disconnecting means shall be readily accessible to the operator, including when the ride is in operation. Where accessible to unqualified persons, the enclosure for the switch or circuit breaker shall be of the lockable type.
~~(2) Where the ride or concession is provided with fused disconnect switch or circuit breaker, an additional disconnecting means without internal overcurrent protection shall be permitted where it is located within sight and within 1.8 m (6 ft) of the operator's station.~~ The disconnecting means shall be readily accessible to the operator, including when the ride is in operation. Where accessible to unqualified persons, the enclosure for the switch or circuit breaker shall be of the lockable type.
Exception: Where the ride or concession is provided with overcurrent protection, the disconnecting means shall not be required to have overcurrent protection.
~~(3)~~ (2) A shunt trip device that opens the fused disconnect or circuit breaker when a switch located in the ride operator's console is closed shall be a permissible method of opening the circuit.
Substantiation: Revising the proposal as indicated above will make it clear that the ride or concession is still required to have overcurrent protection while allowing a nonfused disconnect switch to be used within 6 ft of the operator's station when the ride or concession is provided with overcurrent protection. Although the panel discussion at the ROP meeting indicated that it was not the intent of the original language requiring a fused disconnect switch or circuit breaker to provide overcurrent protection for the ride or concession, revising the proposal as recommended by the meeting action could create a situation where there was no overcurrent protection at the ride or concession or in the disconnecting means within sight of the operators station. Further this revision will address the concern expressed in the negative vote as to removing only the overcurrent language in the first sentence of the existing section.
Panel Meeting Action: Reject
Panel Statement: The meaning is not materially changed by the proposed language and it uses an exception, which is to be avoided per the Manual of Style.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-74 Log #1362 NEC-P15 **Final Action: Accept**
(525.30)

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 15-156
Recommendation: Accept Proposal 15-156 in its entirety.
Substantiation: Accepting the proposal in its entirety will clarify how the bonding required by this section is to take place. The definition of an equipment grounding conductor in Article 100 on its own does not adequately address how the bonding required by this section is to take place. Further, not all of those using the NEC read the ROP and ROC to get the benefit of the additional information provided by NEC Code Making Panels. Including text in this section that specifically identifies that the equipment grounding conductor of the circuit that is supplying the equipment specified in 525.30(1) through (3) can serve as the bonding means will reduce the confusion created by the current text and add clarity to the section. Further, the recommended text in proposal 15-156 will add consistency to the NEC as it is in line with the language already used in 250.104(B) regarding the bonding requirements for "other metal piping."
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

ARTICLE 530 MOTION PICTURE AND TELEVISION STUDIOS AND SIMILAR LOCATIONS

15-74a Log #CC1501 NEC-P15 **Final Action: Accept**
(530.20)

Submitter: Code-Making Panel 15,
Comment on Proposal No:
Recommendation: Change 530.20 to read as follows:
530.20 Grounding
Type MC cable, Type MI cable, metal raceways, and all non–current-carrying metal parts of appliances, devices, and equipment shall be connected to an equipment grounding conductor. This shall not apply to pendant and portable lamps, to stage lighting and stage sound equipment, or to other portable and special stage equipment operating at not over 150 volts dc to ground.
Substantiation: Comment 15-75 pointed to a printing error in the ROP dealing with 530.20. It is section 530.20 that refers to Article 250 instead of 530.64(B). The panel action addresses the intent of the submitter of Comment 15-75.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

15-75 Log #1260 NEC-P15 **Final Action: Reject**
(530.64(B))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 15-2
Recommendation: Continue to accept the following portions of the TCC Grounding and Bonding Task Group proposal 15-2 as modified and revised by the actions of CMP-15 for which the TCC Grounding and Bonding Task Group recommends that CMP-15 accept the revisions to 530.64(B) as proposed in Proposal 15-2. This retains the specific references to Parts VI and VII of Article 250 in the last sentence of this section.
Substantiation: The changes proposed to 530.64(B) were made as a part of the Task Group's work to meet the requirements of the NEC Style Manual Section 4.1.1 which does not permit a section to refer to an entire article, but does permit references to the appropriate parts of such articles.
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Reject
Panel Statement: No action is necessary on 530.64(B) as it already refers to an equipment grounding conductor and makes no reference to Part VI and Part VII of Article 250.
See Comment 15-74a (Log #CC 1501).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 547 AGRICULTURAL BUILDINGS

19-3 Log #1449 NEC-P19 **Final Action: Reject**
(547.2)

Submitter: Donald W. Zipse, Electrical Forensics, LLC
Comment on Proposal No: 9-5
Recommendation: Delete section 547.2 ~~**Equipotential Plane.**~~
Substantiation: . The "**Panel Statement:** The panel contends that it is necessary to retain the definition of Equipotential Plane because it is used in Article 547." This statement does not make any sense and if the correlating committee was on the ball they should have rejected the panel statement for not making sense. There were three other proposals that eliminated the words **Equipotential Plane(s)** in Article 547. So this time PLEASE do your homework and give me a statement and reasons than makes sense.
The rules are to limit each proposal to a "SINGLE SECTION", which was done. Therefore your statement is invalid since I have follow instructions and have submitted detailed proposals for all the other sections dealing with the so-called Equipotential Plane, which would have remove the offending words from Article 547.

For you education and enlightenment I am enclosing an attachment of a peer reviewed Institute of Electrical and Electronic Engineers' technical paper titled, "**Equipotential Planes, A Figment of the Imagination**".

If you continue to allow the inaccurate definition to remain in the NEC you will be telling the readers of the NEC that you are NOT familiar with OHM'S LAW nor do you have any understanding of OHM'S LAW. Sorry to tick you off, but I do not have 21 years to continue to debate this with you as I did when I was younger – Took 21 years to have Panel 5 adopt 4-wire for electric ranges and dryers. So if you insist on keeping erroneous and incorrect information in the Code, I suggest that you insert a FPN stating,

Fpn: "For this Article OHM's LAW does not apply"

Mr. Lawrence C. Neubauer and Donald W. Zipse have conducted tests on many dairies over the past two years that involve so-called Equipotential Planes. These test are described in the technical paper, which is the substation for this comment. We have testified that the so-called Equipotential Planes DO NOT exist and in dairies are very harmful. Non- Equipotential Planes concrete pads have also been tested and found to lack and harmful voltages or current flow. This panel was fooled back during the 1987 code cycle into adopting a flawed proposal, which was based on a misunderstood concept. This information is contained in the technical paper. And PLEASE do not write that I have failed to give you any substation as the technical paper contains 12, 175 words of substation.

Note: Supporting material is available for review at NFPA Headquarters

Panel Meeting Action: Reject

Panel Statement: In the substantiation provided with this proposal, the submitter states that equipotential planes as used in the dairy industry and swimming pools are dangerous. In the substantiation of Comment 17-94 on Proposal 17-114a, the submitter states that cows have approximately the same internal resistance as humans and that dairies have the same electrical setup as swimming pools.

Based on the submitter's remarks, it is clear that he recognizes the similarities between the bonding requirements of swimming pools and agricultural areas.

Therefore, in light of the testing data presented in the Georgia Tech Study provided with Comment 17-98, the panel does not agree with the submitter's substantiation.

The submitter has not substantiated the increase in danger associated with equipotential planes, or an improved level of safety when no equipotential plane is installed.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-4 Log #322 NEC-P19 **Final Action: Accept**
(547.5(A))

Submitter: Code-Making Panel 7,

Comment on Proposal No: 19-11

Recommendation: CMP-7 recommends Proposal 19-11 be rejected.

Substantiation: Type UF, NMC, and Copper SE cables can be run as an exposed wiring method, but must be protected against physical damage. Article 547 should reference the appropriate wiring articles for the uses of the wiring method desired and comply with the appropriate provisions as required.

This comment was balloted through CMP-7 with the following balloting results:

14 Eligible to Vote

13 Affirmative

1 Not Returned (W. Crist)

Mr. J. Daley voted affirmatively stating: "I agree with the CMP-7 comment that Proposal 19-11 should be Rejected.

CMP-7 has the responsibility for defining the Uses Permitted and Uses Not Permitted and the installation requirements and limitations for the cable types within their Scope.

I can appreciate the problem that the submitter of Proposal 19-11 is trying to address, but any such change should be made in Article 334, not Article 547. I refer the submitter of Proposal 19-11 to my Comment on Negative Vote on Proposal 7-45 as a possible solution to the problem."

Panel Meeting Action: Accept

The panel understands that the action on this comment will cause the action on Proposal 19-11 to be "reject".

Panel Statement: Public comments on Proposal 19-11 offer valid reasons for rejecting the proposal: (1) Code-Making Panel 7 has the responsibility for defining uses and limitations of cable types within their Scope, and (2) No technical substantiation has been provided to support deletion of the requirements in Article 334.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

Comment on Affirmative:

EWING, M.: See my Explanation of Affirmative Vote on Comment 19-7.

19-5 Log #468 NEC-P19 **Final Action: Reject**
(547.5(A))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 19-12

Recommendation: Accept proposal revised:

Type NM cable suitable for the location shall be permitted in areas not covered by 547.1(A) and (B) and which do not require a thermal finish rating.

Substantiation: There are many barns, fruit and vegetable stands, and accessory buildings wired with Type NM cable. Type UF and NMC are permitted. All applicable code rules would apply, e.g., protection from physical damage.

Panel Meeting Action: Reject

Panel Statement: As per the Scope of Article 547, this article only applies to areas that are covered by 547.1(A) and (B). See 547.3.

Additionally, it is unclear whether the submitter intended the new sentence to replace the original proposed language or to accompany such language.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-6 Log #645 NEC-P19 **Final Action: Accept**
(547.5(A))

Submitter: Linda J. Little, St. Louis, MO

Comment on Proposal No: 19-11

Recommendation: Proposal 19-11 should be Rejected.

Substantiation: The submitter correctly states that 340.10(4) places restrictions on the use of Type UF cable. No technical substantiation is presented to warrant deviation from these restrictions in agricultural areas. If surface wiring is "preferred," then <u>appropriate</u> surface wiring methods should be selected.

The Panel contradicts itself in the panel statements of Proposals 19-10 and 19-11. In 19-10, the submitter is informed that data verifying the effects of the hazards caused by rodent damage should be submitted before a change is warranted. Then in Proposal 19-11, the panel statement not only acknowledges the damage caused by rodents, but claims that this damage is increased by concealment of nonmetallic types of cables. It is inappropriate to tell one submitter that documentation is required to make a change, and then turn right around and make another change (in opposition to the recommended uses of a particular wiring method) without the same documentation.

The general rules in Chapters 1-4 should only be modified when essential for a reliable and safe installation. Certainly, there must be adequate justification to warrant any such deviation. Alteration of the general rules should enhance the installation and make it safer - this is not a convenience issue. If damage due to rodents is serious enough to warrant a change, more durable wiring methods (as suggested by the submitter of Proposal 19-10) will not only enhance the installation, they will promote safety by using wiring methods in the manner intended and already approved by earlier articles in the NEC.

Panel Meeting Action: Accept

Panel Statement: See the panel action and statement on Comment 19-4.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

Comment on Affirmative:

EWING, M.: See my Explanation of Affirmative Vote on Comment 19-7.

19-7 Log #1295 NEC-P19 **Final Action: Accept**
(547.5(A))

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 9-11

Recommendation: The panel action on the Proposal should be Reject.

Substantiation: I agree with the Explanation of Negative vote by J. Bernson.

No technical substantiation has been provided to support deletion of the installation requirements of Part II of Article 334 when Type UF or Type SE cables are installed as interior wiring in other structures permitted to be Types III, IV, or V construction.

The same requirements apply to these substitute interior wiring methods as for Type NMC cable. When installed as interior wiring in other structures permitted to be Types III, IV, or V construction, all of these cable types must comply with 334.10(3) which requires that "Cables shall be concealed within walls, floors, or ceilings that provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies."

Types UF and SE cables, when used for interior wiring, and Type NMC cable must comply with Part II of Article 334.

These requirements are in accordance with the decision of the NFPA Standards Council, in accepting Proposal 7-137 of the NEC 2001 Report on Proposals, which was subsequently upheld by the NFPA Board of Directors.

Panel Meeting Action: Accept
Panel Statement: See the panel action and statement on Comment 19-4.
Number Eligible to Vote: 8
Ballot Results: Affirmative: 8
Comment on Affirmative:
EWING, M.: I agree with Mr. Daly's comment to Proposal 7-45 and his submitted Comment 7-21 which acknowledges that there is need for creating an Exception to the 15-minute finish requirement for agricultural buildings. Remember that 547.5 wiring methods apply to 547.1(A) & (B) areas only and the areas outside of 547.1(A) & (B) are wired according to 547.3. Mr. Daly's Comment 7-21 will apply to all animal housing/storage facilities and not just those areas originally accepted by Proposal 19-11. If Comment 7-21 is accepted by CMP-7, it makes Comments 19-4, 19-6, and 19-7 worthy of acceptance to reject Proposal 19-11. Note: There is no requirement for tray cable (TC) to be concealed in Article 336 and TC is permitted to be installed in 547.1(A) & (B) areas per 547.5 "other cables or conduits suitable for the location."
Technical substantiation may be provided from the panel members themselves during the review process and does not necessarily have to be part of the submitter's written substantiation. There was no technical substantiation for requiring the 334.10(3) finish rating requirement to apply to agricultural buildings when it was created but, as presently written it applies.

19-8 Log #224 NEC-P19 **Final Action: Accept**
(547.5(A), FPN)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 19-13
Recommendation: The Technical Correlating Committee directs the panel to reconsider the proposal relative to 353.44 which does not exist. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regu lations Governing Committee Projects.
Panel Meeting Action: Accept
The panel accepts the direction of the Technical Correlating Committee to reconsider Proposal 19-13.
Panel Statement: See the panel action on Comments 19-9 and 19-10.
Number Eligible to Vote: 8
Ballot Results: Affirmative: 8

19-9 Log #362 NEC-P19 **Final Action: Accept**
(547.5(A), FPN)

Submitter: Code-Making Panel 8,
Comment on Proposal No: 19-13
Recommendation: CMP-8 recommends that CMP-19 Accept this proposal in Part with the revised text:
FPN: See 300.7, ~~and~~ 352.44, and 355.44 for installation of raceway systems exposed to widely different temperatures.
Substantiation: CMP-8 recommends CMP-19 Accept inPart Proposal 19-13 with the proposed revised wording. Reference 353.44 was deleted in accordance with the CMP-8 action on Proposal 8-73. Type HDPE conduit cannot be used in exposed applications, therefore expansion fittings are not required.
This comment has been balloted through CMP-8 with the following ballot results:
12 Eligible to Vote
12 Affirmative
Mr. R. Loyd voted affirmatively stating: "Proposal 19-13 was to Accept. I agree with Mr. Burns' recommendation to revise the panel action."
Panel Meeting Action: Accept
Number Eligible to Vote: 8
Ballot Results: Affirmative: 8

19-10 Log #1390 NEC-P19 **Final Action: Accept**
(547.5(A), FPN)

Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 19-13
Recommendation: This Proposal should be Accepted as revised below:
FPN: See 300.7, ~~and~~ 352.44, and 355.44 for installation of raceway systems exposed to widely different temperatures.
Substantiation: In accordance with the TCC Action on Proposal 19-13, the FPN to 547.5(A) should be revised to include the correct references to the rigid nonmetallic conduit requirements. This correlates with the panel action on Proposals 8-53 and 8-78.
Panel Meeting Action: Accept
Number Eligible to Vote: 8
Ballot Results: Affirmative: 8

19-11 Log #293 NEC-P19 **Final Action: Accept in Part**
(547.5(B))

Submitter: Code-Making Panel 3,
Comment on Proposal No: 19-14
Recommendation: CMP-3 recommends rewording the recommended text to read as follows:
"Nonmetallic boxes, fittings, conduit, and cables shall be permitted to be mounted directly to any building surface covered by this article without maintaining the 6 mm (1/4 in.) airspace in accordance with 300.6(D) and 312.2(A)."
Substantiation: This exclusion has been in the code since the 1990 NEC and was permitted for any building surfaces for two reasons. The first reason was to install the wiring method to closely follow the contour of the building structure to keep animals from easily damaging the wiring methods. The second reason was there was no data available indicating that water and other liquids were causing damage to these wiring methods on wood structures.
This comment was balloted through CMP-3 with the following results:
13 Eligible to Vote
11 Affirmative
1 Negative
1 Not Returned (J. Sleights)
Mr. M. Sanders voted negatively stating: "The issue that was raised by the Technical Correlating Committee is that the basic rule of 300.6(D), in conjunction with 312.2(A), already states the exception that addresses the submitter's concern, and is unclear as to what is the technical reason why it should be repeated a third time in Article 547. The exceptions in Article 300 and Article 372 (the forerunner to present Article 312) have been in place since the 1990 edition of the NEC specifically to address the issue where livestock or other humid wash down environments may occur. This does not add clarity, it adds a third location where future correlation may be needed, and provides needless cross-referencing, which the revisions to 90.3 the past few code cycles have sought to eliminate. It is incumbent upon code users to know the provisions of the first four chapters and that they apply to the Chapters 5, 6, and 7 articles unless they are specifically modified due to substantiated problems or technical concerns.
If there is a problem to be solved with this redundant text, the following is offered for consideration.
"Nonmetallic boxes, fittings, conduit, and cables shall be permitted to be installed in accordance with 300.6(D) Exception and 312.2(A) Exception."
This should reduce future correlation problems, it will mandate the desired usage, and provide clarity."
Panel Meeting Action: Accept in Part
The panel rejects the addition of the reference to 312.2(A) and accepts the remainder of the comment.
Panel Statement: See Code-Making Panel 9 substantiation on Comment 19-12.
Number Eligible to Vote: 8
Ballot Results: Affirmative: 8
Comment on Affirmative:
EWING, M.: In rewriting ROP 19-14, the CMP failed to incorporate the word "cabinet" with nonmetallic boxes in the second sentence of 547.5(B). Without that word, there is no point in making a reference to 312.2(A). The reason this is in 547 is to permit mounting of nonmetallic enclosures to indoor damp or wet wood surfaces where not permitted by 300.6(D) Exception. Also see Comment to 19-12.

19-12 Log #312 NEC-P19 **Final Action: Accept in Principle**
(547.5(B))

Submitter: Code-Making Panel 9,
Comment on Proposal No: 19-14
Recommendation: The proposal as originally submitted should be accepted.
Substantiation: The proposal, as written, correctly identifies a lack of correlation created by the recent reorganization and expansion of 300.6 in the 2005 code cycle. CMP-9 does not agree, however, that text addressing "nonmetallic boxes, fittings, conduit, and cables" includes equipment within the scope of Article 312. Article 312 only coves cabinets, cutout boxes, and meter socket enclosures, and, therefore, there is no conceptual conflict between the existing text and 312.2(A). Although occasionally made from nonmetallic materials, there is no substantiation on record to wave the spacing requirement when this equipment is mounted on an absorbent surface in an indoor wet location. Note that the existing text of 300.6(D) Exception does waive the spacing requirement on nonabsorbent surfaces.
The spacing waiver in Article 547 originated as a CMP-19 proposal to cover nonmetallic cables in the 1990 code cycle (Proposal 19-8). That proposal preceded the current 300.6(D) (Exception) (which entered the NEC in the 1993 edition) and referred to problems with animals having an easier time of chewing on cables that were spaced out from the surface, as well as problems with cables being hooked by farm implements during the normal course of

work. The proposal was broadened during the comment period (Comment 19-1) to its present form because nonmetallic boxes and conduits are not subject to corrosion. Although CMP-19 reaffirmed its intention to have the spacing waiver applied to wood and other absorbent surfaces in the 1999 cycle (see Proposal 19-13a), that action remained in the more limited context of boxes and wiring methods, not cabinets.

CMP-9 certainly agrees that nonmetallic cabinets are incapable of corrosion, however, we are concerned that the larger surface area of Article 312 enclosures may cause their anchoring provisions to fail if the absorbent mounting surface, typically wood, changes dimension as the moisture level changes. For larger enclosures, a proportional change in dimension creates greater stress on the mounting provisions than would be the case for a box or conduit support. In addition, equipment within the scope of Article 312 should not normally be placed where it would subject to animal attack or where farm implements would inadvertently get behind it (see 110.26(F), for example). This calls into question the relevance of the 1990 substantiation for Article 312 enclosures. Before this change is made, CMP-9 would like to see CMP-19 provide technical substantiation supporting the necessity of broadening this allowance.

This comment has been balloted through CMP-9 with the following balloting results:

11 Eligible to Vote
10 Affirmative
1 Not Returned (H. deVega)

Panel Meeting Action: Accept in Principle

The panel accepts the concept of retaining the original proposal but prefers the language used in Comment 19-11.

Panel Statement: See the panel action and statement on Comment 19-11.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

Comment on Affirmative:

EWING, M.: Presently, I know of only one cabinet manufacturer (Eaton) who makes a nonmetallic panelboard/cabinet for use in agricultural buildings although I haven't seen one installed as yet. The installations I see consist of nonmetallic NEMA 4X box installed per 547.5(B), with a complete panelboard/cabinet assembly installed within it. Unlike 314.23, there is no securing or supporting requirements found in Article 312. It surprises me to see Panel 9's concern for the possibility of anchoring failure when secured flat against wood rather than supported 1/4 in. or more out from the wood with the cabinet tabs and spacers. From my perspective, I've seen less damage to nonmetallic enclosures when they are secured to a flat surface (which provides more surface area for support) than spacing it 1/4 in. or more out from the surface regardless of the surface material. Also, see Comment to 19-11.

19-13 Log #225 NEC-P19 **Final Action: Accept**
(547.5(F))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 19-18
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal. It is unclear as to whether the panel was accepting the held proposal or the held public comment. The Technical Correlating Committee also notes that this action is unclear relative to the action taken by accepting Proposal 19-3 that revised 547.5(F).

This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the direction of the Technical Correlating Committee to clarify the panel action on this proposal.

The panel modified the language in 547.5(F), and the panel intends to keep the word "grounding" for this application. The need to change from "grounding" to "bonding" in Proposal 19-3 is no longer necessary. The panel intended to accept Proposal 19-18 as written.

The text of 547.5(F) in the NEC 2008 ROP Draft is correct and reads as follows:

"(F) Separate Equipment Grounding Conductor. Where an equipment grounding conductor is installed within a location falling under the scope of Article 547, it shall be a copper conductor. Where an equipment grounding conductor is installed underground, it shall be insulated or covered copper."

Panel Statement: The original Proposal 19-10 (Log # 1968) in the May 2004 ROP was to change the term "equipment grounding conductor" to "equipment bonding conductor." That proposal was rejected by the panel because the change in terms did not clarify requirements. The original proposal should continue to be rejected, particularly in light of the Panel 19 action on Proposal 19-3 (Log # 1530) in the A2007 ROP and the recommendations of the TCC Task Group on Grounding and Bonding.

It was the intent of CMP 19 to accept the held Comment 19-8 (Log # 3026) in the May 2004 ROC on Proposal 19-10 (Log # 1968) in the May 2004 ROP and, thereby, accept Proposal 19-18 (Log # 221) in the A2007 ROP. By accepting Proposal 19-18, the previously accepted Proposal 19-3 regarding 547.5(F) is no longer required.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-14 Log #452 NEC-P19 **Final Action: Reject**
(547.5(F))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-19
Recommendation: Accept proposal revised:

Noncurrent-carrying metal parts of equipment, raceways, and other enclosures, ~~where required~~ to be grounded... (remainder unchanged).

Substantiation: Where grounding is not required by code, but done by choice the requirements should apply. This section may be perceived as modifying 250.1(1) which indicates Article 250 applies where grounding is "permitted". The text does not support the panel statement that voluntary grounding requires the insulated or covered conductor since this section relates to required grounding.

Panel Meeting Action: Reject

Panel Statement: The submitter's substantiation is based on text that no longer exists. See the panel action and statement on Comment 19-13.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-15 Log #1272 NEC-P19 **Final Action: Reject**
(547.5(F))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 19-18
Recommendation: Revise 547.5(F) as follows:

(F) Separate Equipment Grounding ~~Bonding~~ Conductor. Non–current-carrying metal parts of equipment, raceways, and other enclosures, where required to be grounded, shall be connected to ground~~ed~~ by a copper equipment grounding ~~bonding~~ conductor installed between the equipment and the building disconnecting means. If installed underground, the equipment grounding ~~bonding~~ conductor shall be insulated or covered.

Substantiation: The use of the term "equipment grounding conductor" is correct according to the Panel action on Proposal 5-76 and for the definition of this term in Proposal 5-6.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.

Panel Meeting Action: Reject

Panel Statement: This comment is based on language that was modified in the proposal stage. See the panel action and statement on Comment 19-13.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-16 Log #226 NEC-P19 **Final Action: Accept**
(547.9)

TCC Action: To be consistent with the panel action on Proposal 19-3, the Technical Correlating Committee directs that item (2) of the panel action text be revised from "…is bonded to…" to "…is connected to…".

This revision will make the use of the terms consistent with the previous panel actions.

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 19-26
Recommendation: It was the action of the Technical Correlating Committee that the panel reconsider the proposal and avoid repeating the requirements of Article 250 in 547.9. The Technical Correlating Committee notes that all of the requirements outlined in 547.9(B)(3) are covered in Article 250 with the exception of the increased requirement that the equipment grounding conductor be the same size as the ungrounded conductors.

For correlation purposes, it would be more appropriate for the panel to reference the requirements in Article 250 and include the increased requirement for the EGC sizing.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the comment and has revised the text per the Technical Correlating Committee direction.

Revise the text of 547.9(B)(3) to read as follows:

"(3) Grounding and Bonding. For each building or structure, grounding and bonding of the supply conductors shall be in accordance with the requirements of 250.32 ~~a separate equipment grounding conductor shall be run with the supply conductors to the building(s) or structure(s)~~, and the following conditions shall be met:

(1) The equipment grounding conductor shall be the same size as the largest supply conductor if of the same material, or adjusted in size in accordance with the equivalent size columns of Table 250.122 if of different materials.

(2) The equipment grounding conductor is bonded to the grounded circuit conductor and the site-isolating device at the distribution point.

~~(3) A grounding electrode system is provided in accordance with Part III of Article 250 and connected to the equipment grounding conductor at the building(s) or structure(s) disconnecting means.~~

~~(4) The grounded circuit conductor is not connected to a grounding electrode or to any equipment grounding conductor on the load side of the distribution point.~~

~~Exception: For existing premises wiring systems only, the grounded conductor run with the supply to the building or structure shall be permitted where all the requirements of 250.32(b)(1), Exception are met."~~

Panel Statement: By referencing 250.32, a separate equipment grounding conductor is required to be run to each building or structure as the submitter requested in the original proposal (Proposal 19-26). By reference, this will also allow use of the exception for existing premises wiring systems. Redundant language in 547.9(B)(3), list items (3) and (4), is eliminated, as these requirements are covered in 250.32(A) and 250.32(B)(1). The increased requirement for the equipment grounding conductor remains in 547.9(B)(3)(1), and requirements for bonding to the site-isolating device remain in 547.9(B)(3)(2).

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-17 Log #1683 NEC-P19 **Final Action: Reject**
(547.10)

Submitter: Donald W. Zipse, Electrical Forensics, LLC

Comment on Proposal No: 19-30

Recommendation: Delete the whole Section 547.10.

Substantiation: The panel statement states- "The use of equipotential planes is an accepted practice in various industries for reducing step-touch potential."

The writer can understand the confusion that appears to exist with the panel between Equipotential Planes and Step – Touch Potentials. The four (4) original Ag Professors also did not understand the difference between the two.

First one has to learn the difference between **FAULT CURRENT** and **STEADY STATE OR CONTINUOUS CURRENT FLOW**.

FAULT CURRENT – (From the IEEE) (general) A current that flows from one conductor to ground or to another conductor owing to an abnormal connection (including an arc) between the two. A fault current flowing to ground may be called a ground fault current.

From The peer reviewed technical paper "Equipotential Planes, A Figment of the Imagination"- (Which was sent with 547.2, 19-5.)

"It is opined that Gustafson, et al and the NEC Making Panels did not take into consideration the purpose of the IEEE Standard 80, "Guide for Safety in AC Substation Grounding".

IEEE Standard 80 states:

"1.2 Purpose. The intent of this guide is to provide guidance and information pertinent to safe grounding practices in ac substation design.

The specific proposes of this guide are to

a) Establish, as a basis for design, the **safe limits of potential differences** that can exist in a substation **under fault conditions** (Author's emphases) between points that can be contacted by the human body.

b) Review substation grounding practices with special reference to safety, and develop criteria for a safe design.

c) Provide a procedure for the design of practical grounding systems, based on these criteria.

d) Develop analytical methods as an aid in the understanding and solution of typical gradient problems."

It is a fact and is very clear that Clause 1.2 a) states that IEEE Standard 80 is under **fault conditions.** Stray current or if one insists, stray voltage, exists under normal continuous flow of neutral distribution current, under continuous utility operating conditions, not fault conditions."

Now one needs to know the difference between fault current and steady state.

STEADY STATE OR CONTINUOUS CURRENT FLOW - (IEEE) steady current

A current that does not change with time.

We have two types of current flow. Fault current that lasts for cycles until the protective device opens such as a circuit breaker, fuse, recloser or other protective device. Therefore a fault current is usually HIGH LEVELS OF CURRENT FOR A VERY SHORT PERIOD OF TIME.

However, a steady state flow of current such as would be flowing to a lamp, or motor, or in a distribution system, such as the current flowing into transformers, is continuous and compared to fault current, steady state is a low level of continuous flow of current.

Table from presentation to Industrial and Commercial Power System Technical Conference, May, 2006, has been provided.

So step – touch potential is associated with fault current. Steady state flow of current is associated with Equipotential Planes

Code-Making Panel stated in their statement that "The submitter's... substantiation is anecdotal and provides insufficient data to justify removing the requirement for equipotential planes. The following is NOT ANECDOTAL, but are facts.

The graph provided is alternating current flow across an Equipotential Plane. The bottom graph is the sum of alternating current flowing through the Equipotential Plane and the alternating current is being rectified into direct current plus a maximum of 0.74 volts that could be coming from galvanic action of the copper conductors and iron re-bar in the concrete that the NEC CODE MAKING PANEL REQUIRES for the equipment grounding conductor to connect to the Equipotential Plane which contains iron re-bar.

If the panel were well versed in Equipotential Planes theory and understanding the panel would require iron conductors instead of copper in dairies and pig confinement areas.

In addition to the graph which is just one of approximately 1,000, is 4 camera screens provided were taken on a dairy.

Camera 1 is showing a cow standing on an Equipotential Plane. The cow is eating wetted crushed corn, sugar to a cow. For ease of discussion we will assume the current is flowing up the cow's legs, through the cow's body and out the mouth into the wetted corn. From the wetted and conductive corn through an iron wire to the direct current ammeter shown in view 3 and to the ac ammeter shown in view 2. From the instrumentation the iron conductor takes the current back to the metal rail adjacent to the cow that the cow would and can touch, thus completing a part of the circuit that originated at the utility distribution substation. Normally we have a top view of the cow in camera 4, which is blank during this test.

The last diagram provided is the electrical circuit from the utility substation and showing the dangerous and hazardous multigrounded neutral electrical distribution system. If one were to follow the red conductor one would see that the current is directed directly into the dairy's Equipotential Plane and back to the substation.

As the peer reviewed technical paper submitted with my Comment on Proposal 9-5(547.2) shows, Equipotential Planes, Are a Figment of the Imagination.

Please delete Section 547.10 and Equipotential Planes.

Therefore, please save the cows and delete 547.10. In one dairy 5 cows a day were dying from stray current until the dairyman realized the problem was Equipotential Planes

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The panel does not agree with the submitter's substantiation based on the testing data provided as a part of the substantiation on Comment 17-98. See the panel action and statement on Comment 19-3.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-18 Log #2218 NEC-P19 **Final Action: Accept**
(547.10(A))

Submitter: Jeff Fitzloff, State of Idaho Division of Building Safety

Comment on Proposal No: 19-36

Recommendation: Revise text to read as follows:

547.10 Equipotential Planes and Bonding of Equipotential Planes. The installation and bonding of equipotential planes shall comply with 547.10(A) and 547.10(B). For the purposes of this section, the term livestock shall not include poultry.

(A) Where Required. Equipotential planes shall be installed where required in (1) and (2). [ROP 19-36]

(1) Indoors. Equipotential planes shall be installed in confinement areas with concrete floors where metallic equipment is located that may become energized and is accessible to livestock. [ROP 19-36]

(2) Outdoors. Equipotential planes shall be installed in concrete slabs where metallic equipment is located that may become energized and is accessible to livestock. [ROP 19-36]

The equipotential plane shall encompass the area where the livestock stands while accessing metallic equipment that may become energized. [ROP 19-36]

Substantiation: This change is a great improvement clarifying the areas where equipotential planes are required.

Panel Meeting Action: Accept

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-19 Log #2191 NEC-P19 **Final Action: Accept**
(547.10(B), FPN No. 1 and 2)

Submitter: Barry Bauman, Alliante Energy
Comment on Proposal No: 19-35
Recommendation: Revise text to read as follows:
547.10 Equipotential Planes and Bonding of Equipotential Planes.
FPN No. 1: Methods to establish equipotential planes are described in American Society of Agricultural and Biological Engineers (ASABE) EP473.2-2001, Equipotential Planes in Animal Containment Areas.
FPN No. 2: Methods for safe installation of livestock waterers are described in American Society of Agricultural and Biological Engineers (ASABE) EP342.2-1995, Safety for Electrically Heated Livestock Waterers.
Substantiation: Along with the American Society of Agricultural Engineers name change to American Society of Agricultural and Biological Engineers, the acronym has been changed from ASAE to ASABE.
Panel Meeting Action: Accept
Number Eligible to Vote: 8
Ballot Results: Affirmative: 8

ARTICLE 550 MOBILE HOMES, MANUFACTURED HOMES, AND MOBILE HOME PARKS

19-20 Log #1511 NEC-P19 **Final Action: Accept**
(550.4(C))

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc.
Comment on Proposal No: 19-39
Recommendation: Use the term "neutral conductor" as originally proposed.
Substantiation: This comment was developed by the Technical Correlating Committee (TCC) Task Group (TG) on the definition of "Neutral Conductor." Task Group members were: Jeffrey Boksiner (Chair) (CMP 5, TCC), Paul Dobrowsky (CMP 5), Walter Skuggevig (CMP 5), Doug White (CMP 5), Michael Toman (CMP 2, TCC), Bob Wilkinson (CMP2), Jim Daly (CMP 6, CMP 7, TCC), Bill Laidler (CMP 6), and Oran Post (CMP 6). The TCC directed that the action on this proposal be sent to the TG for review and comment.
TG concludes that the term "neutral conductor" is more appropriate because a set of conductors supplies the mobile home. This set of conductors includes the neutral conductor. A system with a neutral point may not necessarily carry the neutral conductor along with the other conductors.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-21 Log #503 NEC-P19 **Final Action: Reject**
(550.12(D)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-43
Recommendation: Accept proposal.
Substantiation: The literal indicates a single "outlet" which may contain a single receptacle shall not supply a load in excess of 80 percent of the branch circuit rating. A branch circuit supplying a single receptacle for a single appliance is an individual circuit which per 210.23 may supply a load for which it is rated. What special circumstance or hazard justifies a modification of 210.23?
Panel Meeting Action: Reject
Panel Statement: Section 210.23(A)(1) specifies that any one cord-and-plug utilization equipment not fastened in place shall not exceed 80 percent of the branch-circuit ampere rating. Section 422.10(A) requires the branch-circuit rating for an appliance to be not less than 125 percent of the marked rating of the appliance. Therefore, a "special circumstance or hazard" is not needed to justify the requirements in 550.12(D)(3).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-22 Log #427 NEC-P19 **Final Action: Reject**
(550.14(E).xx (New))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-61
Recommendation: Accept proposal.
Substantiation: It is not clear whether requirements in Article 210 apply. If Chapters 1 through 4 apply generally, why are 550.12, 550.13, 550.16, 550.18, 550.25, 550.32(B)(2)(4)(5), for example included in this article since they are already covered elsewhere in the code? The bulk of the code could be reduced by eliminating all sections of this article that are also covered elsewhere in the code, which indicates no need for repetition.
Panel Meeting Action: Reject
Panel Statement: The substantiation states the submitter's request to reduce bulk by eliminating repetition of the requirements, yet the proposal is to repeat a requirement already stated in the general chapters.
The requirements in Chapters 1 through 4 apply generally except as amended by Chapters 5 through 7. Since the lighting outlet requirements are not amended in Article 550, those requirements in Article 210 already apply.
There is no need for the additional language (see NEC Style Manual 4.1).
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-23 Log #1273 NEC-P19 **Final Action: Reject**
(550.15(D))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 19-48
Recommendation: Accept the original proposal from the NEC TCC Task Group on Grounding and Bonding.
Substantiation: The NEC TCC Task Group on Grounding and Bonding agreed that simplification of the definitions was in order and that prescriptive elements would be proposed for specific Article texts as made in Proposal 19-48. The Task Group requests Panel 19 clarify and reconsider the Panel Action on this Proposal to be consistent with the TCC Grounding and Bonding Task Group's original initiatives.
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its position as stated in the panel statement on Proposal 19-48.
This is identical to the language used in 406.5(B), and there is no need to be more prescriptive as to the method of grounding.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-24 Log #426 NEC-P19 **Final Action: Accept in Principle in Part**
(550.15(E))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-45
Recommendation: Accept as revised:
~~If~~ Where a range or clothes dryer, or ~~similar appliance~~ is connected by metal covered cable or flexible ~~metal~~ conduit, a length of not less than...(remainder unchanged).
Substantiation: "Similar appliance" is subjective and not defined; what constitutes a similar appliance? This section addresses metal covered cable and flexible metal conduit, if used, but doesn't require such methods or limit or prohibit other methods covered in 550.15 such as LFMC ad LFNC. Though FMC provides some protection so do LFMC and LFNC. However, 348.12(7) prohibits FMC were subject to damage the same as 350.12(1) for LFMC and 356.12(1) for LFNC.
Panel Meeting Action: Accept in Principle in Part
In the recommendation, the panel revises "similar appliance" to "other appliance".
The panel does not accept the deletion of the word "metal".
Panel Statement: The panel rejects striking the word "metal" as proposed. Striking this word and leaving the remainder of the section unchanged as indicated in the comment would leave conflicting requirements within this section.
The change from "similar appliance" to "other appliance" meets the intent of the submitter and provides clarification.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-25 Log #501 NEC-P19 **Final Action: Reject**
(550.18(A)(2))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-59
Recommendation: Accept the proposal.
Substantiation: See Substantiation for proposal. The Code provides for a specific minimum va/sq ft for general lighting and this does not increase if more than the minimum number of circuits is installed. This is reasonable since additional circuits simply exceed Code minimums and provide reliability, diversity, and efficiency due to less voltage drop. This is recognized in 210.52(B)(2), Exception. If a square foot area requires a minimum of three general lighting circuits and six circuits are installed, the calculated feeder or service load is not required to be increased.
Panel Meeting Action: Reject
Panel Statement: Substantiation for this comment with regard to lighting circuits is irrelevant since this section deals with small-appliance branch circuits. The submitter cites 210.52(B)(2) Exception, which is irrelevant since 210.52 defines where outlets are required, not load calculations. Section 210.52(B)(2) has two exceptions, neither of which pertains to load calculations in 550.18(A)(2).

It is true that additional lighting circuits can be added without increasing the required load calculation in 550.18(A)(1). This mirrors the requirements in 220.12 for dwelling unit lighting loads.

Section 550.18(A)(2) only requires 1500 volt-amperes for each small appliance branch circuit, paralleling the requirements in 220.52(A). Small-appliance branch circuits are intended for appliances. The load on these circuits is expected to be more than on a general-purpose branch circuit, hence the additional load requirement. The submitter has not provided sufficient technical substantiation for changing the requirements for small- appliance branch circuits.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-26 Log #498 NEC-P19 **Final Action: Accept**
(550.32(B)(2)(4)(6))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-66
Recommendation: Accept the proposal for (B)(2) to delete "equipment".
Substantiation: Service equipment per Article 100 covers switches and circuit breakers. "Service" as defined in Article 100 covers conductors, service equipment and related equipment, not limited to service equipment. Service equipment (switches and circuit breakers) are not covered by part I through Part IV.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-27 Log #227 NEC-P19 **Final Action: Accept**
(550.33)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 19-68
Recommendation: The Technical Correlating Committee directs the panel to reconsider the proposal and determine if the current reference to 310.15(B)(6) is necessary in 550.31 since the panel has accepted the addition of the same reference in 550.33(B). This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The panel accepts the Technical Correlating Committee direction to reconsider the proposal and agrees that the reference to 310.15(B)(6) in 550.31 is not necessary and should be deleted.
Panel Statement: Under the direction of the Technical Correlating Committee, the panel has deleted the reference to 310.15(B)(6) in 550.31.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-28 Log #228 NEC-P19 **Final Action: Accept**
(550.33(A) Exception)

TCC Action: The Technical Correlating Committee directs that in lieu of the panel action on this comment, a new exception be added to 550.33(A) from the Report on Proposals text. The exception will read:

"Exception: For an existing feeder that is installed between the service equipment and a disconnecting means as covered in 550.32(A), it shall be permitted to omit the equipment grounding conductor where the grounded circuit conductor is grounded at the disconnecting means in accordance with 250.32(B) Exception."

The panel created a potential new requirement with their revision in this comment. For mobile homes, feeder conductors can be between the mobile home service equipment and the mobile home or between remote service equipment and a disconnect located within 30 feet. The original exception applied to the feeder between remote service equipment and the disconnect located at the mobile home.

As worded by the panel, the text would require the feeder between the mobile home disconnect and the mobile home to comply with 250.32. This reference would require a grounding electrode at the mobile home which is not required today and was not substantiated during the revision process. The new exception will make it clear that the equipment grounding conductor can be omitted for an existing feeder.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 19-69
Recommendation: It was the action of the Technical Correlating Committee that the proposal be reconsidered and that the panel consider correlating this proposal with the Code-Making Panel 5 action on Proposal 5-119 relative to an exception for existing installations. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The panel accepts the comment and has revised the text per the Technical Correlating Committee direction as follows:

Revise 550.33(A) to read as follows:

550.33 Feeder.

(A) Feeder conductors shall comply with the following:

(1) Feeder conductors shall consist of either a listed cord, factory installed in accordance with 550.10(B), or a permanently installed feeder consisting of four insulated, color-coded conductors that shall be identified by the factory or field marking of the conductors in compliance with 310.12. Equipment grounding conductors shall not be identified by stripping the insulation.

(2) Feeder conductors shall be installed in compliance with 250.32(B).

Panel Statement: Under the direction of the Technical Correlating Committee, the panel has revised the text to correlate with the Panel 5 action on Proposal 5-119.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

ARTICLE 551 RECREATIONAL VEHICLES AND RECREATIONAL VEHICLE PARKS

19-29 Log #2212 NEC-P19 **Final Action: Accept**
(551.42(C))

Submitter: Bruce A. Hopkins, RVIA
Comment on Proposal No: 19-78
Recommendation: Revise Panel Meeting action as follows:

Such recreational vehicles shall be permitted to be equipped with distribution panelboards rated 120 volts maximum or 120/240 volts maximum listed for 30 amp ~~or 50 amp~~ application~~s~~ supplied by the appropriate power supply assemblies.
Substantiation: This would clarify that a 120 volt only rated panelboard would still be permitted with a 30 amp power supply assembly. Also, reference to a 50 amp application should be deleted since 551.42(C) only applies to 30 amp application. 50 amp requirements are covered under 551.42(D).
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-30 Log #432 NEC-P19 **Final Action: Reject**
(551.44(A)(B) and (C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-81
Recommendation: Accept proposal.
Substantiation: See substantiation for proposal. The panel reference to 551.40(B) only provides a general requirement which may not be known to code users. 551.44(D) does not use the term "or larger"; 551.46(C) has specific ratings which do not include the phrase "or larger".
Panel Meeting Action: Reject
Panel Statement: Definitions in Article 555 for Marinas and Boatyards do not apply to Article 551 for Recreational Vehicles and Recreational Vehicle Parks.

551.46(A) requires the power supply assembly to be factory supplied or factory installed, so it is unnecessary to be concerned whether "Code users" are aware of the general requirement in 551.40(B) for compatibility of power supply components. Language in 551.46(C)(1), (2), and (3) specifies 15- 20- and 30-ampere attachment plugs, so plug caps rated higher than the conductors are not permitted as suggested by the substantiation. However, retaining the "or larger" language does allow for conductors larger than the minimum required for the rating of the attachment plug cap.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-31 Log #313 NEC-P19 **Final Action: Accept**
(551.45(D) (New))

Submitter: Code-Making Panel 9,
Comment on Proposal No: 19-84
Recommendation: Continue to reject the proposal.
Substantiation: Although it is certainly true that there will normally be readily accessible upstream methods available to disconnect power to the main conductors supplying a recreational vehicle, that does not mean that the work will be performed deenergized in accordance with safe work practices. Many electricians utilize this (backfed) main to de-energize the panel and then perform maintenance realizing the line side of the main is still energized. Since this device is still energized, it is imperative that provisions to prevent the main from being unplugged are in place. This requirement is intended to provide an additional measure of safety when the work is done hot, even if it shouldn't be done that way. "Field-installed" in this context applies to all wiring done outside of the panelboard manufacturing facilities, including the wiring done in a recreational vehicle assembly facility.

This comment has been balloted through CMP-9 with the following ballot results:

11 Eligible to Vote
10 Affirmative
1 Not Returned (H. deVega)

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-32 Log #422 NEC-P19 **Final Action: Reject**
(551.47(C))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-85
Recommendation: Accept proposal revised:

Nonmetallic boxes, conduit bodies, and other enclosures, except distribution panels, shall be acceptable only with nonmetallic sheathed cable or nonmetallic raceways.

Substantiation: For consistency, the requirement should apply to other enclosures such as conduit bodies and cabinets.
Panel Meeting Action: Reject
Panel Statement: Section 551.47(C) does not pertain to the broader scope of all enclosures and corresponds with the general requirement in 314.3. The submitter has not provided sufficient technical substantiation to cause lack of correlation with the general requirements in Chapters 1 through 4 of the NEC, particularly Article 314.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-33 Log #1275 NEC-P19 **Final Action: Reject**
(551.47(M))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 19-86
Recommendation: Accept the original proposal from the NEC TCC Task Group on Grounding and Bonding.
Substantiation: The NEC TCC Task Group on Grounding and Bonding agreed that simplification of the definitions was in order and that prescriptive elements would be proposed for specific Article texts as made in Proposal 19-86. The Task Group requests Panel 19 clarify and reconsider the Panel Action on this Proposal to be consistent with the TCC Grounding and Bonding Task Group's original initiatives.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its position as stated in the panel statement on Proposal 19-86.

This is identical to the language used in 406.5(B), and there is no need to be more prescriptive as to the method of grounding.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-34 Log #2213 NEC-P19 **Final Action: Accept in Principle**
(551.47(P)(2))

Submitter: Bruce A. Hopkins, RVIA
Comment on Proposal No: 19-87
Recommendation: Revise 551.47(P)(2) as follows:

(2) Direct Wired. That portion of a branch circuit that is installed in an expandable unit shall be permitted to be connected to the portion of the branch circuit in the main body of the vehicle by means of flexible cord in accordance with 551.47(P)(2)(a) through (P)(2)(d) or other acceptable wiring methods.

a. The flexible cord shall be listed for had usage and for use in wet locations.

b. The flexible cord shall be permitted to pass through the interior of a wall ~~or through a floor~~ in lengths not to exceed 600 mm (24 in.) before terminating at an outlet or junction box. ~~c.~~ The flexible cord shall be installed in a nonflexible conduit or tubing that runs continuously from ~~the~~ an outlet or junction box inside the recreational vehicle to a strain relief connector listed for use in wet locations that is located on the underside of the recreational vehicle.

c. The flexible cord shall be permitted to pass directly through a floor, and shall be protected by conduit ~~or~~ and bushings or equivalent.

d. The outer jacket of the flexible cord shall be continuous to an ~~the~~ outlet or junction box.

Substantiation: The language to allow other wiring methods should be accepted. RV manufacturers may choose to make the transition from flexible cord to romex in a wet location J-box located on the underside of the slideout room. In this case, the flexible cord would not enter a wall or floor. The current language restricts the RV manufacturer to one very specific installation, when any installation in compliance with the NEC should be permitted.

The change to b. would allow the flexible cord to run in the wall only when installed in the nonflexible conduit as outlined.

The new c. would permit the cord to pass through a floor in the same manner as a power supply assembly (also a flexible cord) is permitted to pass through floors in 551.46(A)(2).
Panel Meeting Action: Accept in Principle

Revise the wording of the recommendation in the comment to read as follows:

"(2) Direct Wired. That portion of a branch circuit that is installed in an expandable unit shall be permitted to be connected to the portion of the branch circuit in the main body of the vehicle by means of flexible cord installed in accordance with 551.47(P)(2)(a) through (e) or other approved wiring method.

a. The flexible cord shall be listed for hard usage and for use in wet locations.

b. The flexible cord shall be permitted to be exposed on the underside of the vehicle.

c. The flexible cord shall be permitted to pass through the interior of a wall or floor assembly or both a maximum concealed length of 600 mm (24 in.) before terminating at an outlet or junction box.

d. Where concealed, the flexible cord shall be installed in nonflexible conduit or tubing that is continuous from the outlet or junction box inside the recreational vehicle to a weatherproof outlet box, junction box, or strain relief fitting listed for use in wet locations that is located on the underside of the recreational vehicle. The outer jacket of the flexible cord shall be continuous into the outlet or junction box.

e. Where the flexible cord passes through the floor to an exposed area inside of the recreational vehicle, it shall be protected by means of conduit and bushings or equivalent.

Where subject to physical damage, the flexible cord shall be protected with RMC, IMC, Schedule 80 PVC, or other approved means and shall extend at least 150 mm (6 in.) above the floor. A means shall be provided to secure the flexible cord where it enters the recreational vehicle."

Panel Statement: The word "acceptable" is not in the NFPA Style Manual; however, "approved" is and is enforceable under 110.2.

The word "had" was changed to "hard" usage cord in (a).

The panel's language in (b) acknowledges the fact that the cord is permitted between outlet or junction boxes where exposed below the recreational vehicle in addition to where it enters the recreational vehicle.

The panel is retaining the maximum of 24 in. of flexible cord to pass concealed from below the recreational vehicle to an outlet or junction box located inside the recreational vehicle.

No substantiation to permit a length greater than the existing 24 in. has been submitted.

The proposed bushing prevents abrasion to the cord where it leaves the raceway, however, it does not provide strain relief to keep the cord from pulling on terminations.

The panel has created new items "d." and "e." to differentiate between exposed installations that are subject to physical damage and those that are not.

The revised language in (d) and (e) ensures that protection from physical damage and strain relief is provided whether the cord is concealed or exposed.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-35 Log #646 NEC-P19 **Final Action: Accept**
(551.47(S))

Submitter: Linda J. Little, St. Louis, MO
Comment on Proposal No: 19-89
Recommendation: This proposal should have been Accepted in Principle.
Revise the last sentence in 551.47(S)(3):
"An ampere rating ~~compatible with the device~~ not to exceed 80 percent of the circuit rating shall be legibly marked in the blank space."
Substantiation: This new requirement will add safety as the submitter suggests. However, the intended purpose of the circuits is to feed future appliances. These "other appliances or devices" may operate on a continuous basis and the circuit should be rated accordingly as done in 551.47(Q)(3).
Panel Meeting Action: Accept
Panel Statement: The panel notes that in the recommendation of Proposal 19-89, in (2) the last word should be changed from "tapped" to "taped."
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-36 Log #528 NEC-P19 **Final Action: Reject**
(551.73)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-94
Recommendation: Accept the proposal.
Substantiation: Service-entrance conductors are service conductors but all service conductors are not service-entrance conductors. There must be service conductors from the utility to the service disconnecting means. The FPN for Service-Entrance Conductors, Underground System indicates there may be no service-entrance conductors. Service lateral conductors terminated at outside service equipment are service conductors but not service-entrance conductors, and are not covered by Table 551.73.
Panel Meeting Action: Reject
Panel Statement: Conductors falling under the jurisdiction of the utility are not subject to the demand factors in Table 551.73. Those service conductors that are not considered service entrance conductors typically fall under the jurisdiction of the utility.
No substantiation has been provided to warrant expanding the use of demand factors in Table 551.73 to conductors other than service entrance conductors.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-37 Log #625 NEC-P19 **Final Action: Reject**
(551.73)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-95
Recommendation: Accept proposal for (A).
Substantiation: Where the site has a 50-ampere 250-volt receptacle supplied by one feeder and a 20-ampere 125 volt receptacle supplied by a different feeder, present wording requires only the highest rated receptacle to be used for load calculation. The feeder for the 20-ampere receptacle has no required load calculation. Omission of the lowest rated receptacle is only reasonable if supplied by the same feeder. Limiting the calculated load to only the highest rated receptacle should be permitted, not required; a higher calculation should not be a violation. Table 551.73 demand factors appear to be developed specifically for vehicle sites, not for club houses, recreational buildings, swimming pools, tennis courts, etc. which would be covered by the proposed exception. There is no prohibition of 220.61 for such other loads.
Panel Meeting Action: Reject
Panel Statement: The additional language "supplied by the same feeder" is unnecessary since each feeder is calculated on the basis of what it supplies per site as required by the first sentence of 551.73(A). The "permitted to be" language is also unnecessary, as 551.73(C) FPN and 551.73(D) FPN clearly indicate that the minimum values as calculated by 551.73(A) may be inadequate, so conductor size may need to be increased.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-38 Log #527 NEC-P19 **Final Action: Reject**
(551.75)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 19-98
Recommendation: Accept the proposal as revised:
All exposed noncurrent-carrying metal parts of electrical equipment and installation shall be grounded as required by 250.110.
Substantiation: Proposal correlates with 250.110 which specifies "exposed" and "noncurrent-carrying" metal and provides exceptions. It may be perceived that this section modifies 250.110. 551.76 has wording similar to the proposal.
Panel Meeting Action: Reject
Panel Statement: The additional language is unnecessary and does not add clarity. The panel disagrees with the statement, "it may be perceived that this section modifies 250.110," since 551.75 clearly states that the grounding requirements in Article 250 apply.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-39 Log #229 NEC-P19 **Final Action: Accept**
(551.76(D))

TCC Action: The Technical Correlating Committee directs that the panel action text be revised from "250.32(B)(1) Exception" to "250.32(B) Exception". This action will correlate with the action of Code-Making Panel 5 on Comment 5-58.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 19-102
Recommendation: It was the action of the Technical Correlating Committee that the proposal be reconsidered and the panel consider correlating with the Code-Making Panel 5 action on Proposal 5-119 relative to an exception for existing installations. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
The panel accepts the comment and has revised the text per the Technical Correlating Committee direction.
Revise 551.76(D) as shown in the ROP Draft to read as follows:
"...for separately derived systems, and 250.32(B)(1) Exception for separate buildings."
Panel Statement: Under the direction of the Technical Correlating Committee, the panel has modified the text to correlate with the Panel 5 action on Proposal 5-119.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

19-40 Log #363 NEC-P19 **Final Action: Accept**
(551.80(B))

Submitter: Code-Making Panel 8,
Comment on Proposal No: 19-105
Recommendation: CMP-8 recommends that CMP-19 Accept this proposal in Principle with the following revised text:
"(B) Protection Against Physical Damage. Direct-buried conductors and cables entering or leaving a trench shall be protected by rigid metal conduit, intermediate metal conduit, electrical metallic tubing with supplementary corrosion protection, rigid, nonmetallic conduit, liquidtight flexible nonmetallic conduit, liquidtight flexible metal conduit, or other approved raceways or enclosures. Where subject to physical damage, the conductors or cables shall be protected by rigid metal conduit, intermediate metal conduit, or Schedule 80 ~~rigid nonmetallic~~ PVC conduit. All such protection shall extend at least 450 mm (18 in.) into the trench from finished grade."
Substantiation: CMP-8 recommends that CMP-19 Accept in Principle Proposal 19-105 with the following revised wording. The word "rigid" was also deleted in addition to "nonmetallic" to correlate with the action taken by CMP-8 on Proposal 8-53.
This comment has been balloted through CMP-8 with the following ballot results:
12 Eligible to Vote
12 Affirmative
Mr. R. Loyd voted affirmatively stating: "Proposal 19-105 was to Accept. I agree with Mr. Burns' recommendation to revise the panel action."
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Miller, T.

ARTICLE 552 PARK TRAILERS

19-41 Log #1276 NEC-P19 **Final Action: Reject**
(552.48(L))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 19-107
Recommendation: Accept the original proposal from the NEC TCC Task Group on Grounding and Bonding.
Substantiation: The NEC TCC Task Group on Grounding and Bonding agreed that simplification of the definitions was in order and that prescriptive elements would be proposed for specific Article texts as made in Proposal 19-107. The Task Group requests Panel 19 clarify and reconsider the Panel Action on this

Proposal to be consistent with the TCC Grounding and Bonding Task Group's original initiatives.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its position as stated in the panel statement on Proposal 19-107.

This is identical to the language used in 406.5(B), and there is no need to be more prescriptive as to the method of grounding.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Miller, T.

19-42 Log #2214 NEC-P19 **Final Action: Accept**
(552.60(B))

Submitter: Bruce A. Hopkins, RVIA

Comment on Proposal No: 19-112

Recommendation: Accept the original proposed language.

Substantiation: The proposed language is identical to the language approved by CMP-19 for recreational vehicles, 551.60(B) in the 1999 edition of the NEC (Reference 19-117, Log #660 - page 50 of the A98 ROP). The change in RVs was permitted on the basis that many of the low-voltage DC components must be removed from the system prior to testing to prevent component damage and would be the same scenario during park trailer production.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Miller, T.

ARTICLE 553 FLOATING BUILDINGS

19-43 Log #230 NEC-P19 **Final Action: Accept**
(553.9)

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 19-114

Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal relative to its action on Proposal 19-115. This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the direction of the Technical Correlating Committee and continues to accept Proposal 19-114.

Panel Statement: See panel action and statement on Comment 19-44.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-44 Log #231 NEC-P19 **Final Action: Accept**
(553.9)

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 19-115

Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal relative to its action on Proposal 19-114. This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the direction from the Technical Correlating Committee and subsequently rejects Proposal 19-115.

Panel Statement: Based on the action taken on Proposal 5-36 relative to the new definition of "Neutral Conductor", it is the intent of the panel to retain the word "neutral".

See the panel action and statement on Comment 19-43.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

ARTICLE 555 MARINAS AND BOATYARDS

19-45 Log #232 NEC-P19 **Final Action: Accept**
(555.1)

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 19-116

Recommendation: The Technical Correlating Committee directs the panel to reconsider the proposal at the public comment phase based on its technical merits. Although the Scope of NFPA 303 is limited to other than single family applications, there is no procedural reason why Code-Making Panel 19 cannot develop or apply electrical rules to single family applications if they desire to do so. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the direction of the Technical Correlating Committee to reconsider this proposal, and the panel continues to reject Proposal 19-116.

Panel Statement: The panel encourages the submitter of Proposal 19-116 to submit a proposal during the 2011 Code cycle that is more comprehensive and includes rationale for including and excluding specific requirements in this section necessary to provide the level of safety the submitter envisions.

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

19-46 Log #385 NEC-P19 **Final Action: Accept in Principle in Part**
(555.9)

Submitter: P.K. Patel, Anchor Engineering Consultants, Inc.

Comment on Proposal No: 19-117

Recommendation: Revise as follows:

"555.9 Electrical Connections. electrical connections shall be located at least 305 mm (12 in.) above the deck of a floating pier.

Conductor splices, ~~within Type 6P junction boxes,~~ utilizing sealed wire connector systems listed for this application shall be permitted where located above the waterline, but below the electrical datum field for floating piers. All electrical connections shall be located at least 305 mm (12 in.) above the deck of a fixed pier, but not below the electrical datum plane."

Substantiation: (a) The use of sealed, waterproof wire-to-wire splices in wet locations is common practice and allowed under the NFPA 70, section 110.14(B).

(b) These type of splices are located above the waterline on a floating dock/pier and are common practice applications in both direct burial and open bottom junction box (NON Type 6P junction boxes) conditions.

(c) It appears to be redundant to allow the use of approved water proof splices and then require these splices to be contained within Type 6P junction boxes.

THEREFORE:

We would like to see the wording "within Type 6P junction boxes" deleted.

Panel Meeting Action: Accept in Principle in Part

Revise the wording in the submitter's recommendation to read as follows:

"555.9 Electrical Connections. Electrical connections shall be located at least 305 mm (12 in.) above the deck of a floating pier.

Conductor splices, <u>within approved junction boxes</u>, utilizing sealed wire connector systems <u>listed and identified for submersion</u> shall be permitted where located above the waterline, but below the electrical datum field for floating piers. All electrical connections shall be located at least 305 mm (12 in.) above the deck of a fixed pier, but not below the electrical datum plane."

Panel Statement: The panel deleted the words "Type 6P" because a Type 6P box may not be needed in every case. However, a junction box suitable for the location is still required for splicing.

In lieu of the 6P box, the panel added the requirement for sealed wire connector systems to be listed and identified for submersion. Not all listed sealed wire connector systems provide the same degree of protection from moisture ingress.

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

19-47 Log #429 NEC-P19 **Final Action: Reject**
(555.10(A) Exception (New))

Submitter: Dan Leaf, Seneca, SC

Comment on Proposal No: 19-118

Recommendation: Accept the proposed exception.

Substantiation: Conduit bodies do not generally have external lugs or ears for attachment screws. The last sentence infers that holes shall be drilled for attachment screws Conduit bodies are not always installed abutting a surface to which they can be attached by screws through the back. The panel statement

that these locations are more likely to be subject to damage is unsubstantiated opinion and should be judged by the AHJ. Conduit bodies under a pier or dock are somewhat protected and less likely exposed to physical damage.
Panel Meeting Action: Reject
Panel Statement: The submitter is correct in that conduit bodies under a pier or dock are somewhat protected and less likely to be exposed to physical damage. Likewise, conduit bodies installed above the deck level are more likely to be exposed to physical damage.

Since 555.10(A) deals with securing and supporting electrical equipment enclosures installed on piers above deck level, the original panel statement that these locations are more likely to be subject to damage is in agreement with the submitter's substantiation.

No technical substantiation has been provided to justify allowing conduit to support electrical equipment enclosures.
The exception for 314.23(E) should not be allowed for these installations.
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

19-48 Log #1402 NEC-P19 **Final Action: Accept**
(555.21)

Submitter: Leslie Sabin-Mercado, San Diego Gas & Electric Company
Comment on Proposal No: 19-127
Recommendation: Revise text of the 2005 NEC to read as follows:
_555.21 Motor Fuel Dispensing Stations — Hazardous (Classified) Locations.

(A) General. Electrical wiring and equipment located at or serving motor fuel dispensing ~~stations~~ locations shall comply with Article 514 in addition to the requirements of this article. All electrical wiring for power and lighting shall be installed on the side of the wharf, pier, or dock opposite from the liquid piping system.

FPN: For additional information, see NFPA 303-2000, *Fire Protection Standard for Marinas and Boatyards*, and NFPA 30A-2003, *Motor Fuel Dispensing Facilities and Repair Garages*.

(B) Classification of Class I, Division 1 and 2 Areas.

The following criteria shall be used for the purposes of applying Tables 514.3(B)(1) and 514.3(B)(2) to motor fuel dispensing equipment on floating or fixed piers, wharfs or docks.

(1) Closed Construction. Where the construction of floating docks, piers, or wharfs is closed so that there is no space between the bottom of the dock, pier, or wharf and the water, such as concrete enclosed expanded foam or similar construction, and having integral service boxes with supply chases:

(a) The space above the surface of the floating dock, pier, or wharf shall be a Class I, Division 2 location with distances as identified in Table 514.3(B)(1) Dispenser and Outdoor.

(b) The space below the surface of the floating dock, pier or wharf having areas or enclosures such as tubs, voids, pits, vaults, boxes, depressions, fuel piping chases, or similar spaces where flammable liquid or vapor can accumulate shall be a Class I, Division 1 location.

Exception No. 1: Dock, pier, or wharf sections that do not support fuel dispensers and abut but are 6.0m (20 feet) or more from dock sections that support fuel dispenser(s) shall be permitted to be Class I, Division 2 where documented air space is provided between dock sections to permit flammable liquids or vapors to dissipate and not travel to these dock sections. Such documentation shall comply with 500.4(A).

Exception No. 2: Dock, pier, or wharf sections that do not support fuel dispensers and do not directly abut sections that support fuel dispensers shall be permitted to be unclassified where documented air space is provided and where flammable liquids or vapors can not travel to these dock sections. Such documentation shall comply with 500.4(A).

FPN: See 500.4(A) for documentation requirements.

(2) Open Construction. Where the construction of piers, wharfs, or docks is open, such as decks built on stringers supported by pilings, floats, pontoons or similar construction:

(a) The area 450 mm (18 in) above the surface of the dock, pier or wharf and extending 6.0 m (20 ft) horizontally in all directions from the outside edge of the dispenser and down to the water level shall be Class 1 Division 2.

(b) Enclosures such as tubs, voids, pits, vaults, boxes, depressions, piping chases, or similar spaces where flammable liquids or vapors can accumulate within 6.0 m (20 ft) of the dispenser shall be a Class I, Division 1 location.

Substantiation: Panel 19 accepted Proposal 19-127 unanimously but determined that a task group to address the technical merits of this proposal was in order. A Task Group comprised of members from CMP-19, CMP-19, CMP-14, NFPA 30A, NFPA 303, and the submitter of Proposal 19-127, met to discuss and coordinate the requirements of the proposal with those in Article 514, NFPA 30A and NFPA 303. Refer to Task Group Member list attached.

The Task Group has added no new requirements to this proposal. The terms have been altered to align with NFPA 30A-2003, *Motor Fuel Dispensing Facilities and Repair Garages*, and NFPA 303-2000, *Fire Protection Standard for Marinas and Boatyards*, such as "docks, piers and wharfs". The addition of these terms is not intended to expand the application of the requirements of the proposal but to be inclusive of various terms used to describe the same structure. Another phrase, "tubs, voids, pits, vaults, boxes, depressions, piping chases, or similar spaces where flammable liquids or vapors can accumulate" is borrowed from NFPA 30A for consistency between NFPA Standards. Metric dimensions have been included to meet the requirements of the NEC Style Manual. User-friendly language has been added to help the user correctly apply the requirements of Table 514.3(B)(1) and Table 514.3(B)(2). The proposed exception was subdivided to clarify declassification methods for dock sections that abut and for those that do not, so that the requirements of this section parallel those in 514.3. Two exceptions are added to provide a reasonable boundary of Class I, Division 1 and 2 areas. It is intended that these exceptions, along with other modified text, do not provide a new concept that is not contained in the Proposal or Article 514.
Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 9

20-1 Log #1559 NEC-P20 **Final Action: Reject**
(585 Title)

Submitter: Lawrence A. Bey, Cummins Power Generation
Comment on Proposal No: 20-1
Recommendation: Revise text to read as follows:
Change the title of Article 585 to Critical Operation Facilities.
Substantiation: This new article is located in Chapter Five, which is Special Occupancies. A power system is not an occupancy. The article covers more than just a critical operations power system.
Panel Meeting Action: Reject
Panel Statement: The panel rejects changing the title of the proposed article. See the panel action on Panel Comment CC-2000, which recommends relocating proposed Article 585, covering special conditions to the Chapter 7 of the NEC. The panel understands that location of articles in the NEC is the responsibility of the Technical Correlating Committee.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-1a Log #CC2000 NEC-P20 **Final Action: Accept**
(Article 585)

TCC Action: The Technical Correlating Committee directs that the Article be located as new Article 708.
Submitter: Code-Making Panel 20,
Comment on Proposal No: 20-1
Recommendation: Relocate Article 585, Critical Operations Power Systems to Chapter 7 between Articles 705 and 720.
Substantiation: CMP-20 recommends that the TCC move this article to Chapter 7 between Articles 705 and 720. The requirements of this Article are more appropriately located in Chapter 7 covering special conditions because the systems within this article may apply to multiple areas or facilities at a particular site and not just to a single building or occupancy. A critical operations power system is a special condition, not a special occupancy.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-1b Log #CC2001 NEC-P20 **Final Action: Accept**
(585.1)

Submitter: Code-Making Panel 20,
Comment on Proposal No: 20-1
Recommendation: Add a new Fine Print Note No. 6 to 585.1 to read:
For further information regarding physical security see NFPA 730-2006, *Guide for Premises Security*.
Reidentify FPN No.6 shown in the panel action on Proposal 20-1 as FPN No. 7.
Substantiation: The new fine print note provides direction to information regarding physical security. This guidance will aid in application of 585.5. The panel understands that scope statements are under the purview of the Technical Correlating Commmittee and the panel recommends to the Technical Correlating Committee that this fine print note be located in 585.1 for consistency with the approach taken in Proposal 20-1 of locating the informational references to other documents in this section.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-2 Log #2109 NEC-P20 **Final Action: Accept in Principle**
(585.1)

TCC Action: The Technical Correlating Committee advises that article scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee accepts the panel action.
Submitter: Richard E. Loyd, Sun Lakes, AZ
Comment on Proposal No: 20-1
Recommendation: Revise text to read as follows:
I. General.
585.1 Scope. The provisions of this article apply to the electrical installation, operation, monitoring, control, and maintenance of critical operations power systems, and to the HVAC, Fire Alarm, Security, Communications and Signaling supplying designated the DCOA or equipment ~~consisting of~~

~~circuits and equipment intended to supply, distribute and control electricity to~~ designated vital operations in the event of disruption to elements of the normal system. Critical operations power systems are those systems so classed by municipal, state, federal, or other codes, by any governmental agency having jurisdiction or by facility engineering documentation establishing the necessity for such a system.

Substantiation: The proposed Scope is unclear and does not include the items listed in 585.14. I found it difficult to define the bounds of the article as written. I would assume that the intent is to cover certain equipment such as pumps in flood areas etc., as well as the DCOA. Which may be a specially constructed concrete bunker of some type that is intended to withstand the expected disaster?

585.5 seems to be a performance requirement while 585.14 is prescriptive, but does not seem to assure compliance with the requirements in 585.5? It would seem that all of the wiring be required to meet 585.10(C)?

Consider identifying the performance requirements as such (see 250.4) and revise prescriptive requirements to meet them. I believe the proposed scope is concise and describes the proposed application of the article. Please consider.

Panel Meeting Action: Accept in Principle

The provisions of this article apply to the ~~electrical~~ installation, operation, monitoring, control, and maintenance of ~~critical operations power systems consisting of circuits and equipment~~ the portions of the premises wiring system intended to supply, distribute and control electricity to designated ~~vital~~ critical operations areas (DCOA) in the event of disruption to elements of the normal system.

Critical operations power systems are those systems so classed by municipal, state, federal, or other codes, by any governmental agency having jurisdiction, or by facility engineering documentation establishing the necessity for such a system. These systems include but are not limited to power systems, HVAC, fire alarm, security, communications and signaling for designated critical operations areas.

Panel Statement: The panel acknowledges that the proposed wording of 585.1 Scope was unclear and would cause some confusion among users of this Code. The panel's action clarifies that Article 585 applies to the electrical system supplying power to the critical operations facility and its related systems. The panel understands that article scopes are the responsibility of the Technical Correlating Committee and submits this change for TCC approval.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

20-3 Log #1193 NEC-P20 **Final Action: Reject**
(585.1.Scope)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group

Comment on Proposal No: 20-1

Recommendation: Revise the Scope and Fine Print Notes of proposed Article 585 in Proposal 20-1 as follows:

585.1 Scope. The provisions of this article apply to the electrical installation, ~~operation, monitoring, control, and maintenance~~ of critical operations power systems consisting of circuits and equipment intended to supply, distribute and control electricity to designated vital operations in the event of disruption to elements of the normal system.

Critical operations power systems are those systems so classed by municipal, state, federal, or other codes, by ~~any governmental agency~~ the authority having jurisdiction or as an optional system where ~~by~~ facility engineering documentation establishes~~ing~~ the necessity for such a system.

FPN No. 1: Critical Operations Power Systems are generally installed in vital infrastructure facilities that, if destroyed or incapacitated, would disrupt national security, the economy, public health or safety; and where enhanced electrical infrastructure for continuity of operation has been deemed necessary. ~~by governmental authority.~~

FPN No. 2: For further information on disaster and emergency management see NFPA 1600-2004 edition, *Standard on Disaster/Emergency Management and Business Continuity Programs*.

Substantiation: 1) Material Outside the NEC Committee Scope: The scope of Article 585 as accepted by the Panel covers material that is outside the Committee Scope of the National Electrical Code because it contains provisions for "operation, monitoring, control, and maintenance of critical operations power systems."

The Committee Scope of the National Electrical Code is printed on Page 22 of the 2005 NEC. The NEC Committee Scope (included as a reference for discussion) is as follows:

Committee Scope: This Committee shall have primary responsibility for documents on minimizing the risk of electricity as a source of electric shock and as a potential ignition source of fires and explosions. It shall also be responsible for text to minimize the propagation of fire and explosions due to electrical installations.

The NEC Committee Scope applies to only the **installation** portion of the electrical system and *not* the operation, monitoring, control and maintenance of such systems. Broadening the NEC Committee Scope or the proposed Scope of Article 585 will have unwanted applications and will make these provisions unenforceable. Provisions for the operation, monitoring, control and maintenance of such systems should be placed in an Annex of the National Electrical Code.

2) Mandatory Requirements or Optional System: The wording of the second paragraph of the Article Scope seems to indicate that Critical Operations Power Systems (COPS) are classified by either a government agency having jurisdiction or by facility engineering documentation establishing the necessity for such a system. The text of the paragraph is included for discussion purposes below:

Critical operations power systems are those systems so classed by municipal, state, federal, or other codes, by any governmental agency having jurisdiction or by facility engineering documentation establishing the necessity for such a system.

The issue is the identification of which governmental agency will actually classify such systems. Also, can any engineer classify their electrical system or facility as a Critical Operations Power System?

Typically, the term "authority having jurisdiction" is widely accepted in the NFPA documentation and used in standards. In Edison Electric Institute's opinion, this term should be the chosen term as the one to classify such systems. The wording of this paragraph (paragraph 2 of the Scope) as currently written eliminates some authorities such as the non-governmental ones with statutory authority such as the investor-owned electric utility companies.

Also, any engineering documentation for a facility can classify the facility, or portion of such, as a critical operations power system. This action would further support the requirements of an optional system for those who choose to implement these requirements for their own use.

Article 585 is intended and written as a set of mandatory regulations. However in Edison Electric Institute's opinion, the document may be best served as information in a Recommended Practice or an optional system. For example, 585.4 Risk Assessment outlines a requirement for conducting a risk assessment for critical power operations power systems including identifying the hazards, their likelihood of occurrence and the vulnerability of the electrical system to those hazards. Hazards are to be identified as naturally occurring and human-caused events.

Once the hazards are known by completing the Risk Assessment, a mitigation strategy addressing the results of the risk assessment is to be developed. Much of the language that currently appears in Article 585 is not easily enforceable and is highly subjective for the engineer or individual conducting the Risk Assessment. Also, the section on mitigation strategy would be at best performance requirements of a standard.

Panel Meeting Action: Reject

Panel Statement: The panel disagrees with the submitter's comment that the National Electrical Code is precluded from including language requiring operation, control, monitoring, or maintenance of electrical systems. In numerous instances, including 700.1 and 701.2, currently in the Code scope statements include similar language. The panel acknowledges that this article addresses a wiring system that is absolutely vital to life safety and thus intends language to require a higher oversight than previously included within the Code.

The panel also disagrees with the submitter's comments concerning mandatory or optional. Article 585 is mandatory when a critical operations facility is designated by another party. This is a similar concept to Article 645 concerning information technology rooms where the regulations only apply under certain designated conditions. The example of the "investor-owned electric utility companies" is already addressed by 90.2(B)(5)c which excludes "Installations under the exclusive control of an electric utility where such installations … are on property owned or leased by the electric utility for the purpose of communications, metering, generation, control, transformation, transmission, or distribution of electric energy." During construction of those facilities, the utility can request that Article 585 be used, which would then fall under the "facility engineering documentation establishing the necessity for such occupancy."

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

20-4 Log #1560 NEC-P20 **Final Action: Reject**
(585.1 Scope)

Submitter: Lawrence A. Bey, Cummins Power Generation

Comment on Proposal No: 20-1

Recommendation: Revise text to read as follows:

The provisions of this article shall apply to the electrical installation, operation, monitoring, control, and maintenance of critical operations facilities that are intended to remain operational and/or occupied in the event of a disaster, both naturally occurring and manmade. The requirements of this article not only apply to single function buildings but are also intended to be individually applied to a critical operation facility within a multifunction building. Critical operations facilities are those facilities so classed by municipal, state, or federal agencies having jurisdiction and authority.

Substantiation: The article covers more than just a critical operations power systems, such as requirements found in 585.4, 585.14, and 585.64; and the scope needs to be broadened to cover those special occupancy requirements. This article should only address governmental mandated facilities and not optional systems based on a facilities engineer's documentation. Facility engineering documentation is not defined and minimum requirements for the documentation are not established. The proposed scope statement was modeled on Article 517 for a facility instead of Article 700 for a power system.

Panel Meeting Action: Reject
Panel Statement: See the panel actions on Comment 20-1a and Comment 20-2.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-5 Log #1561 NEC-P20 **Final Action: Reject**
(585.4)

Submitter: Lawrence A. Bey, Cummins Power Generation
Comment on Proposal No: 20-1
Recommendation: Delete this section.
Substantiation: Risk assessment is outside the scope of the NEC. Risk assessment is addressed by 585.1 FPN No. 2 which calls out NFPA 1600 as a referenced document.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees that risk assessment is outside the scope of this Code. There are numerous instances where outside information necessary to enforce code provisions is required, including testing of ground-fault protection of equipment in 230.95 and performance of ground rods in 250.56. Due to the high degree of reliability that the wiring system for a critical operations area is required to meet, an assessment of potential hazards is vital to ensure proper minimum requirements for a safe and reliable installation. Article 585 does not designate which facilities are classified as critical to operations, nor does it designate what types of hazards the electrical system must withstand that is the purpose of the risk assessment.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-6 Log #1562 NEC-P20 **Final Action: Reject**
(585.5(1))

Submitter: Lawrence A. Bey, Cummins Power Generation
Comment on Proposal No: 20-1
Recommendation: Delete 585.5 and 585.5(1).
Substantiation: The requirement for a strategy for physical security is a vague and unenforceable requirement of an electrical installation.
Panel Meeting Action: Reject
Panel Statement: The panel disagrees that physical security is unenforceable. A risk assessment identifies potential physical hazards that are mitigated during installation of the wiring system. This concept is no different from protecting against physical damage or severe physical damage as required elsewhere in the Code. In fact, requiring a risk assessment provide a more definitive indication of physical risk than is provided elsewhere in the Code. See the panel action on Comment 20-1b for a reference to information on premises security considerations.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-6a Log #CC2002 NEC-P20 **Final Action: Accept**
(585.5(A))

Submitter: Code-Making Panel 20,
Comment on Proposal No: 20-1
Recommendation: Revise 585.5(A) to read:
Based on the results of the risk assessment, a strategy for providing physical security for critical operations power systems shall be developed, documented, and implemented.
Substantiation: Adding the word "documented" clarifies the intent that a written risk assessment strategy be in place.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-7 Log #1822 NEC-P20 **Final Action: Reject**
(585.10(B))

Submitter: Richard E. Loyd, Sun Lakes, AZ
Comment on Proposal No: 20-1
Recommendation: Revise text to read as follows:
585.10(B) Wiring. Wiring of two or more COPS circuits supplied from the same source shall be permitted in the same raceway, cable, box, or cabinet. Wiring outside of the DCOA from a COPS source or COPS source distribution overcurrent protection ~~to critical loads~~ shall be identified by a distinctive color or marking and be kept entirely independent of all other wiring and equipment.
~~Exception: Where the COPS feeder is installed in transfer equipment enclosures.~~
Substantiation: It is vitally important for all COPS components outside the DCOA to be easily distinguishable from the other electrical power, control and communications components.
Panel Meeting Action: Reject
Panel Statement: The panel rejects the recommendation to identify the COPS wiring methods that are installed outside the DCOA because of the the unique security risks that may be associated with such identification. Identifying such circuits in these areas could facilitate intentional tampering and vandalism. The exception needs to be retained because it is necessary to have the COPS wiring system in the transfer switch enclosure with the wiring from the normal source and alternate source.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-8 Log #2207 NEC-P20 **Final Action: Reject**
(585.10(C)(1)(1))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 20-1
Recommendation: Revise the text as follows:
(1) Rigid Metal Conduit, Intermediate Metal Conduit, Electrical Metallic Tubing, Type MI cable or Schedule 80 rigid nonmetallic conduit.
Substantiation: Electrical Metallic Tubing (EMT) is the logical wiring method for many of the applications in these areas. COPS circuits will undoubtedly be routed through ceiling spaces and other locations where they will not be subject to severe physical damage. The text in 585.10 (C) (1) (1) appears to be modeled after the text in 517.30 (3) **Mechanical Protection of the Emergency System.** This text allows the use of "nonflexible metal raceways" which includes EMT. There is no allowance for the use of EMT anywhere in 585.10 (C) (1). This is a robust wiring method allowed for use where not subject to "severe physical damage". Some of the wiring methods allowed in 585.10 (C) (1) such as Schedule 40 rigid nonmetallic conduit and metallic cable assemblies are not allowed at all where subject to any type of physical damage.
Panel Meeting Action: Reject
Panel Statement: The panel intends that COPS feeder wiring be installed in raceways suitable for exposure to severe physical damage or otherwise protected from severe physical damage.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-8a Log #CC2003 NEC-P20 **Final Action: Accept**
(585.10(C)(1)(1) and 585.10(C)(1)(2))

Submitter: Code-Making Panel 20,
Comment on Proposal No: 20-1
Recommendation: Revise 585.10(C)(1)(1) by removing "Schedule 80 rigid nonmetallic conduit".
Revise 585.10(C)(1)(2) to read:
Where encased in not less than 50 mm (2 in.) of concrete any of the following wiring methods shall be permitted:
a. Schedule 40 or Schedule 80 Rigid Polyvinyl Chloride Conduit (Type PVC)
b. Reinforced Thermosetting Resin Conduit (Type RTRC)
c. Electrical Metallic Tubing (Type EMT)
d. Flexible nonmetallic or jacketed metallic raceways
e. Jacketed metallic cable assemblies listed for installation in concrete
Substantiation: The panel has removed Schedule 80 from 585.10(C)(1)(1) because it is necessary to use metal wiring methods for physical protection in order that the fire protection required by 585.10(C)(2) also can be provided. The panel has added RTRC nonmetallic conduit to 585.10(C)(1)(2) based on the Panel 8 action to separate that type of nonmetallic raceway into a separate article. The panel has also added electrical metallic tubing to 585.10(C)(1)(2) because with 2 inches of concrete encasement the raceway is provides the intended physical and fire protection for the contained conductors. The panel action to permit nonmetallic raceways only where they are installed within concrete encasement provides the enhanced level of physical protection that is necessary for feeder circuits supplying mission critical loads.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-9 Log #2208 NEC-P20 **Final Action: Accept**
(585.10(C)(3))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 20-1
Recommendation: Revise text as follows:
(3) **Floodplain Protection.** Where COPS feeders are installed below the level of the 100-year floodplain, the circuit conductors shall be listed for use in a wet location and be installed in a wiring method that is permitted for use in wet locations.
Substantiation: (3) **Floodplain Protection.** Where COPS feeders are installed below the level of the 100-year floodplain, the circuit conductors shall be listed for use in a wet location and be installed in a wiring method that is permitted for use in wet locations.

Substantiation: Article 585 requires certain wiring methods for COPS feeders which the NEC allows for use in wet locations but that do not have a "wet location" marking on the listing label. For example, Article 344 allows rigid metal conduit to be used *"under all atmospheric conditions and occupancies."* Section 344.10(B) also states that rigid metal conduit *shall be permitted to be installed in concrete, in direct contact with the earth."* Rigid metal conduit is listed to UL 6 which references that the product be installed in accordance with the NEC but does not require the product to be marked for use in wet locations. Schedule 80 rigid nonmetallic conduit is listed to UL 651. This standard references the NEC, which allows Schedule 80 rigid nonmetallic conduit to be used in wet locations. UL 651 does not require a "wet location" marking on the listing label, however. This change in text will maintain the requirement in 585.10(C) (3) but will not confuse the user who may think the product has to be marked as listed for use in wet locations.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-9a Log #CC2004 NEC-P20 **Final Action: Accept (585.10(D))**

Submitter: Code-Making Panel 20,
Comment on Proposal No: 20-1
Recommendation: Revise 585.10(D) to read:
(D) COPS Branch Circuit Wiring.
(1) Outside of the DCOA. COPS branch circuits installed outside the DCOA shall comply with the physical and fire protection requirements of 585.10(C)(1) through (3).
(2) Within the DCOA. Any of the wiring methods recognized in Chapter 3 of this *Code* shall be permitted within the DCOA.
Substantiation: This comment provides additional clarity with respect to the wiring methods permitted for branch circuits that are installed within the DCOA. The construction of the DCOA will provide a higher degree of physical and fire protection for the wiring methods than is afforded to the wiring located outside of the DCOA.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-10 Log #2209 NEC-P20 **Final Action: Reject (585.10(D))**

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 20-1
Recommendation: Reconsider the requirements in this section for branch circuit wiring.
Substantiation: We are not sure of the intent of the Panel regarding branch circuit wiring. The existing text states that COPS branch circuits installed outside the DCOA must comply with the same requirements as the COPS feeder circuits. If the DCOA is a specific area within a very large building, do all feeder and branch circuits within the entire building have to comply with the requirements of 585.10 (C)(1) and (2)? If so, this seems to mandate, for example, that there be no exposed conduit within the entire building or that no electrical metallic tubing is allowed to be used for branch circuit wiring. We are also not sure why there are no special requirements for wiring within the DCOA. It seems as if this area could be subjected to the same stresses that the panel is concerned about in areas feeding the DCOA or outside of the DCOA.
Panel Meeting Action: Reject
Panel Statement: The panel has rejected this comment in accordance with 4.4.5(c) of the Regulations Governing Committee Projects because the recommendation does not include or refer to specific Code text to be added, revised, or deleted. See the panel action on Comment 20-9a.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-11 Log #2210 NEC-P20 **Final Action: Accept in Principle in Part (585.14, 585.14(1), 585.14(7), and 585.14(8))**

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 20-1
Recommendation: Revise the text as follows:
585.14 Wiring of HVAC, Fire Alarm, Security, Emergency Communications, and Signaling Systems. The wiring of heating, ventilation, and air-conditioning remote control and signaling circuits; fire alarm circuits; circuits for security; circuits for emergency communications; and signal systems shall be installed in any of the metal ~~conduits~~ raceways listed in 585.10(C)(1)(1).and in addition shall comply with (1) through (8) as applicable.
585.14 (1) Signal and communication wires shall use shielded twisted pairs. ~~be installed in any of the metal conduits installed in accordance with 585.10(C)~~
585.14(7) Riser communication cables shall be 2-hour fire resistive cables or a listed 2-hour electrical circuit protective system.
585.14(8) Control, monitoring, and power wiring to HVAC systems shall be 2-hour fire resistive cables or a listed 2-hour electrical circuit protective system.
Substantiation: The requirement for metal raceways should be relocated from (1) to the charging paragraph that contains the general requirements for this section. To ensure continuity of service, specially in COPS systems, these critical systems should be installed in noncombustible raceways which provide protection from physical damage, whether intentional or accidental. The word "conduit" was replaced with "raceway" in 585.14 in the event that our proposal to 585.10(C)(1)(1) to add Electrical Metallic Tubing is accepted. EMT is usually not included under the definition of "conduit" but EMT and the other conduits listed in 585.10(C)(1)(1) are all raceways.
Panel Meeting Action: Accept in Principle in Part
Revise 585.14 to read:
585.14 Wiring of HVAC, Fire Alarm, Security, Emergency Communications, and Signaling Systems. All conductors or cables shall be installed using any of the metal wiring methods permitted by 585.10(C)(1) and in addition shall comply with 585.14
(1) through 585.14 (8) as applicable.
(1) Signal and communication wires shall use shielded twisted pairs.
(2) Shields of signal and communication wires shall be continuous.
(3) Fiber optic cables shall be used for connections between two or more buildings on the property and under single management.
(4) Listed secondary protectors shall be provided at the terminals of the communication circuits.
(5) Conductors for all control circuits rated above 50 V shall be installed with wire rated not less than 600 V.
(6) Communications, fire alarm, and signaling circuits shall use relays with contact ratings that exceed circuit voltage and current ratings in the controlled circuit.
(7) Riser communication cables shall be 2-hour fire-resistive cable or a listed 2-hour electrical circuit protective system.
(8) Control, monitoring, and power wiring to HVAC systems shall be 2-hour fire-resistive cable or a listed 2-hour electrical circuit protective system.
Panel Statement: This action achieves the original panel objective of providing physical protection in addition to a 2-hour fire rating for these circuits. The panel rejected the recommendation to change the word "conduit" to "raceway" because it is the panel's intent to limit the wiring method to only those conduit types identified in 585.10(C) and did not accept the recommendation to add electrical metallic tubing to the permitted wiring methods. The panel has accepted the recommendation to change the term "rated" to "resistive".
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-12 Log #2348 NEC-P20 **Final Action: Accept in Principle (585.24(C))**

Submitter: Alan Manche, Square D Company
Comment on Proposal No: 20-1
Recommendation: Revise text to read:
(C) Automatic Transfer Switches. ~~Automatic transfer switches shall comply with (C)(1) and (C)(2).~~
~~(1) Automatic transfer switches shall be listed for emergency use.~~
~~(2)~~ Automatic transfer switches shall be electrically operated and mechanically held.
Substantiation: There has been no substantiation presented that equipment failure is an issue where appropriately rated and installed electrical equipment is used. The proposed text only requires a transfer switch to listed, which is only one of many solutions for transferring power to alternate sources. Multiple switchboards from multiple manufacturers are often employed in large facilities to control the power from multiple power sources. It is not reasonable to require such an installation to have equipment that is specifically listed for transfer or paralleling of sources.
The panel should reconsider the lack of substantiation for this requirement and consider the broader applications of products that control the electrical system. The panel must consider the restriction being placed on the user by requiring listing which inherently will exclude safe and possibly more reliable product solutions, without any substantiation that safety or reliability will be enhanced by requiring listing. The proposed wording should be revised as noted above to reflect the language currently found in Article 700.
Panel Meeting Action: Accept in Principle
Revise the first sentence of 585.24(C) to read:
(C) Automatic Transfer Switches. Where used with sources that are not inherently synchronized, automatic transfer switches shall comply with (C)(1) and (C)(2).

Panel Statement: The panel has revised this section to address the concerns expressed in the substantiation and has added a condition under which compliance with 585.24(C)(1) and (2) is required. The safety issues addressed by this section are inherent to sources that are not synchronized at the time of transfer.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

20-13 Log #1994 NEC-P20 **Final Action: Reject**
(585.54)

Submitter: Ed Larsen, Square D Company
Comment on Proposal No: 20-1
Recommendation: Delete proposed 585.54 that would require the selective coordination of ALL overcurrent devices.

~~585.54 Coordination. Critical operations power system(s) overcurrent devices shall be selectively coordinated with all supply side overcurrent protective devices.~~

Substantiation: The Panel agreed to include this new text for public comment and it is apparent from the proposals to NEC 700.27 and the comments from the voting members of CMP 20 that selectivity is not an independent technical solution as it impacts reliability, personnel safety from arc-flash hazard being increased, and the removal of isolation devices such as circuit breakers in the electrical system. By unnecessarily driving the size of overcurrent devices larger throughout the system, the size of conductors, raceways and electrical equipment are also unnecessarily increased with no added technical performance benefit. In fact, the performance reliability can be reduced and the arc-flash hazard increased from over-sizing overcurrent device that provide no further isolation.

NFPA 110 Emergency and Standby Power Systems does not require all devices to be selective. the proposed NEC 585.54 requires all devices to be selective as compared to the definition in Article 100 that provides the engineer the necessary latitude to choose the appropriate overcurrent devices and system configuration. Requiring all overcurrent devices to be selective is an over design of the system, which is recognized by the IEEE examples presented in the substantiation found in numerous proposals to delete or revise NEC 700.27 and 701.18. This results in an increase in the size of equipment, conductors and raceways, leading to unnecessary equipment cost and size increases, higher available short circuit currents and increased arc flash hazard for the installation.

I have assisted in the selective coordination of a number of facilities across the country and all of the following points have entered into the discussion at some point. The points discussed below are independent of applying fuses or circuit breakers; as a matter of fact, the overcurrent devices in the switchboard and the generator are based on the manufacturer dependent 2:1 fuse ratio. Consider the diagram I have provided and the challenges with selective coordination.

Proposal 585.54 must be deleted, leaving selectivity to the engineering community in order to ensure that the most reliable and safest system is installed. Many other technical performance issues are left to the engineering community such as:

1) Voltage drop, where you have an NEC compliant installation that is selectively coordinated and the lights dim and drop out computer systems.

2) Sizing motor overcurrent devices for selectivity, where the motors are unable to start but they are NEC compliant, permitting exhaust fans in the legally required standby system to be code compliant even if they are unable to start.

3) Ground-fault protection, where none is required on the emergency system source but may be found on the normal source. Hence a small ground fault can take down the normal source which is often more reliable than the alternate source. Once again a performance issue that is ignored in the NEC but the engineer addresses the issue in design.

These few examples illustrate reliability issues that are left to the engineer to address. Why is selectivity more important than these examples that are not addressed by the NEC for enhanced safety and reliability?

Industry is having to address the implications of selectivity that has been added in 700.27 due to the engineering community's demand to ensure appropriate design that are both safe and legally compliant. Here are a few of the amendments that are utilized in the industry to address some of these issues:

1) The State of Washington has amended the Selectivity requirement in the 2005 NEC.

2) The healthcare industry in the State of Florida recognizes the challenges of selective coordination and permits overcurrent devices to overlap where no additional isolation is gained in the system. The 2005 NEC fails to address this issue.

3) The inspection community in plan review has recognized this challenge as we have engaged in numerous conversations between engineers and inspectors that are working together to optimize selectivity per NFPA 110. They are recognizing that the 2005 NEC is more restrictive than necessary and are having to address designs through 90.4 by getting permission from the AHJ to permit appropriate latitude to comply with NFPA 110 even though they are not compliant with NEC 585.54. There is no safety or performance compromised and it is easy to recognize enhancements in performance and reliability with enhanced safety as a by-product of a reduction in the size of the overcurrent devices.

The panel should reconsider the action taken on this proposal and the numerous others looking for relief in this section to provide the safest and most reliable system to the facility they are designing. Delete NEC 585.54 and leave the performance issues to the engineer as is done with numerous other aspects of the electrical system.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The overriding theme of Articles 585 is to keep the power on for vital loads. Selective coordination is obviously essential for the continuity of service required in critical operations power systems. Selective coordination increases the reliability of the COPS system. The use of the term "all" in the requirement has to be taken in context with the definition of selective coordination in Article 100 that reads, "Localization of an overcurrent condition to restrict outages to the circuit or equipment affected, accomplished by the choice of overcurrent protective devices and their ratings or settings." The panel addressed the several issues that were common to the comments they received on selective coordination. These issues and the panel responses follow:

1. Increase in the size of equipment resulting in higher available short-circuit current and increased arc-flash and equipment damage.

Panel Response: Design can incorporate techniques such as zone-selective interlocking and arc-reduction maintenance switches to address the increased arc-flash energy resulting from the larger equipment used to achieve selective coordination.

2. Performance/reliability reduction.

Panel Response: Selective coordination increases reliability by localizing the effects of a fault on the system. Selective coordination does not decrease the reliability of the system where properly engineered.

3. Eliminating the expertise of the professional engineer.

Panel Response: The requirement for selective coordination increases the necessity to provide a design based on the individual system.

4.The interpretation of the term "selectivity of all overcurrent protective devices".

Panel Response: There is a need for all of the devices to be evaluated in order to ensure that selective coordination is provided by all overcurrent protective devices. However, selective coordination does not mean that two devices installed in series will not localize the fault due to overlapping time/current responses.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16
Comment on Affirmative:

CARROLL, J.: The panel came to consensus during the discussion of Comment 20-13 that selective coordination is necessary to ensure a higher degree of reliability for a critical operations power system. The panel statement recognizes the requirement, as presently worded, falls short of establishing the requirement as intended. The panel discussion was clearly spent on understanding the requirement and addressing many of the concerns expressed by the numerous submitters where every device is not always selective. The panel action on Comment 20-16 should have been an accept in principle with a panel action to revise the wording that would provide the appropriate latitude necessary for the system engineer to make the correct engineering decision without a legal mandate that each device be selective. The panel should have at the minimum considered the new language that was reached in Panel 13 on this very topic. Inconsistency between this article and Article 700 will simply reinforce the rigid compliance for only this article. The panel statement in this comment is valuable for those reading and instructing on this topic but it contradicts the actual wording which is the requirement.

HICKMAN, P.: We are voting affirmative with the panel action to reject Comment 20-13. The major theme of Article 585 is "Continuity of Service". Keep the power on! Selective Coordination plays a major part in keeping the power on. For far too long engineers and overcurrent device manufacturers have relied on a "cookie cutter" approach to coordination. With a little more work on the consulting engineer's part, Critical Operations Power Systems can be designed and installed so that overcurrent conditions are isolated to only the affected circuit, so that other parts of the system are not needlessly shut down.

Panel 20 discussed the possibility of adding the two exceptions that Panel 13 added for emergency and legally required standby systems. Those exceptions were for two overcurrent devices of the same size in series, and for devices on the primary and secondary of a transformer. Panel 13 recognized that these exceptions do not really affect selective coordination because no additional parts of the electrical system are shut down. It doesn't matter if one or both of the devices open, the same amount of circuits are off line. Panel 20 felt that these exceptions were unnecessary, because selective coordination is not really affected, since no additional parts of the electrical system are shut down.

Panel 13 thought it best to specifically explain to the users that two devices of the same size in series and devices on the primary and secondary of a transformer do not have to selectively coordinate, and Panel 20 felt that these same devices did not affect the selective coordination of the system so they did not need to add the exceptions. Different approach. Same outcome. The important point is that both Panels recognized the need for selective coordination for these critical systems, where loss of power can lead to injury or death.

However, to improve clarity, usability and for consistency is may be appropriate for the TCC to place the same exceptions in Article 585 as accepted by CMP-13 for two overcurrent devices of the same size in series, and for devices on the primary and secondary of a transformer.

The argument that a selectively coordinated system creates other safety hazards is without merit. NFPA 70E requires an electrically safe work condition and recognizes energized work only where the task is infeasible or deenergization would create a greater hazard. Arc reduction maintenance switches and current limiting overcurrent protective devices can also be used in the system design to reduce arc flash energy for energized work when it is infeasible or a greater hazard to deenergize.

ZGONENA, T.: When implemented properly, selective coordination will normally enhance a power system's ability to maintain power to critical loads. Selective coordination is appropriate for specifically determined critical areas and loads. Selective coordination is desirable in order to localize overcurrent conditions, and to limit circuit interruption to the circuits in which the overcurrent is occurring. While selective coordination with all overcurrent protective devices under all overcurrent conditions will provide such localization, there are some conditions under which this coordination may not be desirable from a safety or reliability standpoint. Requiring selective coordination of all overcurrent protective devices under all possible overcurrent conditions will require a selective coordination study be conducted, but does not allow for relaxation of this requirement where such coordination is not necessary. Where a selective coordination study reveals that complete selective coordination introduces safety concerns which are greater than those encountered if the system is not entirely coordinated, a relaxation of the requirement may be appropriate, but the current wording will not allow such a relaxation under any condition. Additional guidance needs to be provided within the code to better define where and how selective coordination is to be implemented.

20-14 Log #2104 NEC-P20 **Final Action: Reject (585.54)**

Submitter: Philip M. Piqueira, General Electric Co.
Comment on Proposal No: 20-1
Recommendation: I disagree with the panel action. I recommend that the text in 585.54 of the panel action be deleted in its entirety.
Substantiation: GE strongly supports selective coordination as a valuable safety asset in the current range where overloads most often occur. However, GE does not support the mandate for Selective Coordination for ALL current ranges and ALL overcurrent devices because safety and reliability can both actually be diminished. This is due to increased hazardous arc flash energy with increased equipment damage and potential fire initiation, decreased reliability, and extended downtime before service restoration. Mandates for selective coordination for ALL current ranges and ALL overcurrent devices will not always provide the optimum safety solution or optimum reliability. Such a solution requires the expertise and judgment of a Professional Engineer who can balance the design, safety and operating requirements in order to determine the optimum design for each specific facility.

Selective coordination is a system design issue, not a Code issue.

The wording of this section states that ALL overcurrent devices selectively coordinate, but this is not what the definition in Article 100 implies. The definition deals with localization of an overcurrent and, in many cases, selective coordination for ALL overcurrent devices serves no useful localization purpose such as when: 1) Overcurrent devices are located on the primary and secondary sides of a low voltage transformer with no loads in between. 2) A feeder overcurrent device is connected in series with the main overcurrent device in a downstream panelboard with no loads in between. 3) An overcurrent device on a generator is in series with an overcurrent device in a switchboard with no loads in between. In these instances, requiring both devices to be selectively coordinated does not add to the reliability of the system, which is the stated objective of the CMP.

When overcurrent devices are located on the primary and secondary sides of a low voltage transformer, sized to meet the NEC transformer protection requirements, it is almost impossible to also meet the requirement for selective coordination of this section, regardless of the type of overcurrent protective device chosen.

In many instances it may not be possible to meet the requirements for generator protection provided by an overcurrent device located on or near the generator and provide selective coordination with downstream overcurrent devices. Further, the generator protection functions provided within the engine-generator controller by the manufacturer might not be able to selectively coordinate with downstream overcurrent devices.

The paralleling of generators is often done to enhance system reliability, which is the stated objective of the CMP, however, in order to meet the requirement for selective coordination each generator overcurrent device and controller must selectively coordinate with all downstream overcurrent devices. This may not be possible if the generators are of unequal size.

The upgrade or expansion of an existing building may require the replacement of existing upstream equipment so that it will selectively coordinate with the new downstream equipment it must feed. The State of Washington has recognized the significant economic burden this is placing on building owners and businesses and has issued an emergency order exempting existing buildings from meeting the selective coordination requirements of the 2005 NEC.

Systems are normally designed for selective coordination in the overload region of the overcurrent device time-current curves. If this were not so, they would not operate under normal conditions, so what is really being called for in this requirement is overload and short circuit selective coordination. In order to achieve total short circuit selective coordination, the size of upstream overcurrent protective devices may need to be increased and/or time delay trip characteristics increased, thereby possibly increasing the arc flash hazard. In other words, by forcing selective coordination for an event that most likely will never occur, namely a bolted fault, the hazards involved in performing tasks which most likely will occur, namely system maintenance, may be increased. This is another reason why system designers need the flexibility to optimize the design of a system, which the current requirement does not allow.

Further, we wish to point out the following:

1. The need for the flexibility to optimize the design of a system is recognized in IEEE Standard 242-2001 (The Buff Book). Section 15.1 states, "In applying protective devices, it is occasionally necessary to compromise between protection and selectivity. While experience may suggest one alternative over another, the preferred approach is to favor protection over selectivity. Which choice is made, however, is dependent on the equipment damage and the affect on the process."

2. The need for the flexibility to optimize the design of a system is also recognized in NFPA 110-2005, Standard for Emergency and Standby Power Systems. Section 6.5.1 states, "The overcurrent protective devices in the EPSS shall be coordinated to optimize selective tripping of the circuit overcurrent protective devices when a short circuit occurs. A further explanation of this statement is given in Annex A section A.6.5.1, "It is important that the various overcurrent devices be coordinated, as far as practicable, to isolate faulted circuits and to protect against cascading operation on short circuit faults. In many systems, however, full coordination is not practicable without using equipment that could be prohibitively costly or undesirable for other reasons."

3. This NEC text conflicts with Chapter 27 of the International Building Code that specifically requires compliance with NFPA 110 for emergency systems. This presents a conundrum for the system designer and the AHJ. Which code takes precedence, the IBC or the NEC?

In summary, GE strongly supports selective coordination as a valuable safety asset in the current range where overloads most often occur. However, GE does not support the mandate for Selective Coordination for ALL current ranges and ALL overcurrent devices because safety and reliability can both actually be diminished, thus the section should be deleted.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 20-13.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16
Comment on Affirmative:
ZGONENA, T.: See My Affirmative with Comment on 20-13.

20-15 Log #2228 NEC-P20 **Final Action: Reject (585.54)**

Submitter: Kevin J. Lippert, Eaton/Cutler-Hammer
Comment on Proposal No: 20-1
Recommendation: Disagree with the panel action. Recommend that the text in 585.54 be deleted in its entirety.
Substantiation: Eaton strongly supports selective coordination as a valuable safety asset in the current range where overloads most often occur. However, there are circumstances where overcurrent devices (both fuses and circuit breakers) selected specifically to coordinate across ALL current ranges, will have the unwanted consequence of substantially increasing the hazardous arc flash energy with corresponding increased equipment damage and potential fire initiation. Mission critical systems must also weigh the importance of extended downtime before service restoration. This mandate eliminates the Professional Engineer's expertise and judgment from determining the optimum design for each specific facility. Optimum designs are a balance between safety and operating requirements.

Alternatively, CMP-20 could choose to make this a FPN, similar to the 2002 NEC FPN to 700.25, with advice that selective coordination MAY increase overall reliability of the system.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 20-13.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16
Comment on Affirmative:
ZGONENA, T.: See My Affirmative with Comment on 20-13.

20-16 Log #2347 NEC-P20 **Final Action: Reject**
(585.54)

Submitter: Alan Manche, Square D Company
Comment on Proposal No: 20-1
Recommendation: Revise text to read:
~~585.54 Coordination. Critical operations power system(s) overcurrent devices shall be selectively coordinated with all supply side overcurrent protective devices.~~
585.54 Coordination. The overcurrent protective devices in the COPS shall be selected to optimize selective coordination.
Substantiation: I agree with Mr. Carroll's and Mr. Moniz's position that requiring all overcurrent devices to be selective is over restrictive and can actually establish a less reliable and reduce safety and performance of the overall electrical system.

Square D supports the deletion of NEC 585.54, however, if the panel is reluctant to address the safety, reliability and performance issues by deleting it, it would be prudent for the panel to revise the text to address many of the concerns addressed in Mr. Carroll's comment.

Utilizing similar language to that found in NFPA 110 would permit some latitude to address many of these issues found in his comment to enhance the reliability and performance of the system.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 20-13.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15 Negative: 1
Explanation of Negative:

CARROLL, J.: The panel came to consensus during the discussion of Comment 20-13 that selective coordination is necessary to ensure a higher degree of reliability for a critical operations power system. The reason for this negative vote is that the panel statement recognizes the requirement, as presently worded, falls short of establishing the requirement as intended. The panel discussion was clearly spent on understanding the requirement and addressing many of the concerns expressed by the numerous submitters where every device is not always selective. The panel action should have been an accept in principle with a panel action to revise the wording that would provide the appropriate latitude necessary for the system engineer to make the correct engineering decision without a legal mandate that each device be selective. The panel should have, at the minimum, considered the new language that was reached in Panel 13 on this very topic. Inconsistency between this article and Article 700 will simply reinforce the rigid compliance for only this article. The panel statement in Comment 20-13 is valuable for those reading and instructing on this topic, but it contradicts the actual wording which is the requirement.
Comment on Affirmative:

ZGONENA, T.: See My Affirmative with Comment on 20-13.

20-17 Log #2346 NEC-P20 **Final Action: Reject**
(585.56)

Submitter: Alan Manche, Square D Company
Comment on Proposal No: 20-1
Recommendation: Include the phase loss text in Mr. Carroll's affirmative comment and revise text to read:

585.56 Phase Loss. All ungrounded service or feeder conductors of the circuit shall be automatically opened during an overcurrent condition.
Substantiation: I agree with Mr. Carroll's comment that a loss of one phase on feeder or service conductors can place the entire system at risk. Based on the scope of this article it is prudent to have such a requirement for reliability in place. This is a reliability issue that is more elementary than appropriate selective coordination. The proposed revised text excludes branch circuits by recognizing that a phase loss in a branch circuit would only place connected utilization equipment at risk such as motor driven equipment including the HVAC system. The panel may revert to include all circuits if they so choose to ensure appropriate reliability, however the focus on the service and feeder is due to the loss of a transformer from overheating or overloading of conductors that can be masked in the system that would be detrimental to the entire electrical system and may make it impossible to bring the system back on line if such a system condition persisted for any substantial amount of time. Utilization equipment may be designed to be protected by a specific type or configuration of overcurrent protection which is not impacted by phase loss, hence the comment to revise the language proposed by Mr. Carroll.
Panel Meeting Action: Reject
Panel Statement: The comment correctly identifies continuity of power for vital loads as one of the primary goals of Article 585. However, opening all three poles of overcurrent protective devices actually decreases reliability and continuity of power for many vital loads. For example, since most faults are phase-to-ground faults, assume a phase-to-ground fault in an emergency feeder circuit that supplies power for egress lighting and other critical single-phase and phase-to-phase loads. If all three poles of the overcurrent device open because of this phase-to-ground fault, the entire emergency lighting circuit and many other vital loads are without power. This is a blackout condition caused by one phase-to-ground fault. It is much better for only one pole to open in such a situation, which would leave two thirds of these loads energized. Protection for individual branch-circuit three-phase motor loads has been addressed since the 1971 NEC(R) began requiring three overcurrent relays and there are other means that can be deployed. Solid state overloads and solid state drives as well as additional phase loss relays are optionally available for branch circuits where enhanced protection is warranted for specific critical motor circuits.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16
Comment on Affirmative:

CARROLL, J.: I am casting an affirmative vote in support of the panel action as there was a lack of substantiation for the panel to consider the necessity of including such a requirement in this article. My greatest concern is the panel statement fails to consider the aspects of protecting critical sensitive electrical loads such as communication equipment and computers that will be necessary to ensure a critical operations facility remains operational during an emergency. This article has included a number of performance requirements that include selectivity and fire protection, it should also consider power quality issues (from single phasing in this case) that would damage the equipment necessary to support emergency needs.

As a manufacturer and partner in designing numerous mission-critical environments, single phasing is an extremely critical from a performance standpoint. Consider the response of the UPS to single phasing. Single-phasing of the rectifier input supply to a static UPS, for example, will typically cause the UPS to begin supplying power to the critical load from its stored-energy source (typically batteries). Single-phasing of the UPS output can cause the UPS to start attempting to balance the load, which can result in UPS overload. The preservation of the load then becomes dependent upon the over-all topology of the system and the loading of the system. For these reasons, protection from single phasing is almost exclusively found in the applications of these critical facilities.

The panel statement makes a couple of points that raise the question regarding the necessity of requiring such robustness and reliability. The panel statement goes further to inaccurately state that protection from single phasing will reduce the reliability of the system, which is refuted in the example above. There is merit to protecting the system from single phasing to ensure power quality that will not damage sensitive electronic loads along with others, however, there may need to be boundaries established around such a performance requirement to address certain aspects of the system power quality issues.

HICKMAN, P.: We are voting affirmative with the panel action to reject Comment 20-17. The NEC already requires single-phasing protection of three phase motors by demanding an overload relay in each of the three phases. We certainly would not want to knock off all the lighting in a three phase branch circuit when a short occurs in a ballast in one lighting fixture. Protection for other specific types of loads, such as for UPS systems, is an issue for product standards where manufacturers and users can provide the very best possible solutions.

It should be noted that single phasing conditions have many causes, including damaged motor starter contacts, burned-open overload relays, damaged switch or circuit breaker contacts, open fuses, open cables, and open windings in transformers. Whenever critical loads need to be protected from single phasing, they cannot simply be protected by requiring three pole operation of the overcurrent protective device. For example, a three pole molded case circuit breaker is not designed to open to protect against single phasing damage caused by an open winding in an upstream transformer.

The proposed text as written would literally guarantee that all power for lighting, communications and every other function critical to police stations, fire departments, emergency rescue departments, coast guard and others be removed completely on a single ground fault. The result would be a total loss of power. Inclusion of this suggested requirement would be reason to reject the entire Article.

ARTICLE 590 TEMPORARY INSTALLATIONS

3-82 Log #736 NEC-P03 **Final Action: Accept**
(590.2(C))

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 3-111
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 3 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others

when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
MAASSEN, R.: See my Explanation of Negative Vote on Comment 3-86.

3-83 Log #737 NEC-P03 **Final Action: Accept**
(590.2(C))

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 3-110
Recommendation: Continue to Reject .
Substantiation: Continue to Reject. The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. A total of sixteen new Fine Print Notes were proposed to reference NECA standards. ALL were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). The TCC should intervene to prohibit these types of Fine Print Notes. CMP 3 should continue to reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
MAASSEN, R.: See my Explanation of Negative Vote on Comment 3-86.

3-84 Log #845 NEC-P03 **Final Action: Accept**
(590.2(C) (New))

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 3-110
Recommendation: The panel is encouraged to continue to Reject Proposal 3-110.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
MAASSEN, R.: See my Explanation of Negative Vote on Comment 3-86.

3-85 Log #846 NEC-P03 **Final Action: Accept**
(590.2(C))

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 3-111
Recommendation: The panel is encouraged to continue to Reject Proposal 3-111.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
MAASSEN, R.: See my Explanation of Negative Vote on Comment 3-86.

3-86 Log #2142 NEC-P03 **Final Action: Reject**
(590.2(C) (New))

Submitter: Ronald E. Maassen, Lemberg Electric Co., Inc.
Comment on Proposal No: 3-110
Recommendation: Add new text to read as follows:
590.xx Temporary electrical power and lighting installed in a neat and workmanlike manner.
FPN: Accepted industry practices are described in ANSI/NECA 200-2002, Recommended Practice for Installing and Maintaining Temporary Electrical Power at Construction Sites, and other ANSI-approved installation standards.
Substantiation: The panel action to reject Recommended Practices for Installing and Maintaining Temporary Electrical Power at Construction Sites, and referring to 110.12 FPN, did not take into consideration the specifics of the document. The NECA 200-2002 is specific to temporary wiring and gives the contractor and AHJ a document to better understand the installation of temporary wiring on construction sites and holiday lighting. I believe this document should be included as a fine print note to Article 590.
Panel Meeting Action: Reject
Panel Statement: The panel reiterates that Section 110.12 already provides requirements for electrical equipment to be installed in a neat and workmanlike manner with an accompanying fine print note for accepted industry practices. Inserting this same requirement in Article 590 is not necessary since Chapters 1 through 4 are general requirements and anyone installing temporary wiring in accordance with Article 590 must adhere to 110.12.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
MAASSEN, R.: The panel should have accepted the this comment. Many temporary installations are slip shod, at best, and have and can created hazards. Giving guidelines to the authority having jurisdiction and to the electrician, can only help in making these installations safer. Other Code-Making Panels have accepted many of the NECA/ANSI Fine Print Note proposals.

3-87 Log #1203 NEC-P03 **Final Action: Accept**
(590.4(D) and 590.6 (B)(2)(a))

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 3-5
Recommendation: 1) The NEC TCC Grounding and Bonding Task Group agrees with the CMP-3 editorial revisions to Section 590.4(D).
2) The NEC TCC Grounding and Bonding Task Group recommends that CMP-3 reconsider accepting the existing proposed text for Section 590.6(B)(2)(a).
Substantiation: The NEC TCC Grounding and Bonding Task Group:
1) Understands the revisions to Section 590.4(D) have been made for clarity and continue to be consistent with the Grounding and Bonding Task Group's original initiatives.
2) Concludes that the proposed revision as worded for 590.6(B)(2)(a) provides good clarification and properly identifies the specific conductor referred to in this section. The specific grounding conductor referenced in this rule is the equipment grounding conductor which accomplishes the grounding and provides an effective ground-fault current path for operation of protective devices supplying the equipment. This prescriptive language can only make the provision required by OSHA 1926.404 more effective. The Task Group does not agree that this change would affect OSHA's acceptance of this prescriptive method of protection. The intent of this grounding is to facilitate operation of protective devices in the situation of a ground fault. The wording proposed by the Task Group is consistent with prescriptive requirements in 250.114, 250.138, 406.3(C), and 590.4(D) referenced in 590.6(B)(2).

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-88 Log #1633 NEC-P03 **Final Action: Accept**
(590.6)

Submitter: Paul J. Casparro, Scranton Electricians JATC / Rep. International Brotherhood of Electrical Workers
Comment on Proposal No: 3-125
Recommendation: This Proposal should continue to be Accepted.
Substantiation: This proposal eliminates a possible misunderstanding of the current text of the NEC. The intent of the section is to make sure that all persons on a construction site are protected by a ground fault circuit interrupter regardless of the source of power. The addition of this text adds clarity to this section.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-89 Log #890 NEC-P03 **Final Action: Reject**
(590.6(B) Exception)

Submitter: Paul Schnackenberg, Gen/Tran Corp.
Comment on Proposal No: 3-129
Recommendation: Revise as follows:
Exception: 30A-125V and 125/250V receptacles on portable generators, when used for home standby systems with approved transfer switches, and temporary wiring, shall not be required to have GFCI protection for these specific receptacles.
Substantiation: Add to substantiation provided: In searching through catalogs, tool supply outlets and rental companies, no tools have been found using a 30A-125V plug. The only use of a 125/250V receptacle on a construction site is to power a "Spider Box" which already have GFCI protection. Combining all of the leakage in a spider box will cause nuisance tripping in genset GFCI.
Panel Meeting Action: Reject
Panel Statement: While the substantiation has provided additional text regarding the use of spider boxes and protection on construction sites, the text in the exception still deals with portable generators connected for use as home standby systems. The panel reiterates its statement from the proposal as follows: Section 590.6 only applies to temporary power to equipment used by personnel during construction, remodeling, maintenance, repair, or demolition of buildings, structures, equipment, or similar activities. This proposed text more appropriately belongs in Article 702 since the proposal is addressing portable generators used for optional standby power for a dwelling unit.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-90 Log #1148 NEC-P03 **Final Action: Reject**
(590.8 (New))

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 3-131
Recommendation: Accept Proposal 3-131.
Substantiation: Requirements of Article 702 apply to the installation of optional standby systems that are permanently installed in their entirety and not for temporary installations. The specific requirements for temporary installations in 590.2, 590.3, and 590.4 should cover the temporary connection of portable generators.
The proposed addition of 590.8 in Proposal 3-131, properly deals with the "temporary connection of portable generators", and has additional requirements that are not covered under the provisions of Article 702.
Panel Meeting Action: Reject
Panel Statement: The scope of Article 702 was changed to include portable alternate power supplies as follows:
"702.1 Scope. The provisions of this article apply to the installation and operation of optional standby systems. The systems covered by this article consist of those that are permanently installed in their entirety, including prime movers, and those that are arranged for a connection to a premises wiring system from a portable alternate power supply." Since this proposed text provides requirements for connection of portable generators to permanent premises wiring, the text more appropriately belongs in Article 702, not in Article 590.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 600 ELECTRIC SIGNS AND OUTLINE LIGHTING

18-95a Log #CC1800 NEC-P18 **Final Action: Accept**
(600.7)

Submitter: Code-Making Panel 18,
Comment on Proposal No: 18-123
Recommendation: Revise the Panel Action in Proposal 18-123 to read:
600.7 Grounding and Bonding
(A) Grounding.
(1) Equipment Grounding. Signs and metal equipment of outline lighting systems shall be grounded by connection to the equipment grounding conductor of the supply branch circuit(s) or feeder using the types of equipment grounding conductors specified in 250.118.
Exception: portable cord-connected signs shall not be required to be connected to the equipment grounding conductor where protected by a system of double insulation or its equivalent. Double insulated equipment shall be distinctively marked.
(2) Size of Equipment Grounding Conductor. The equipment grounding conductor size shall be in accordance with 250.122 based on the rating of the overcurrent device protecting the branch circuit or feeder conductors supplying the sign or equipment.
(3) Connections. Equipment grounding conductor connections shall be made in accordance with 250.130 and in a method specified in 250.8.
(4) Supplementary Grounding Electrode. Supplementary grounding electrode(s) shall be permitted for electric signs and outline lighting systems covered by this article and shall meet the requirements of 250.54.
(5) Metal Building Parts. Metal parts of a building shall not be permitted as a secondary return conductor or an equipment grounding conductor.
(B) Bonding.
(1) Bonding of Metal Parts. Metal parts and equipment of signs and outline lighting systems shall be bonded together and to the equipment grounding conductor of the branch circuit or feeder supplying the sign or outline lighting system and shall meet the requirements of 250.90.
(2) Bonding Connections. Bonding connections shall be made in accordance with 250.8.
(3) Metal Building Parts. Metal parts of a building shall not be permitted to be used as a means for bonding metal parts and equipment of signs or outline lighting systems together or to the equipment grounding conductor of the supply circuit.
(4) Flexible Metal Conduit Length. Listed flexible metal conduit or listed liquidtight flexible metal conduit that encloses the secondary circuit conductor from a transformer or power supply for use with neon tubing shall be permitted as a bonding means if the total accumulative length of the conduit in the secondary circuit does not exceed 30 m (100 ft.).
(5) Small Metal Parts. Small metal parts not exceeding 50 mm (2 in.) in any dimension, not likely to be energized and spaced at least 19 mm (3/4 in.) from neon tubing shall not require bonding.
(6) Nonmetallic Conduit. Where listed nonmetallic conduit is used to enclose the secondary circuit conductor from a transformer or power supply and a bonding conductor is required, the bonding conductor shall be installed separate and remote from the nonmetallic conduit and be spaced at least 38 mm (1 1/2 in) from the conduit when the circuit is operated at 100 Hz or less or 45 mm (1 3/4 in.) when the circuit is operated at over 100 Hz.
(7) Bonding Conductors. Bonding conductors shall comply with (a) and (b).
(a) Bonding conductors shall be copper and not smaller than 14 AWG.
(b) Bonding conductors installed external of a sign or raceway shall be protected from physical damage.
(8) Signs in Fountains. Signs or outline lighting installed inside a fountain shall have all metal parts and bonded to the equipment grounding conductor of the branch circuit for the fountain recirculating system. The bonding connection shall be as near as practicable to the fountain and shall be permitted to be made to metal piping systems that are bonded in accordance with 680.53.
FPN: Refer to 600 32(J) for restrictions in length of high-voltage secondary conductors.
Substantiation: This revision to 600.7 addresses the recommendation or a portion of the recommendation in Comments 18-96, 18-97, 18-98,18-99,18-100, and 18-101. The panel concurs with the TCC Grounding and Bonding Task Group recommendation that the specific references to sections within Article 250 are necessary to ensure compliance. The panel added titles where necessary to comply with the NEC Style Manual and also modified 600.7(B)(1) and 600.7(B)(3) to clarify that all metal parts (other than as exempted in 600.7(B)(5)) of a sign or outline lighting are to be bonded to the equipment grounding conductor of the supply circuit. The panel clarified the protection of a bonding conductor installed external to a sign or outline lighting system.

Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 11 Negative: 2
Explanation of Negative:

KIEFFER, S.: CMP-18 has erred by including in this panel comment six cross-references to specific sections of Article 250.

Those cross-references do not change the application of any of the requirements of Article 250 to signs and outline lighting. The cross-references do not change the requirements for signs and outline lighting. They do not modify or amend Chapters 1 through 4. To conform with 90.3, Article 600 should only include statements that modify Chapters 1 through 4.

The only substantiation provided for these cross-references is to improve clarity. However, providing only six cross-references to specific sections of Article 250, while ignoring twenty-six other sections of Article 250 that frequently apply to signs and outline lighting, will not improve clarity. Instead the cross-references will increase the incidents of false interpretations of the code, creating confusion in the field, rather than code compliance. Individuals will erroneously conclude that the only requirements in Article 250 applicable to signs and outline lighting are the six cross-referenced sections. Erroneous interpretations of the code are always a problem. The panel should avoid creating additional potential for this to occur, particularly when the panel's action does not change the requirements of the code.

The code clearly states in 90.1 that is not a training manual for untrained persons. A common sense analysis readily concludes that the only individuals who might gain a little benefit from these cross-references are untrained persons: persons who are presently failing to comply with the requirements of the code. Trained persons are knowledgeable of the requirements in Article 250. A massive, nationwide training effort exists to reinforce this knowledge.

Panel Comment 18-95a should be modified, deleting all cross-references to Article 250, similar to what was recommended in Comment 18-98. The recommendation in 18-95a should be as follows:

600.7 Grounding and Bonding.

(A) Grounding.

(1) Equipment Grounding. Signs and metal equipment of outline lighting systems shall be grounded by connection to the equipment grounding conductor of the supply branch circuit(s) or feeder.

(2) Metal Building Parts. Metal parts of a building shall not be permitted as a secondary return conductor or an equipment grounding conductor.

(B) Bonding.

(1) Bonding of Metal Parts. Metal parts and equipment of signs and outline lighting systems shall be bonded together and to the equipment grounding conductor of the supply circuit.

(2) Metal Building Parts. Metal parts of a building shall not be permitted to be used as a means of bonding metal parts and equipment of signs and outline lighting together or to the equipment grounding conductor of the supply circuit.

(3) Flexible Metal Conduit. Listed flexible metal conduit or listed liquidtight flexible metal conduit that encloses the secondary circuit conductor from a transformer or power supply for use with neon tubing shall be permitted as a bonding means if the total accumulative length of the conductor in the secondary circuit does not exceed 30 m (100 ft).

(4) Small Metal Parts. Small metal parts not exceeding 50 mm (2 in.) in any dimension, not likely to be energized and spaced at least 19 mm (3/4 in.) from neon tubing shall not require bonding.

(5) Nonmetallic Conduit. Where listed nonmetallic conduit is used to enclose the secondary circuit conductor from a transformer or power supply and a bonding conductor is required, the bonding conductor shall be installed separate and remote from the nonmetallic conduit and be spaced at least 38 mm (1 1/2 in.) from the conduit when the circuit is operated at 100 Hz or less or 45 mm (1 3/4 in.) when the circuit is operated at over 100 Hz.

(6) Bonding Conductors. Bonding conductors shall comply with (a) and (b).

(a) Bonding conductors shall be copper and not smaller than 14 AWG.

(b) Bonding conductors installed external of a sign or raceway shall be protected from physical damage.

(8) Signs in Fountains. Signs or outline lighting installed inside a fountain shall have all metal parts and equipment grounding conductors bonded to the equipment grounding conductor for the fountain recirculating system. The bonding connection shall be as near as practicable to the fountain and shall be permitted to be made to metal piping systems that are bonded in accordance with 680.53.

FPN: Refer to 600.32(J) for restrictions on length of high-voltage secondary conductors.

TODD, S.: The panel action included references to Article 250 in Section 600.7 that do supplement or modify the general rules of Chapters 1-4 as stated in Section 90.3. The placement of the references in Section 600.7 could be construed by the casual user of the NEC to be the only requirements from Article 250 that apply to Article 600 which is not consistent with Section 90.3.

Comment on Affirmative:

WRIGHT, R.: I concur with the actions and the correction.

18-96 Log #386 NEC-P18 **Final Action: Accept in Principle (600.7)**

Submitter: Michael J. Johnston, Plano, TX
Comment on Proposal No: 18-123
Recommendation: Continue to accept Proposal 18-123 as revised by CMP-18 and include the following revisions to the proposal.

Add a title to 600.7(A)(1) as follows: 600.7(A)(1) Equipment Grounding.
Add a title to 600.7(B)(1) as follows: 600.7(B)(1) Bonding of Metal Parts.
Add a title to 600.7(B)(2) as follows: 600.7(B)(2) Bonding Connections.

600.7 Grounding and Bonding.

(A) Grounding

(1) Equipment Grounding. Signs and metal equipment of outline light systems shall be grounded by connection to the equipment grounding conductor of the supply branch circuit or feeder using any of the types of equipment grounding conductors specified in 250.118.

Exception: Portable cord-connected signs shall not be required to be connected to the equipment grounding conductor where protected by a system of double insulation or its equivalent. Double insulted equipment shall be distinctively marked.

(2) The equipment grounding conductor size shall be in accordance with 250.122 based on the rating of the overcurrent device protecting the branch circuit or feeder conductors supplying the sign or equipment.

(3) Connections. Equipment grounding conductor connections shall be made in accordance with 250.130 and in a method specified in 250.8.

(4) Supplementary Grounding Electrode. Supplementary grounding electrode(s) shall be permitted for electric signs and equipment covered by this article and shall meet the requirements of 250.54.

(5) Metal Building Parts. Metal parts of a building shall not be permitted as a secondary return conductor or an equipment grounding conductor.

(B) Bonding.

(1) Bonding of Metal Parts. Metal parts of electric signs and outline lighting systems shall be bonded together and to the associated transformer or power supply equipment grounding conductor of the supply branch circuit or feeder and shall meet the requirements of 250.90.

(2) Bonding Connections. Bonding connections shall be made in accordance with 250.8.

(3) Metal Building Parts. Metal parts of a building shall not be permitted to be used as a means for bonding metal parts of signs or outline lighting systems together or to the transformer of power supply equipment grounding conductor.

(4) Flexible Metal Conduit Length. Listed flexible meal conduit or listed liquidtight flexible metal conduit that encloses the secondary circuit conductor from a transformer or power supply for use with neon tubing shall be permitted as a bonding means if the total accumulative length of the conduit in the secondary circuit does not exceed 30 m (100 ft).

(5) Small Metal Parts. Small metal parts not exceeding 50 mm (2 in.) in any dimension, not likely to be energized and spaced at least 19 mm (3/4 in.) from neon tubing shall not require bonding.

(6) Nonmetallic Conduit. Where listed nonmetallic conduit is used to enclose the secondary circuit conductor from a transformer or power supply and a bonding conductor is required, the bonding conductor shall be installed separate and remote from the nonmetallic conduit and be spaced at least 38 mm (1 1/2 in.) from the conduit when the circuit is operated at 100 Hz or less or 45 mm (1 3/4 in.) when the circuit is operated at over 100 Hz.

(7) Bonding Conductors. Bonding conductors shall be copper and not smaller than 14 AWG. Bonding conductors installed external shall be protected where subject to physical damage.

(8) Signs in Fountains. Signs or outline lighting installed inside a fountain shall have all metal parts and bonded to the equipment grounding conductor of the branch circuit for the fountain recirculating system. The bonding connection shall be as near as practicable to the fountain and shall be permitted to be made to metal piping systems that are bonded in accordance with 680.53.

FPN: Refer to 600.32(J) for restrictions in length of high-voltage secondary conductors.

Substantiation: This comment is an effort to provide editorial revisions to the proposal by inserting titles to the list items in 600.7(A)(1), 600.7(B)(1) and 600.7(B)(2). The suggested revisions will help provide clarity and improve usability of this section as revised. This comment does not introduce new requirements and is intended as an editorial adjustment only.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Panel Comment 18-95a (Log #CC1800).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-97 Log #1195 NEC-P18 **Final Action: Accept in Principle (600.7)**

Submitter: Stephen G. Kieffer, Kieffer & Co., Inc. / Rep. International Sign Association
Comment on Proposal No: 18-123
Recommendation: Revise the panel action to read as follows:

(A) Grounding.

(1) Signs and metal equipment of outline lighting systems shall be grounded in accordance with Article 250 Part VI and Part VII by connection to the equipment grounding conductor of the supply branch or feeder circuit(s) ~~or feeder using the types of equipment grounding conductors specified in 250.18.~~

Exception: Portable cord-connected signs shall not be required to be connected to the equipment grounding conductor where protected by a system of double insulation or its equivalent. Double insulated equipment shall be distinctively marked.

~~(2) The equipment grounding conductor size shall be in accordance with 250.122 based on the rating of the overcurrent device protecting the branch-circuit or feeder conductors supplying the sign or equipment.~~

(3) ~~Connections~~. Equipment grounding conductor connections shall be made in accordance with ~~250.130 and in a method specified in~~ 250.8.

(4) Supplementary Grounding Electrode. Supplementary grounding electrode(s) shall be permitted for electric signs and ~~equipment~~ outline lighting systems ~~covered by this article~~ and shall meet the requirements of 250.54.

(5) Metal Building Parts. Metal parts of a building shall not be permitted as a secondary return conductor or an equipment grounding conductor.

(B) Bonding.

(1) Metal parts and equipment of signs and outline lighting systems shall be bonded together and to the ~~associated transformer or power supply~~ equipment grounding conductor of the branch or feeder circuit(s) ~~or feeder~~ and shall meet the requirements of Article 250 Part V ~~250.90~~.

(2) Bonding connections shall be made in accordance with 250.8.

(3) Metal Building Parts. Metal parts of a building shall not be permitted to be used as a means for bonding metal parts and equipment of signs or outline lighting systems ~~together or to the transformer or power supply equipment grounding conductor.~~

(4) Flexible Metal Conduit Length. Listed flexible metal conduit or listed liquidtight flexible metal conduit that encloses the secondary circuit conductor from a transformer or power supply for use with neon tubing shall be permitted as a bonding means if the total accumulative length of the conduit in the secondary circuit does not exceed 30 m (100 ft).

(5) Small Metal Parts. Small metal parts not exceeding 50 mm (2 in.) in any dimension, not likely to be energized and spaced at least 19 mm (3/4 in.) from neon tubing shall not require bonding.

(6) Nonmetallic Conduit. Where listed nonmetallic conduit is used to enclose the secondary circuit conductor from a transformer or power supply and a bonding conductor is required, the bonding conductor shall be installed separate and remote from the nonmetallic conduit and be spaced at least 38 mm (1 1/2 in.) from the conduit when the circuit is operated at 100 Hz or less or 45 mm (1 3/4 in.) when the circuit is operated at over 100 Hz.

(7) Bonding Conductors.

(a) Bonding conductors shall be copper and not smaller than 14 AWG.

(b) Bonding conductors required by 600.7(B)(6) to be installed ~~external~~ separately from the conduit shall be protected from physical damage.

(8) Signs in Fountains. Signs or outline lighting installed inside a fountain shall have all metal parts and bonded to the equipment grounding conductor of the branch circuit for the fountain recirculating system. The bonding connection shall be as near as practicable to the fountain and shall be permitted to be made to metal piping systems that are bonded in accordance with 680.53.

FPN: Refer to 600.32(J) for restrictions in length of high-voltage secondary conductors.

Substantiation: Should the panel elect to continue with partial cross-references to specific portions of Article 250 (Note: see submitter's other comment on 18-123 which addresses the error of this action), then the cross-reference should be to complete parts of the article rather than select sections. Highlighting through cross-reference to a few select sections, while ignoring other applicable sections of a part of Article 250 increases the potential for errors and misunderstanding in the application of the code.

This comment also includes changes in (A)(1), (A)(4), (B)(1), (B)(3) and (B)(7) to better clarify the intent and improve usability.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Panel Comment 18-95a (Log #CC1800).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-98 Log #1197 NEC-P18 **Final Action: Accept in Principle in Part (600.7)**

Submitter: Stephen G. Kieffer, Kieffer & Co., Inc. / Rep. International Sign Association
Comment on Proposal No: 18-123
Recommendation: Revise the panel action to read as follows:

(A) Grounding.

(1) Signs and metal equipment of outline lighting systems shall be grounded by connection to the equipment grounding conductor of the supply branch or feeder circuit(s) ~~or feeder using the types of equipment grounding conductors specified in 250.18.~~

~~Exception: portable cord-connected signs shall not be required to be connected to the equipment grounding conductor where protected by a system of double insulation or its equivalent. Double insulated equipment shall be distinctively marked.~~

~~(2) The equipment grounding conductor size shall be in accordance with 250.122 based on the rating of the overcurrent device protecting the branch-circuit or feeder conductors supplying the sign or equipment.~~

~~(3) Connections. Equipment grounding conductor connections shall be made in accordance with 250.130 and in a method specified in 250.8.~~

~~(4) Supplementary Grounding Electrode. Supplementary grounding electrode(s) shall be permitted for electric signs and equipment covered by this article and shall meet the requirements of 250.54.~~

(5) Metal Building Parts. Metal parts of a building shall not be permitted as a secondary return conductor or an equipment grounding conductor.

(B) Bonding.

(1) Metal parts and equipment of signs and outline lighting systems shall be bonded together and to the ~~associated transformer or power supply~~ equipment grounding conductor of the branch or feeder circuit(s) ~~or feeder and shall meet the requirements 250-90.~~

~~(2) Bonding connections shall be made in accordance with 250.8.~~

(3) Metal Building Parts. Metal parts of a building shall not be permitted to be used as a means for bonding metal parts and equipment of signs or outline lighting systems ~~together or to the transformer or power supply equipment grounding conductor.~~

(4) Flexible Metal Conduit Length. Listed flexible metal conduit or listed liquidtight flexible metal conduit that encloses the secondary circuit conductor from a transformer or power supply for use with neon tubing shall be permitted as a bonding means if the total accumulative length of the conduit in the secondary circuit does not exceed 30 m (100 ft).

(5) Small Metal Parts. Small metal parts not exceeding 50 mm (2 in.) in any dimension, not likely to be energized and spaced at least 19 mm (3/4 in.) from neon tubing shall not require bonding.

(6) Nonmetallic Conduit. Where listed nonmetallic conduit is used to enclose the secondary circuit conductor from a transformer or power supply and a bonding conductor is required, the bonding conductor shall be installed separate and remote from the nonmetallic conduit and be spaced at least 38 mm (1 1/2 in.) from the conduit when the circuit is operated at 100 Hz or less or 45 mm (1 3/4 in.) when the circuit is operated at over 100 Hz.

(7) Bonding Conductors

(a) Bonding conductors shall be copper and not smaller than 14 AWG.

(b) Bonding conductors required by 600.7(B)(6) to be installed ~~external~~ separately from the conduit shall be protected from physical damage.

(8) Signs in Fountains. Signs or outline lighting installed inside a fountain shall have all metal parts and be bonded to the equipment grounding conductor of the branch circuit for the fountain recirculating system. The bonding connection shall be as near as practicable to the fountain and shall be permitted to be made to metal piping systems that are bonded in accordance with 680.53.

FPN: Refer to 600.32(J) for restrictions in length of high-voltage secondary conductors.

Substantiation: The Panel's action is in direct conflict with the 2003 National Electrical Code Style Manual, 4.1 "do not use a reference if the requirement is already covered by 90.3". The proposed references to 250.18, 250.122, 250.130, 250.8, 250.54 and 250.90 do not supplement or modify the rules in Chapters 1 through 4. These references conflict with the arrangement of the code as specified in 90.3. and should not be included in Article 600.

Concurrently, by having selected only a few references to Article 250 the proposal ignores numerous other sections of Article 250 which are applicable to electric signs and outline lighting systems including: 250.4, 250.6, 250.10, 250.12, 250.52, 250.53, 250.62, 250.66, 250.68, 250.70, 250.90, 250.96, 250.98, 250.102, 250.110, 250.112, 250.114, 250.118, 250.119, 250.120, 250.132, 250.134, 250.136, 250.138, 250.144 and 250.148. Therefore, the proposal adds confusion and potential misunderstandings rather than clarity. By only including a few cross-references, non-of-which modify Article 250, the proposal could readily result in failures to read and comply with all applicable requirements of Article 250.

This comment also includes changes in (A)(1); (B)(1); (B)(3) and (B)(7) to better clarify the intent and improve usability.

Panel Meeting Action: Accept in Principle in Part
The panel rejects the deletion of the specific references to Artilce 250. The panel accepts the remainder of the recommendation in principle.
Panel Statement: The panel concurs with the TCC Grounding and Bonding Task Group that the specific references to the sections of Article 250 are necessary to ensure compliance. See the panel action and statement on Panel Comment 18-95a (Log #CC1800).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-99 Log #1268 NEC-P18 **Final Action: Accept (600.7)**

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 18-123
Recommendation: Continue to accept the TCC Grounding and Bonding Task Group proposal 18-123 as modified and revised by the actions of CMP-18.
Substantiation: The CMP-18 revisions to the proposal have been made for clarity and continue to be consistent with the Grounding and Bonding Task Group's original initiatives. The NEC style manual does permit references to specific sections in 4.1.1 and in this instance the TG feels the references are appropriate and 90.3 affirms that all of Chapters 1 thru 4 do apply. The references in this article are to draw specific attention to relevant sections.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:

KIEFFER, S.: Proposals 18-123 and 18-124 were not submitted to CMP-18 by the TCC Grounding and Bonding Task Group. It was submitted by an individual. In this proposal that individual did not claim to represent the task group or his employer.

See also my explanation of negative vote on Comment 18-95a.

18-100 Log #1270 NEC-P18 **Final Action: Accept (600.7)**

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 18-124
Recommendation: Continue to accept the TCC Grounding and Bonding Task Group proposal 18-124 as modified and revised by the actions of CMP-18.
Substantiation: The CMP-18 revisions to the proposal have been made for clarity and continue to be consistent with the Grounding and Bonding Task Group's original initiatives. The NEC style manual does permit references to specific sections in 4.1.1 and in this instance the TG feels the references are appropriate and 90.3 affirms that all of Chapters 1 thru 4 do apply. The references in this article are to draw specific attention to relevant sections.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:

KIEFFER, S.: See my explanation of negative vote on Comment 18-99.

18-101 Log #1558 NEC-P18 **Final Action: Accept (600.7)**

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 18-125
Recommendation: Continue to accept the TCC Grounding and Bonding Task Group proposal 18-125 as modified and revised by the actions of CMP-18.
Substantiation: The CMP-18 revisions to the proposal have been made for clarity and continue to be consistent with the Grounding and Bonding Task Group's original initiatives. The NEC style manual does permit references to specific sections in 4.1.1 and in this instance the TG feels the references are appropriate and 90.3 affirms that all of Chapters 1 thru 4 do apply. The references in this article are to draw specific attention to relevant sections.

This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:

KIEFFER, S.: See my explanation of negative vote on Comment 18-99.

18-102 Log #220 NEC-P18 **Final Action: Accept (600.12)**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 18-133
Recommendation: It was the action of the Technical Correlating Committee that this proposal be sent to Code-Making Panel 3 for comment regarding the use of Class 2 wiring methods without there being a Class 2 power supply. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See the panel action and statement on Comment 18-103.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-103 Log #292 NEC-P18 **Final Action: Accept (600.12)**

Submitter: Code-Making Panel 3,
Comment on Proposal No: 18-133
Recommendation: Change (C) in the recommendation to read as follows:

(C) Less than 50 Volts. Secondary circuit wiring less than 50 volts shall be installed in accordance with any of the following:

(1) Any wiring method included in Chapter 3 suitable for the conditions.

(2) Where the power source complies with the requirements in 725.41, wiring methods shall be permitted to be installed in accordance with 725.52(A) or (B).

Substantiation: Just limiting the power source to less than 50 volts does not cover the power sources that may exceed the current limitations outlined in Tables 11(A) and 11(B) in Chapter 9. For example, 725.21 permits Class 1 power limited circuits to be 30 volts and 1000 volt-amperes with a current rating of 33.33 amps. Where a power-limited Class 1 power source is other than a transformer, the maximum output or VAmax can be as high as 2500 volt-amperes with a current peak of 83.33 amps. Obviously, a Class 2 wiring method would not be acceptable for circuits with amperage and volt-ampere levels in these ranges.

This comment has been balloted through CMP-3 with the following ballot results:

13 Eligible to Vote
11 Affirmative
1 Negative
1 Not Returned (L. Sleights)

Mr. S. Egesdal voted negatively stating: "The apparent intention of the revision to 600.12 is to be able to use Class 2 and Class 3 wiring methods. It is important for the installation of Class 2 and Class 3 cable to comply with Part I and Part III of Article 725. The references in the text proposed by the Task Group only refer to selected sections in Part III of Article 725. Local authorities inspecting an installation could have concern for Class 2 and Class 3 cables not installed in compliance with Part I, such as 725.8 Mechanical Execution of Work and 725.10, Class 1, Class 2, and Class 3 Circuit Identification. Where other articles use Class 2 and Class 3 wiring methods, it is important that all the relevant requirements of Article 725 are met.

Suggestion: Change 600.12(C)(2) to: "Class 2 and Class 3 wiring methods shall be permitted where installed in compliance with Part I and Part II of Article 725."

Mr. M. Sanders voted affirmatively stating: "Change the second sentence of (C) to read as follows: "Secondary circuit wiring less than 50 volts shall be istalled in accordance with ~~any~~ one of the following:". There are only two methods permitted, so the choice is between one of them or the other. Because the choices stated are for two different conditions, the user should not be left with the impression that both can be used at the same location unless that is the intent, in which case it should be made more clear."

Panel Meeting Action: Accept
Panel Statement: Panel 18 confirms that it is their intent to use Class 2 power supplies and wiring methods that are installed in accordance with 725.41 and 725.52. Article 600 has never prohibited the use of the circuits and wiring methods covered within the scope of Article 725.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-104 Log #1198 NEC-P18 **Final Action: Accept**
(600.24)

Submitter: Stephen G. Kieffer, Kieffer & Co., Inc. / Rep. International Sign Association
Comment on Proposal No: 18-139
Recommendation: Revise the panel action on 600.24 as follows:
600.24 Class 2 Power Sources.
Signs and outline lighting systems supplied by Class 2 transformers, power supplies, and power sources shall comply with the applicable requirements of Article 600 and all of the following:
(A) Listing. Class 2 Power supplies and Power sources shall be listed for use with electric signs and outline lighting systems and shall comply with 725.41.
(B) Grounding. ~~Systems shall be grounded where required by 250.20(A).~~ Metal parts of signs and outline lighting systems shall be grounded and bonded in accordance with 600.7 ~~and 250.112(G).~~
(C) Secondary Wiring. Secondary wiring from Class 2 power sources shall comply with 600.12(C).
Substantiation: 250.20(A) enables ungrounded AC systems below 50 volts. This provision of Chapter 2 has been modified by 600.7 which requires grounding of all signs and outline lighting. Therefore, 250.20 should not be referenced as that reference results in an apparent conflict with 600.7 and the second sentence of 600.24(C).
The reference to 250.112 should be deleted as this is a circular reference because 250.112s sole function is to reference 600.7.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-105 Log #1196 NEC-P18 **Final Action: Accept**
(600.32(A)(1))

TCC Action: The Technical Correlating Committee directs that this section be revised to delete the term "rigid nonmetallic conduit" to be consistent with other actions taken in the NEC and to revise the text to comply with the NEC Style Manual.
The Technical Correlating Committee understands that the panel meeting action on Comment 18-105 supplements the panel actions on Proposals 18-146 and 18-148 to read as follows:
"(1) Installation. Conductors shall be installed in rigid metal conduit, intermediate metal conduit, PVC conduit, RTRC, liquidtight flexible nonmetallic conduit, flexible metal conduit, liquidtight flexible metal conduit, electrical metallic tubing, metal enclosures, on insulators in metal raceways, or in other equipment listed for use with neon secondary circuits over 1000 volts."
Submitter: Stephen G. Kieffer, Kieffer & Co., Inc. / Rep. International Sign Association
Comment on Proposal No: 18-148
Recommendation: Revise text to read:
600.32(A)(1): Conductors shall be installed on insulators, in rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, liquidtight flexible nonmetallic conduit, flexible metal conduit, liquidtight flexible metal conduit, electrical metallic tubing, metal enclosures, or other equipment listed for use with neon secondary circuits over 1000 volts and shall be installed in accordance with the requirements of Chapter 3.
Substantiation: The subject of 600.32 is neon secondary circuits. I believe the submitter's intent was to identify the specific purpose, for neon secondary circuits, as opposed to requiring a general high-voltage listing, which would be an extensive expansion of the requirements.
No substantiation was provided to support imposing the requirements for high-voltage general wiring on neon secondary circuits.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-106 Log #221 NEC-P18 **Final Action: Accept**
(600.32(F))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 18-151
Recommendation: The Technical Correlating Committee directs that the Panel reconsider and correlate their actions on this proposal with Proposal 18-152. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise 600.32(F) to read:
Insulators and Bushings. Insulators and bushings for conductors shall be listed for use with neon secondary circuits over 1000 volts.
Panel Statement: The panel concludes that their action on Proposal 18-151 was in error. The correct action should be to "Accept in Principle" with a panel statement of "See panel actions and statement on Proposal 18-152." This action is also correlates with the action on Comment 18-105.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-107 Log #222 NEC-P18 **Final Action: Accept**
(600.32(F))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 18-152
Recommendation: The Technical Correlating Committee directs that the Panel reconsider and correlate their actions on this proposal with Proposal 18-151. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See the panel action and statement on Comment 18-106.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

18-108 Log #1194 NEC-P18 **Final Action: Accept**
(600.32(G))

Submitter: Stephen G. Kieffer, Kieffer & Co., Inc. / Rep. International Sign Association
Comment on Proposal No: 18-153
Recommendation: Accept the proposal and revise 600.32(G) to read:
(G) Conductors in Raceways.
~~(1) Damp or Wet Locations. In damp or wet locations the insulation on all conductors shall extend not less than 100 m (4 in.) beyond the metal conduit or tubing.~~
~~(2) Dry Locations. In dry locations~~, the insulation on all conductors shall extend not less than 65 mm (2 1/2 in.) beyond the metal conduit or tubing.
Substantiation: Electrode enclosures required by 600.42 are listed under UL 879 Standard for Sign Components for damp and wet locations and include requirements that the GTO cable be enclosed.
The demonstration samples of GTO submitted at the panel meeting were not subject to failure testing while the GTO was inside of a required enclosure. They were not tested in an installation that complies with the code or with the applicable UL standards. The samples appearance of failure can only be produced by an open circuit, shorted to ground, power by a transformer or power supply that does not have the required secondary-circuit ground-fault protection.
UL is presently conducting a fact-finding investigation of GTO cable.
In analyzing this proposal and the opposition to the proposals it is important to keep in mind that a hazard would only exist as a result of multiple concurrent failures; a neon tube must break; the listed electrode enclosure required in 600.42 and the UL required GTO enclosure must both fail thus exposing the bare conductor at the splice to wet conditions and grounded metal; and the secondary-circuit ground-fault protection required in 600.23 must fail to perform and allow a continuous short to ground. It is only if all four of those fault conditions exist that GTO insulation performance might become an issue.
Additionally, the Panel's actions in Proposal 18-146; 18-154; and 18-158 collectively eliminate any instances where GTO can be installed in a wet location external from an electrical enclosure.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept
Panel Statement: The panel notes that the "t" in "the" should be capitalized at the beginning of the sentence.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 10 Negative: 3
Explanation of Negative:
OWENS, T.: I continue to oppose the removal of the 4 inch requirement for wet locations. A report of a study by UL was presented just prior to the panel meeting. I concede that the report did provide documentation about the reaction of GTO cable in a pristine environment that would seem to support the Sign Industry proposal and comment. However, questions were raised about the validity of the report to actual installations situations. Included within the report was a statement by the engineer that the absence of contamination was a detriment to causing arc-tracking. Every installation of outline lighting is subject to contamination of the surface of the GTO due to dust in the air, exterior environmental conditions, and poor maintenance of the installation also, the report did not take into account of the different electrical conditions created by the presence of capacitive coupling created where the GTO exists a conduit. These two omissions provide sufficient concern to retain the current requirements.
Another issue that was raised during this meeting was that the 4 inch requirement was being required under the UL standards for signs and components. This NEC section addresses only the installation of neon secondary-circuit conductors in field installed skeleton tubing or, by 600.12 field-installed wiring of section signs. Therefore, the NEC language does not apply to any wiring contained within a listed electric sign. The subject report should be submitted to the standards bodies for their action.

SMITH, M.: The submitter has not shown any safety benefit to reducing the amount of GTO cable from 4 in. to 2 1/2 in. The Fact Finding Study by UL shows no difference in the performance of the conductor, yet no data was presented as to why the original length of 4 in. was required. In talking with several installers, the 4 in. was thought to be required in ordered to make a drip loop. This loop would prevent moisture from seeping back into the raceway or tube.

WRIGHT, R.: I disagree with the panel's action to lower the fire safety of exposed GTO wire based on a fact-finding report provided by a Sign Association, which had no relationship to real application of field use of the wire in question. Those results even confirmed that 4 in. would fail under certain conditions. Why allow 2 1/2 in.? Remember, field-installed skeleton tubing is not required to be listed when installed in conformance with this code. The current article has stood the test of time and should not be changed to allow a few product flaws. Please vote your better judgment on this safety issue.

Comment on Affirmative:

KIEFFER, S.: 600.32(G) Conductors in Raceways has been applicable to three different situations: when GTO exists conduit or tubing into open air; when GTO exits conduit or tubing of a raceway (an enclosed metal or nonmetallic channel): and when GTO exits conduit or tubing inside of an enclosure.

The first application occurs when GTO exits conduit or tubing at the face of a build
ing wall, interior or exterior, and continues in open air following the wiring method "conductors on insulator" (600.32(A)) to the connection with the neon tube electrodes. That connection is most commonly made by a twisted wire connection as allowed by 600.42(B). That connection point must be in a listed enclosure (600.42(B)). this is the wiring method most referenced when someone complains about GTO failures. However, with almost 100 percent certainty I can declare that those referenced wet-location failures will be non-code-compliant installations. Why? Because the applicable UL Standard #879 requires that the listed wet location enclosures required by 600.42(B) include enclosure of the GTO and physical connection of that GTO enclosure to the conduit or tubing. Therefore in a code-compliant wet-location installation the GTO cannot be exposed to open-air and weather

CMP-18's action this cycle have further reinforced this requirement by:

1) Approving the sign industry's proposal to delete conductor on insulator as an approved wiring method for all locations.

2) Added 600.42 (A) Points of Transition. Where the high voltage secondary circuit conductors emerge from the wiring methods specified in 600.32(A), they shall be enclosed in a listed assembly. This reinforces the requirements in UL 879 and make the requirement applicable to all locations: wet, damp and dry.

Therefore, it can be concluded that installations involving exposed GTO are no longer allowed by the code or the applicable UL standard. Wet-location exposed GTO is no longer allowed by the code.

The second and third application of 600.32(G) occurs when GTO exits conduit or tubing in another raceway or in an enclosure. The most common occurrences of this condition involve conduit connected to a large metal raceway which contains other conductors, such as a splice enclosure, or conductors and equipment such as a transformer or power supply.

There is certainly some confusion caused by the definitions, an overlap between the code definitions of a raceway and an enclosure, verse the sign industry definition which lumps both into a single category, and UL standards for the sign industry which treat them in an identical manner. The code further compounds this confusion by stating that a fabricated metal raceway may contain equipment, thus essentially meeting the definition of an enclosure.

Regardless of the definition confusion, the practical application has been to apply the spacing requirements of 600.32(G) to the inside of metal raceways and enclosures at any point where conduit or tubing is connected to the enclosure or raceway. This requirement is considered to be applicable any time GTO exits conduit or tubing. Regardless of whether it is a raceway or enclosure, the requirements for "conductors in raceways" are applied. This application of the requirements of 600.32(G) will continue and is the basic concern being addressed by the sign industry's proposal, comment, and the UL fact-finding investigation.

The UL fact finding investigation was specifically designed to create a wet-location failure of the insulation in order to determine whether or not there was a performance difference in UL listed GTO when installed with the code required 2 1/2 in. dry location spacing versus the 4 in. wet location spacing. The fact-finding investigation determined that there is no performance difference. This answers the panel question regarding the proposal.

The fact-finding investigation was not a test of the reliability or suitability of GTO insulation that conforms to the requirements of the code. The test is not intended to question the validity of the UL standard or the code requirement for this wire.

It is important to recognize that the fault protection device, in this case secondary-circuit fault-protection, was bypassed.

The primary purposes of insulation are to protect conductors from physical damage, such as corrosion, and to maintain electrical separation," the separation of conductors by means of nonconductors so as to prevent the transfer of electricity" during normal operations. Conductor insulators are not intended to always maintain electrical separation and protect electric circuits during major fault conditions. Fault protection devices exist for this purpose. It is not intended that conductor insulation exist and be able to handle any fault condition. The main fault protector for general wiring circuits is the circuit breaker, not the conductor's insulation. The primary fault protection for a neon circuit is the secondary-circuit ground-fault protector (SCGF), not the GTO wire insulation. SCGF protectors are used in neon circuits because the transformers and power supplies in these circuits do not include an internally wired connection between the primary and secondary coils. Therefore, a secondary fault will not trip the primary circuit protector. The SCGF protectors in neon circuits must conform to a specific UL standard for those products. That standard is quite complex. The testing is extensive. The circuit requirements are such that a ground fault in a neon secondary circuit must trip the protector within a few cycles, a fraction of a second. A layman's description is that the UL standard requirements for transformers and power supplies preclude a secondary circuit fault being able to start a fire in tissue paper.

Yes the GTO failed. It was a failure test. The test sequence wasn't complete until UL found a failure condition. That does not mean there is anything wrong with this product. The failure was induced solely for purposes of measuring the difference in performance, if any, with a change in spacing. It is important to note that UL has stated they have not received field complaints regarding GTO listed under the current standard. Therefore, it appears reasonable to conclude that any reported failures of neon circuits must involve factors other than the insulation on GTO wire, or must be installations that are not code compliant.

This test should be considered to be no different than taking a general wiring product, such as THHN insulated wire, and spraying water on it until it shorts to ground while simultaneously bypassing the circuit breaker. That insulation would also fail the test. Such a failure would be much more dramatic than what was seen with GTO in a neon secondary circuit. Such a test would have no bearing on the code requirements for conductors. The vast majority of insulation used on conductors would fail such testing.

Further, it should be pointed out that CMP-18, in ROP 18-146, deleted approval of the conductor on insulator wiring method, and when combined with ROP 18-154 and 18-158 eliminates any instance where GTO can be wired exposed to a wet location. The conductor must always be enclosed.

The only application remained for 600.32(G) is when GTO exits conduit or tubing inside of another wireway. Article 600 enables other equipment in wireways. Therefore, the practical application of 600.32(G) is anytime GTO exits conduit and tubing in an enclosure or another raceway. This would never be a wet location. At times, the applicable UL standard will treat the inside of such enclosures as if they were damp location. The UL test for GTO wire already addresses damp location through the water immersion conditioning requirements that must occur before some of the testing.

The FFI does not support the need for extra spacing for damp and wet locations. Therefore, it is proper to approve the comments and allow a single spacing dimension to be applicable with the knowledge that the net results of all of the code changes the panel has approved is the elimination of any instances where GTO can be installed in a wet location; it must always be enclosed.

ARTICLE 604 MANUFACTURED WIRING SYSTEMS

19-49 Log #708 NEC-P19 **Final Action: Accept in Principle in Part (604.6 and 604.7 (New))**

TCC Action: The Technical Correlating Committee understands that Proposal 19-131 is being reported as "hold" in addition to the portion of the comment that was held by the panel. The only revision that will be made to the NEC from this comment is the addition of the following text:

"604.7 Installation. Manufactured wiring systems shall be secured and supported in accordance with the applicable cable or conduit article for the cable or conduit type employed."

Since the panel held the requirement for listing, the Technical Correlating Committee also understands that the addition of UL 183 to Annex A will be "held" as well.

Submitter: Dean Negrelli, Wiremold/Legrand

Comment on Proposal No: 19-131

Recommendation: The Panel should continue to accept in principle and revise the ROP draft text as follows:

604.6 Listing Requirements. Manufactured wiring systems shall be listed manufactured wiring systems or shall be constructed in accordance with 604.7.

FPN: One method of determining applicable requirements for listing of manufactured wiring systems is to refer to ANSI/UL 183-2004, Standard for Manufactured Wiring Systems.

604.67 Construction. Manufactured wiring systems that are not listed manufactured wiring systems shall be constructed in accordance with (A) through (E).

(A) Wiring Methods. ~~Manufactured wiring systems shall be listed as manufactured wiring systems assemblies or shall be constructed in accordance with (1), (2), or (3).~~

~~FPN: One method of determining applicable requirements for listing of manufactured wiring systems is to refer to ANSI/UL 182-2004, Standard for Manufactured Wiring Systems.~~

(1) Cables. Cable shall be one of the following:

(~~1~~a) Listed Type AC cable containing nominal 600-volt, 8 to 12 AWG insulated copper conductors with a bare or insulated copper equipment grounding conductor equivalent in size to the ungrounded conductor.

(~~2~~b) Listed Type MC cable containing nominal 600-volt, 8 to 12 AWG insulated copper conductors with a bare or insulated copper equipment grounding conductor equivalent in size to the ungrounded conductor.

(~~3~~c) Listed Type MC cable nominal 600 volts, 8 to 12 AWG insulated copper conductors with an aluminum grounding conductor and armor assembly identified as acceptable ground paths. The aluminum ground armor assembly shall have a current-carrying capacity equivalent to the ungrounded copper conductor.

The rest of this section in the ROP draft is to remain as is.

Substantiation: The title of 604.6(A) has been revised to "Wiring Methods" in the ROP draft, but this section deals with the listing of the entire manufactured wiring system as well as wiring methods.

This section should be changed to "Listing Requirements" and remaining sections reidentified. The final result of this comment is that the listing requirements for manufactured wiring systems are covered by 604.6 and the construction requirements for manufactured wiring systems that are not listed are covered by 604.7.

Panel Meeting Action: Accept in Principle in Part

1. The FPN was moved to Annex A. (See the panel action on Comment 19-50.)

2. Move existing 604.6(E) to become new 604.7 as follows:

"604.7 Installation. Manufactured wiring systems shall be secured and supported in accordance with the applicable cable or conduit article for the cable or conduit type employed."

3. The panel is holding "604.6, Listing Requirements" and "604.6~~7~~ Construction Manufactured wiring systems that are not listed manufactured wiring systems shall be constructed in accordance with (A) through (E)", based on the action taken on Comments 19-51, 19-52, and 19-53.

The remaining text is accepted in principle based on the actions taken on Comments 19-55 and 19-56.

Panel Statement: 1. The FPN was moved to Annex A by the action taken on Comment 19-50.

2. This action is a clarification that this is an installation requirement, rather than a type of construction, and does not belong under 604.6.

3. See the panel action and statement on Comments 19-55 and 19-56.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 7 Negative: 1

Explanation of Negative:

LICHTENSTEIN, T.: The panel action should be to accept in principle and in part and make the changes noted in 1 and 2 below.

1. The FPN was moved to Annex A Comment 19-50.

2. The installation section should be moved from 604.6(E) to 604.8.

The remainder of the recommended text of Comment 19-49 should be accepted. Proposal 19-131 should not be held until the 2011 cycle. See my negative to Comment 19-51.

Holding over this proposal and applicable comments until the 2011 Code cycle is unnecessary and should not be permitted. The panel members have had 11 months to study the impact of this change to Article 604 and no new substantiation has been provided that would meet the criteria for a hold as detailed in the NFPA Rules and Regulations Governing Committee Projects as follows:

4.4.6.2.2 Hold. It shall hold for processing as a proposal for the next revision cycle a comment that:

(a) Would introduce a concept that has not had public review by being included in a related proposal as published in the Report on Proposals.

(b) Would change the text proposed by the TC to the point that the TC would have to restudy the text of the Report on Proposals or other affected parts of the document.

(c) Would propose something that could not be properly handled within the time frame for processing the report.

4.4.6.2.3 Basis for Hold. In determining whether to hold a comment pursuant to 4.4.6.2.2, the TC may consider any relevant factors including, but not limited to, the extent to which the comment proposes a change that is new and/or substantial, the complexity of the issues raised, and whether sufficient debate and public review has taken place.

Comment on Affirmative:

EWING, M.: For clarity: The Panel is holding the Submitter's comment language regarding "604.6, Listing Requirement" and "604.7 Construction.....

MCNEIVE, T.: It is appropriate to hold this comment until 2011 NEC Cycle. The submitter of proposal 19-131 has UL non-compliance with longstanding requirements in Section 604.6(A)(2) as the fundamental substantiation for suggesting expanded permission to list manufactured wiring systems constructed of "nonstandard" components presently required to be themselves listed according to Section 604.6 (A)(1), (2) and (3). Code-making Panel 16 has traditionally been cautious in expanding the application and construction for manufactured wiring systems. The ramifications of the proposed change is potentially far reaching and deserves more thoughtful consideration and perhaps inputs from code-making panels having jurisdiction over the conduits and wiring systems covered by Section 604.6 (A)(1), (2) and (3).

19-50 Log #233 NEC-P19 **Final Action: Accept**
(604.6(A))

TCC Action: The Technical Correlating Committee understands that the reference will not be added to Annex A since the requirement for listing was held through the action on Comment 19-49.

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 19-131

Recommendation: It was the action of the Technical Correlating Committee that the panel reconsider the proposal and move the FPN reference to the product standard into Annex A. The NEC Style Manual requires that product standards references appear in Annex A. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the recommendation of the Technical Correlating Committee to reconsider the proposal, and the panel moves the product standard reference in 604.6(A) to Annex A.

Panel Statement: This action is taken under the direction of the Technical Correlating Committee and to be consistent with the NEC Style Manual. The panel notes that this product standard reference already exists in Annex A.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-51 Log #475 NEC-P19 **Final Action: Hold**
(604.6(A))

Submitter: Gregory J. Steinman, Thomas & Betts Corporation

Comment on Proposal No: 19-131

Recommendation: Change the panel action to Reject.

Substantiation: The comments accompanying Mr. Bernson's and Mr. McNeive's negative votes should be considered by the CMP and the CMP's action reconsidered.

Panel Meeting Action: Hold

The panel is holding Proposal 19-131.

Panel Statement: Proposal 19-131 seeks to amend 604.6(A) to include an option that listed manufactured wiring systems be permitted to be made from components that themselves are not listed as required presently in 604.6(A) (1), (2) and (3). The submitter's substantiation is based on past practice by Underwriter's Laboratories that, by the submitter's admission, is in conflict with the present requirement in 604.6(A)(2).

ANSI/UL 183-2004, Manufactured Wiring Systems, is cited in the proposal as "One method for determining applicable requirements for listing of manufactured wiring systems." The scope of this standard states: "The products covered under this standard are to be installed in accordance with Article 604 of the National Electrical Code, ANSI/NFPA 70." Yet, this standard contains provisions that allow manufactured wiring systems to be listed without conformance to 604.6(A)(2).

Code panel members are concerned about the precedent that it might set in accepting the proposal with this substantiation and some panel members are concerned about the ability of all nationally recognized testing laboratories to consistently apply the subjectivity of the scope requirements permitted to be considered in UL 183.

Holding further action on Proposal 19-131 and related comments until the 2011 Code cycle will enable further evaluation, by panel members, of the system for managing and applying the requirements in UL 183 and the impact of such a broad change.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 7 Negative: 1

Explanation of Negative:

LICHTENSTEIN, T.: The panel action should be to reject Comment 19-51.

Holding over this proposal and applicable comments until the 2011 Code cycle is unnecessary and should not be permitted. The panel members have had 11 months to study the impact of this change to Article 604 and no new substantiation has been provided that would meet the criteria for a hold as detailed in the NFPA Rules and Regulations Governing Committee Projects as follows:

4.4.6.2.2 Hold. It shall hold for processing as a proposal for the next revision cycle a comment that:

(a) Would introduce a concept that has not had public review by being included in a related proposal as published in the Report on Proposals.

(b) Would change the text proposed by the TC to the point that the TC would have to restudy the text of the Report on Proposals or other affected parts of the document.

(c) Would propose something that could not be properly handled within the time frame for processing the report.

4.4.6.2.3 Basis for Hold. In determining whether to hold a comment pursuant to 4.4.6.2.2, the TC may consider any relevant factors including, but not limited to, the extent to which the comment proposes a change that is new and/or substantial, the complexity of the issues raised, and whether sufficient debate and public review has taken place.

Proposal 19-131 should be accepted per the ROP ballot. Proposal 19-131 seeks to require that Manufactured Wiring Systems be listed as a Manufactured Wiring System to UL 183, the Standard for Manufactured Wiring Systems or be constructed in accordance with the Listed cables and conduits detailed in 604.6(A). UL 183, the Standard for Manufactured wiring Systems has very specific requirements for investigating conduits for equivalency to a Listed conduit. The requirements detailed in Section 7.4 are specifically written so that misinterpretation of the requirements by other certification organizations is highly unlikely as was the concerns of some panel members. The requirements from UL 183 are below:

"7.4 Flexible metal conduit, liquid-tight flexible metal conduit, or liquid-tight flexible nonmetallic conduit shall comply with the Standard for Flexible Metal Conduit, UL 1, the Standard for Liquid-Tight Flexible Steel Conduit, UL 360, or the Standard for Liquid-Tight Flexible Nonmetallic Conduit, UL 1660.

Exception: Flexible metal conduit is not required to comply with all specified construction dimensions under the following conditions:

a) Trade sizes of 9/16-inch and 5/8-inch oval shaped and flexible metal conduit shall comply with the 1/2-in trade size performance requirements in UL 1, and trade size of 3/8-inch reduced wall flexible conduit shall be provided with internal and external diameters as specified in Table 7.1. All other construction and performance requirements shall be in accordance with UL 1.

b) All mating fittings and connector assemblies used with conduit specified in (a) shall be factory installed:

c) The flexible metal conduit in (a) shall be subjected to follow up evaluation on performance testing in accordance with UL 1 on the indicated trade sizes."

The only permitted deviation is the shape and maximum outer diameter of the conduit. This permits for different shape conduits and sizes to reduce the bending radius and increase the flexibility of the conduit for ease of installation of manufactured wiring systems in the field. The minimum inner diameter of the conduit is required to be the same as listed conduit so that the wire fill capabilities are not affected. The different shapes in trade sizes permitted only affect the capability of the conduit to be used with standardized listed conduit fittings. Because of that, these conduits are required by section 7.4 Exception (b) of UL 183 to have their conduit connectors factory installed, so that the fittings that are specifically listed for use on those conduits are factory assembled to the conduits and just have to be terminated to the standard trade size knock out in the field if applicable. Typically, these are terminated to proprietary modular connectors and do not require termination except for the power in feed to the system and comply with 604.6(C) and (D).

These conduits in question are UL component recognized conduits and have been a component part of Listed manufactured wiring systems for over 20 years with no adverse field history. They are evaluated to be the equivalent of Listed conduit as part of an overall Listed manufactured wiring assembly intended for installation in accordance with Article 604 of the NEC.

It is not the Panel's responsibility to judge the ability of a certification organization to apply a nationally recognized standard in their certification process or to write code around the abilities of different accredited laboratories. We have to assume that if an accredited nationally recognized testing laboratory has Listed a product as defined in Article 100, that they have followed the appropriate standard as is required by their accreditation. The panel's concern regarding all nationally recognized testing laboratories ability to consistently apply the requirements in a safety standard is not an adequate technical justification for rejecting or holding a proposal without impeaching all the Code's Listing requirements and the ability of an electrical inspector to base his approval of an installation on a products Listing as is permitted in 90.7. If a certification organization is not acceptable to the authority having jurisdiction, they can always reject the certified product in the field.

Comment on Affirmative:

EWING, M.: I don't see a problem with components being listed as part of an assembly rather than have the cost of listing the components and then listing them again as part of an assembly. The problem with the submitted language is that there is no code language proposed or present to address installation requirements for the assembly cables or raceway components when they are not addressed by Chapters 1-4 installation requirements. The proposed FPN is not an enforcement tool for installation requirements should someone create there own standard other than ANSI or UL 183 to test these assemblies to.

MCNEIVE, T.: See my Explanation of Affirmative Vote on Comment 19-49.

19-52 Log #647 NEC-P19 **Final Action: Hold**
(604.6(A))

Submitter: Linda J. Little, St. Louis, MO
Comment on Proposal No: 19-131
Recommendation: This proposal should have been Accept in Principle and in Part.
Substantiation: The FPN product standard reference should be accepted and it should be moved to Annex A as per the NEC Style Manual. The remainder of the proposal should have been Rejected.

If this proposal is allowed to be Accepted, there are two major issues of concern. First, is the appropriateness of allowing manufactured wiring systems assemblies to be constructed of component parts that are not individually listed for use or allowed by the NEC. If listing laboratories have inconsistent interpretations of the standards, competitive manufacturers can possibly use substandard components for listed assemblies. The Standard for Manufactured Wiring Systems ANSI/UL 183 permits metal conduit that may not be listed. This alone should not be a reason for the NEC to reduce its standards to allow non-listed components.

The second concern is that by accepting this proposal, Code-Making Panel 19 is setting a dangerous precedent. The substantiation for this change states that some manufactured wiring systems have been constructed with flexible metal conduit that is not listed, in violation of the requirement in 604.6(A)(2). It is inappropriate to make a change based upon the fact that the current rule is being violated. If some manufactured wiring systems are being constructed with component parts that are listed, those are the ones we should be using. If we change the code because someone is violating the requirements, we are undermining the issue of safety. Rather than compromising the minimum standards set forth by the code, we should require the manufactured wiring systems assemblies to be constructed of listed components.

Panel Meeting Action: Hold
Panel Statement: See the panel action and statement on Comment 19-51.
Number Eligible to Vote: 8
Ballot Results: Affirmative: 7 Negative: 1
Explanation of Negative:

LICHTENSTEIN, T.: The panel action should be to reject.

See my negative for Comment 19-51. Holding over Proposal 19-131 and applicable comments until the 2011 code cycle is unnecessary and should not be permitted. The Panel members have had 11 months to study the impact of this change to Article 604 and no new substantiation has been provided that wold meet the criteria for a hold as detailed in the NFPA Rules and Regulations Governing Committee Projects as follows:

4.4.6.2.2 Hold. It shall hold for processing as a proposal for the next revision cycle a comment that:

(a) Would introduce a concept that has not had public review by being included in a related proposal as published in the Report on Proposals.

(b) Would change the text proposed by the TC to the point that the TC would have to restudy the text of the Report on Proposals or other affected parts of the document.

(c) Would propose something that could not be properly handled within the time frame for processing the report.

4.4.6.2.3 Basis for Hold. In determining whether to hold a comment pursuant to 4.4.6.2.2, the TC may consider any relevant factors including, but not limited to, the extent to which the comment proposes a change that is new and/or substantial, the complexity of the issues raised, and whether sufficient debate and public review has taken place.

Comment on Affirmative:

EWING, M.: See my Explanation of Affirmative Vote on Comment 19-51.

MCNEIVE, T.: See my Explanation of Affirmative Vote on Comment 19-49.

19-53 Log #1296 NEC-P19 **Final Action: Hold**
(604.6(A))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 19-131
Recommendation: The Proposal should be Rejected.
Substantiation: I concur with the Explanation of Negatives by Mr. McNeive and Mr. Bernson. They both have provided valid reasons for the Proposal to be Rejected.
Panel Meeting Action: Hold
Panel Statement: See the panel action and statement on Comment 19-51.
Number Eligible to Vote: 8
Ballot Results: Affirmative: 7 Negative: 1
Explanation of Negative:

LICHTENSTEIN, T.: The panel action should be to reject.

See my negative for Comment 19-51. Holding over Proposal 19-131 and applicable comments until the 2011 code cycle is unnecessary and should not be permitted. The Panel members have had 11 months to study the impact of this change to Article 604 and no new substantiation has been provided that wold meet the criteria for a hold as detailed in the NFPA Rules and Regulations Governing Committee Projects as follows:

4.4.6.2.2 Hold. it shall hold for processing as a proposal for the next revision cycle a comment that:

(a) Would introduce a concept that has not had public review by being included in a related proposal as published in the Report on Proposals.

(b) Would change the text proposed by the TC to the point that the TC would have to restudy the text of the Report on Proposals or other affected parts of the document.

(c) Would propose something that could not be properly handled within the time frame for processing the report.

4.4.6.2.3 Basis for Hold. In determining whether to hold a comment pursuant to 4.4.6.2.2, the TC may consider any relevant factors including, but not limited to, the extent to which the comment proposes a change that is new and/or substantial, the complexity of the issues raised, and whether sufficient debate and public review has taken place.

Comment on Affirmative:

EWING, M.: See my Explanation of Affirmative Vote on Comment 19-51.

MCNEIVE, T.: See my Explanation of Affirmative Vote on Comment 19-49.

19-54 Log #648 NEC-P19 **Final Action: Reject**
(604.6(A)(1))

Submitter: Linda J. Little, St. Louis, MO
Comment on Proposal No: 19-133
Recommendation: This proposal should be Rejected.
Substantiation: Although the general rules in Chapters 1 through 4 may be modified in Chapter 6, there should be a substantial reason for doing so, and in this case there is not.

330.108 requires Type MC cable to comply with 250.118(10) where it is used for equipment grounding, and 250.118(10) requires Type MC cable to be "listed and identified for grounding." The new language in 604.6(A)(1)(b) and (c): "Listed Type MC Cable," is not consistent with language in 250.118(10).

Additionally, the "grounding conductor and armor assembly identified as acceptable ground paths" in 604.6(A)(1)(c) does not meet the "listed and identified for grounding" requirement in 250.118(10).

If, as the submitter states, the ground path of this cable does in fact provide an effective ground fault current path before and after physical performance testing, there should be no reason why this cable cannot be listed and identified for grounding. It is inappropriate to modify the general rules in this code to allow a nonlisted product when other listed products are readily available.

Panel Meeting Action: Reject
Panel Statement: The substantiation states that the cable in the proposal is not listed and identified for grounding.

This cable is listed and identified for grounding.

Number Eligible to Vote: 8
Ballot Results: Affirmative: 8

19-55 Log #1119 NEC-P19 **Final Action: Accept in Principle in Part**
(604.6(A)(1))

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 19-133
Recommendation: The Panel Action should be to Accept in Principle and modify the Proposal as follows.

In a., b., and c. renumber as (1), (2), and (3) as shown in the Preprint, delete the first word "Listed" and revise as follows:

(1) ~~a. Listed~~ Type AC cable containing nominal 600 V ~~600-volt~~, 8 to 12 AWG insulated copper conductors with a bare or insulated copper equipment grounding conductor in accordance with 250.118 and sized in accordance with 250.122. ~~equivalent in size to the ungrounded conductor.~~

(2) ~~b. Listed~~ Type MC cable containing nominal 600 V ~~600-volt~~, 8 to 12 AWG insulated copper conductors with a grounding conductor and armor assembly listed and identified for grounding ~~as acceptable ground paths~~ in accordance with 250.118(10) and sized in accordance with 250.122. ~~bare or insulated copper equipment grounding conductor equivalent in size to the ungrounded conductor.~~

~~(3) Listed Type MC cable nominal 600 volts, 8 to 12 AWG insulated copper conductors with an aluminum grounding conductor and armor assembly identified as acceptable ground paths. The aluminum ground armor assembly shall have a current-carrying capacity equivalent to the ungrounded copper conductor.~~

Substantiation: Articles 320 (Type AC) and 330 (Type MC) do not require the cables to be listed. 250.118(10) does require "Type MC cable where listed and identified for grounding in accordance with the following:" to be used as an equipment grounding conductor.

Combining (2) and (3) will still accomplish the Submitter's objective while eliminating additional text. The rewording of (2) will permit copper or aluminum grounding conductor(s), either individually or in conjunction with an aluminum or copper metallic sheath to be used as the equipment grounding conductor provided it complies with 250.118(10) [listed and identified] and is sized in accordance with 250.122.

The change from "600-volt" to "600 V" is in accordance with the Standard Terms and Units of Measurement in Annex B of the NEC Style Manual.

Panel Meeting Action: Accept in Principle in Part

The panel accepts the principle of changing "600-volt" to "600 V", and the inclusion of "grounding conductor and armor assembly listed and identified for grounding in accordance with 250.118(10)."

The panel rejects the remainder of the comment.

Panel Statement: See the panel action and statement on Comment 19-56.

The panel rejects the redundant reference to 250.122. Chapters 1 through 4 apply generally, unless modified by this section. In addition, this section does contain modified sizing requirements for the equipment grounding conductor, and there is no technical substantiation to warrant a change.

The panel rejects the combining of (2) and (3) and the renumbering as the submitter requests, because these changes do not add clarity. The subdivisions and numbering in the original proposal comply with the NEC Style Manual.

Number Eligible to Vote: 8
Ballot Results: Affirmative: 8

19-56 Log #1298 NEC-P19 **Final Action: Accept in Principle in Part**
(604.6(A)(1))

TCC Action: The Technical Correlating Committee understands that the reference in item (3) of the panel action text is to 250.118(10) in accordance with the panel action on 19-55.
Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 19-133
Recommendation: The panel action should be to Accept in Principle in Part and modify the Proposal as follows:

Delete the first word "Listed" in a., b., and c. [(1), (2), and (3) in the Preprint].

In c. add the word "containing", change "volts" to "volt" and revise as follows:

c. ~~Listed~~ Type MC cable containing nominal 600 volts~~,~~ 8 to 12 AWG insulated copper conductors with an aluminum grounding conductor and armor assembly listed and identified for grounding ~~as acceptable ground paths~~ in accordance with 250.118(10). The aluminum ~~ground~~ grounding conductor and armor assembly shall have a current-carrying capacity equivalent to the ungrounded copper conductor.

Substantiation: Articles 320 (Type AC) and 330 (Type MC) do not require the cables to be listed. 250.118(10) does require "Type MC cable where listed and identified for grounding in accordance with the following:" to be used as an equipment grounding conductor.

Addition of the word "containing" and making volt singular provides consistency with a. and b. and provides clarity.

While the Type MC cable may not be listed, if the grounding conductor and armor assembly are to be used for grounding, it must comply with 250.118(10).

The revision in the last sentence is for clarity.

Panel Meeting Action: Accept in Principle in Part
Revise the wording in Proposal 19-133, 604.6(A)(1)(a), (b), and (c), to read as follows:

"(1) Listed Type AC cable containing nominal 600 V, 8 to 12 AWG insulated copper conductors with a bare or insulated copper equipment grounding conductor equivalent in size to the ungrounded conductor.

(2) Listed Type MC cable containing nominal 600 V, 8 to 12 AWG insulated copper conductors with a bare or insulated copper equipment grounding conductor equivalent in size to the ungrounded conductor.

(3) Listed Type MC cable containing nominal 600 V, 8 to 12 AWG insulated copper conductors with a grounding conductor and armor assembly listed and identified for grounding in accordance with 250.118(10)a. The combined metallic sheath and grounding conductor shall have a current-carrying capacity equivalent to the ungrounded copper conductor."

The remainder of the text is unchanged.

Panel Statement: It has been the panel's intent since the inclusion of Article 604 in the 1981 NEC that cables be listed AC or MC cable. The change of "volts" to "volt" is not accepted by the panel. See the panel action and statement on Comment 19-55.

The panel has renumbered the list using (1), (2), (3), per the NEC Style Manual "Structuring and Numbering" and revised (3) to delete the prescriptive construction requirements.

Number Eligible to Vote: 8
Ballot Results: Affirmative: 8

19-57 Log #364 NEC-P19 **Final Action: Accept**
(604.6(A)(4) (New))

Submitter: Code-Making Panel 8
Comment on Proposal No: 19-132
Recommendation: CMP-8 supports the action on this proposal by CMP-19.
Substantiation: CMP-8 supports the action on this proposal by CMP-19.

This comment has been balloted through CMP-8 with the following ballot results:

12 Eligible to Vote
11 Affirmative
1 Negative

Mr. Dabe voted negatively stating: "CMP-8 recommends that CMP-19 delete in accordance with 368.12, 368.17(D) and 368.30. It could be interpreted that these are the only references in Article 368 that apply. Trolley-Type Busway must comply with all of Article 368."

Mr. Loyd voted affirmatively stating: "Proposal 19-132 was to Accept in Principle in Part. I agree with Mr. Burns' recommendation to revise the panel

action."
Panel Meeting Action: Accept
Panel Statement: Although the panel accepts this comment, the panel notes that 368.12, 368.17(D), and 368.30 detail applicable sections of Article 368 that should be applied when using a busway as part of a manufactured wiring system. Section 368.12 addresses uses not permitted, 368.17(D) addresses overcurrent protection of branch circuits that utilize a busway, and manufactured wiring systems are not permitted for feeders. Section 368.30 addresses support. It was not the intent of Code-Making Panel19 to adopt all of Article 368 when a busway is used as part of a manufactured wiring system. Article 604 includes other specific criteria for these installations.
Number Eligible to Vote: 8
Ballot Results: Affirmative: 8

ARTICLE 610 — CRANES AND HOISTS

12-1 Log #73 NEC-P12 **Final Action: Accept**
(610, 620, 630, 640, 645, 650, and 665)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 12-1
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal by inserting the specific Sections or Parts of Article 250 that apply as required by 4.1.1 of the NEC Style Manual. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise 620.82 and 680.83, to read as follows:
620.82 Electric Elevators. For electric elevators, the frames of all motors, elevator machines, controllers, and the metal enclosures for all electrical equipment in or on the car or in the hoistway shall be bonded in accordance with Article 250, Parts V and VII.
620.83 Nonelectric Elevators. For elevators other than electric having any electric conductors attached to the car, the metal frame of the car, where normally accessible to persons, shall be bonded in accordance with Article 250, Parts V and VII.
Panel Statement: The panel accepts the TCC direction and has added the required parts in 620.82 and 620.83.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-2 Log #529 NEC-P12 **Final Action: Reject**
(610.14(A))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-4
Recommendation: Accept the proposal as revised:
Add: Neutral conductors that comply with 310.15(B)(4)(a) shall not be required to be counted in determining allowable ampacities.
Substantiation: 310.15(B)(4)(a) permits the neutral not to be counted as current-carrying. Tables 310.15(B)(2)(a), 310.16, and 310.18 headings use the phrase "current-carrying" which exempt neutrals that comply with 310.15(B)(4)(a).
Panel Meeting Action: Reject
Panel Statement: Existing footnotes to Table 610.14(A) meet the concerns of the submitter.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-3 Log #74 NEC-P12 **Final Action: Accept**
(Table 610.14(D))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 12-6
Recommendation: The Technical Correlating Committee directs the panel to reconsider this proposal and clarify if their revisions are to the recommendation or the existing code text. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Change the title of Table 610.14 (D) in the 2005 NEC to "Minimum Contact Conductor Size Based on Distance Between Supports".
Add the word "Minimum" in front of the column title "Size of Wire (AWG)"
Panel Statement: The panel accepts the TCC direction and clarifies the meeting action to apply to the 2005 NEC text and not the text of Proposal 12-6.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-4 Log #1852 NEC-P12 **Final Action: Accept in Principle**
(610.31)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 12-9
Recommendation: Revise text to read as follows:
The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed. ~~Portable means for adding a lock to the switch or circuit breaker shall not be permitted.~~
Substantiation: The last sentence that was added by the panel "Portable means for adding a lock to the switch or circuit breaker shall not be permitted." Will prohibit the use of portable devices that provide for the attachment of multiple locks (i.e. Scissors) to the locking mechanism. The sentence should be removed.
Panel Meeting Action: Accept in Principle
Revise the sentence that reads "Portable means for adding a lock to the switch or circuit breaker shall not be permitted." of committee action on Proposal 12-9 to read as follows:
"Portable means for adding a lock to the switch or circuit breaker shall not be permitted as the means required to be installed at and remain with the equipment."
Panel Statement: An attachment device (i.e., scissors or multiple lock hasp) that provides a means to attach multiple locks to the locking device on the disconnect is not prohibited. Instead of inserting one lock in the locking device, the multiple lock hasp is inserted and multiple locks can be used. The intention of prohibiting portable means for adding a lock is so that a provision for locking or adding a lock to the disconnect is permanent.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13
Comment on Affirmative:
QUAVE, D.: The new language will clarify the fact that the additional language was not meant to prohibit the use of Lock out/Tag out devices, but assures that there will be a place to install the Lock out/Tag out device.

12-5 Log #1246 NEC-P12 **Final Action: Reject**
(610.61)

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 12-1
Recommendation: Revise the Panel's action on 610.61 as follows:
610.61 Grounding. All exposed non-current-carrying metal parts of cranes, monorail hoists, hoists, and accessories, including pendant controls, shall be bonded to each other and to an equipment grounding conductor either by mechanical connections or bonding jumpers, where applicable so that the entire crane or hoist is a ground fault current path as required or permitted by Article 250, Parts V and VII.
Moving parts, other than removable accessories, or attachments that have metal-to-metal bearing surfaces, shall be considered to be electrically bonded to each other through bearing surfaces for grounding purposes. The trolley frame and bridge frame shall not be considered as electrically grounded through the bridge and trolley wheels and its respective tracks. A separate bonding conductor jumper shall be provided.
Substantiation: The addition of "to each other and to an equipment grounding conductor" in 610.61 clarifies what needs to be bonded and to where, which is the equipment grounding conductor. See the Panel action on Proposal 5-76 and on the definition of the term "equipment grounding conductor" in Proposal 5-6. The change of the term "bonding conductor" to "bonding jumper" in the second paragraph in 610.61 is consistent with the NEC TCC Task Group on Grounding and Bonding's original initiative that "bonding jumper" as defined in Article 100 is the proper use of the term.
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Reject
Panel Statement: The original panel action in the ROP took into account the NEC TCC task group recommendation as presented in ROP Proposal 12-1 as it applied to cranes and hoists. While the intended results are the same, the changes proposed in the comment fail to regard some of the special physical constraints such as requiring the use of an impractically long jumper versus grounding conductor-collector systems required in some equipment systems.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 620 — ELEVATORS, DUMBWAITERS, ESCALATORS, MOVING WALKS, WHEELCHAIR LIFTS, AND STAIRWAY CHAIR LIFTS

12-6 Log #2095 NEC-P12 **Final Action: Reject**
(620.11(A) Exception (New))

Submitter: Kevin L. Brinkman, AEMA, Dave Balmer
Comment on Proposal No: 12-23
Recommendation: The proposal has been reworded below to clarify the intent. Please consider approval as modified.

620.11(A) Hoistway Door Interlock Wiring. The conductors to the hoistway door interlocks from the hoistway riser shall be flame retardant and suitable for a temperature of not less than 200°C (392°F). Conductors shall be Type SF or equivalent.

Exception: Where Firefighters' Emergency Operation is not required, the conductors to hoistway door interlocks shall comply with 620.11(C).

Substantiation: The Panel Statement indicates that the purpose of this rule is to protect firefighters who are using the equipment during firefighters operations. The intent of this proposal was to defer to requirement 620.11(C) for equipment that does not have firefighters operation because it is not intended for use during fires (such as private residence elevators, platforms lifts, etc.).
Panel Meeting Action: Reject
Panel Statement: Whether the elevator is used by firefighters or not, protection should be provided to prevent the elevator from running with the doors open due to melted insulation on the hoistway door interlock wiring.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-7 Log #402 NEC-P12 **Final Action: Reject**
(Table 620.14)

Submitter: Daniel Leaf, Seneca, SC
Comment on Proposal No: 12-24
Recommendation: Accept in Part. Where Table 620.14 is used no other demand factors shall be permitted.
Substantiation: 220.61(B)(2) allows a demand factor for certain feeders that may supply elevator rooms. Proposal would clarify that both demand factors cannot be used.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any additional substantiation for the change.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-8 Log #1305 NEC-P12 **Final Action: Reject**
(620.15)

Submitter: David Sroka, Turner Falls, MA
Comment on Proposal No: 1-54
Recommendation: Add a sentence as follows:

"The short-circuit current rating shall be included on the nameplate for elevator controllers."

Substantiation: This data is hard to obtain after the original installation. It is important information. The nameplate is the best place for the controller's short-circuit current rating. Integral component's rating can mistakenly be taken as the controller's rating. Lastly, it is safest to read the nameplate to get this information rather than physical removal of covers, moving wires, etc. The function of an elevator controller is so critical that the rating merits inclusion on the nameplate.
Panel Meeting Action: Reject
Panel Statement: The FPN to 620.15 states, "For controller markings, see 430.8". Section430.8 requires the short-circuit current rating to be marked on the controller.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-9 Log #75 NEC-P12 **Final Action: Accept**
(620.21 Exception)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 12-25
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal regarding the exact location of the Exception.

The Technical Correlating Committee understands that the last phrase in the first sentence should read "the pump shall be permitted to be cord connected."

This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Following 620.21(A)(1)(d), add the following text:

(e) A sump pump or oil recovery pump located in the pit shall be permitted to be cord connected. The cord shall be a hard usage oil resistant type, of a length not to exceed 1.8 m (6 ft), and shall be located to be protected from physical damage.

Panel Statement: The panel accepts the direction of the TCC and has clarified the panel action and furthermore rewrites the exception into positive Code language.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-10 Log #2094 NEC-P12 **Final Action: Reject**
(620.21(A)(2)(d) Exception (New))

Submitter: Kevin L. Brinkman, AEMA, Dave Balmer
Comment on Proposal No: 12-30
Recommendation: The proposal has been reworded to reflect this change. Please consider approval as modified:

620.21(A)(2)(d) Add Exception as follows:

Exception: Flexible metal conduit, liquidtight flexible metal conduit, or liquidtight flexible nonmetallic conduit shall be permitted, in lengths not to exceed 3.6 m (12 ft) without being installed in a raceway and where the conduit is located to be protected from physical damage and is clamped every 1.8 m (6 ft) and where the conductors are of the flame retardant type.

Substantiation: In certain applications, such as wiring from a car top box to switches mounted on the car frame, it is very difficult to run hard conduit due to the close conditions and the need to "weave" in and around the car frame. Allowing longer lengths of flex conduit, while adding a requirement for clamping of the conduit every 6 ft, should provide equivalent safety to the current requirements.
Panel Meeting Action: Reject
Panel Statement: Flexible metal conduit, liquidtight flexible metal conduit, or liquidtight flexible nonmetallic conduit are raceways and would not be installed in another raceway.
No technical substantiation has been provided for modifying the support distance required in 348.30, 350.30, and 356.30.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-11 Log #76 NEC-P12 **Final Action: Accept**
(620.21(A)(3)(e))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 12-31
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal since the proposal text is unclear as to how the final sentence is incorporated into the preceding text. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise the recommendation of Proposal 12-31 to read as follows:

(e) Flexible cords and cables in lengths not to exceed 1.8 m (6 ft) that are of a flame-retardant type and located to be protected from physical damage shall be permitted in these rooms and spaces without being installed in a raceway.

They shall be part of:
(1) Listed equipment,
(2) A driving machine, or
(3) A driving machine brake.

Panel Statement: The panel accepts the direction of the TCC and has clarified 620.21(A)(3)(e).
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-12 Log #551 NEC-P12 **Final Action: Accept**
(620.21(A)(4))

Submitter: Andy Juhasz, Kone, Inc. / Rep. National Elevator Industry Inc. (NEII)
Comment on Proposal No: 12-33
Recommendation: Remove the (d) shown in the very beginning of the text in the original proposal. It was incorrectly included. The proposal should read as follows:

(4) Counterweight. ~~Flexible metal conduit, liquidtight flexible metal conduit, liquidtight flexible nonmetallic conduit or flexible cords and cables, or conductors grouped together and taped or corded that are part of listed equipment, a driving machine, or a driving machine brake shall be permitted on the counterweight assembly, in lengths not to exceed 1.8 m (6 ft), without being installed in a raceway and where located to be protected from physical damage and are of a flame-retardant type.~~

The following wiring methods shall be permitted on the counterweight assembly in lengths not to exceed 1.8 m (6 ft):

(a) flexible metal conduit
(b) liquidtight flexible metal conduit
(c) liquidtight flexible nonmetallic conduit
(d) flexible cords and cables, or conductors grouped together and taped or corded, shall be permitted to be installed without a raceway. They shall be located to be protected from physical damage and shall be of a flame-retardant type and shall be part of:
(1) listed equipment
(2) a driving machine, or
(3) a driving machine brake

Substantiation: The Technical Correlating Committee was misled in their understanding as the original submittal was in error when it indicated 620.21(A)(4)(d) in the text of the revision. The subject of the revision is 620.21(A)(4).
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-13 Log #1718 NEC-P12 **Final Action: Reject**
(620.37(D))

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association
Comment on Proposal No: 12-47
Recommendation: Add new language to 620.27 as follows:
620.37(D) Interface with Fire Alarm System. Wiring connecting the fire alarm recall outputs to the Elevator Control System shall be kept within the elevator machine room, the elevator control room, or the elevator control space.
Substantiation: This new language has been proposed by the Technical Correlating Committee of the National Fire Alarm Code. This proposal is consistent with NFPA 70's goal's "for the practical safeguarding of persons and property from hazards arising from the use of electricity." It is hoped that the Task Group appointed by the NEC-TCC Chair will be able to reach a compromise on language that will meet the needs of those jurisdictions who only have adopted the NEC and not NFPA 72 to protect persons and property from hazards arising from the use of electricity.
Panel Meeting Action: Reject
Panel Statement: The submitter has provided no new substantiation for Proposal 12-47.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-14 Log #552 NEC-P12 **Final Action: Accept**
(620.44)

TCC Action: The Technical Correlating Committee understands that the panel action to Accept the comment text replaces both existing paragraphs in 620.44.
Submitter: Andy Juhasz, Kone, Inc. / Rep. National Elevator Industry Inc. (NEII)
Comment on Proposal No: 12-48
Recommendation: Recommend Panel reconsider Proposals 12-48 and 12-49.

Proposed change:

620.44 Installation of Traveling Cables. Traveling cables that are suitably supported and protected from physical damage shall be permitted to be run without the use of a raceway in either or both of the following:

(a) when used inside the hoistway, on the elevator car, hoistway wall, counterweight, or controllers and machinery that are located inside the hoistway provided the cables are in the original sheath

(b) from inside the hoistway, to elevator controller enclosures and to elevator car and machine room, control room, machinery space, and control space connections that are located outside the hoistway for a distance not exceeding 1.8 m (6 ft) in length as measured from the first point of support on the elevator car or hoistway wall, or counterweight where applicable, provided the conductors are grouped together and taped or corded, or in the original sheath. These t~~T~~raveling cables shall be permitted to be continued to this equipment ~~elevator controller enclosures and to elevator car and machine room, control room, machinery space, and control space connections, as fixed wiring, provided they are suitably supported and protected from physical damage~~.

Substantiation: NFPA 70 permits elevator travel cables that are properly supported to be used as fixed wiring in the hoistway without the use of junction boxes. There is no technical rationale to require these same cables that are located within the hoistway to be in raceways when lengths exceed 1.8 m (6 ft) when they are properly supported and protected from the risk of damage. Fully sheathed elevator travel cables are robust and designed to survive in an elevator hoistway for great lengths, as much as 250 meters, in unsupported conditions. Cables are designed for little strain on the copper conductors by use of a steel support member typically used as a center member in a round cable and as integral support members in flat construction and must meet the requirements of NFPA 70. Fully sheathed travel cables that are attached to cars, counterweights, and other hoistway machinery and suitably protected from physical damage have no more risk of damage than cables provided in raceways in these locations.

I have submitted examples with this comment on applications in accordance with the proposed change and note the travel cables are not exposed to any new hazards in the hoistway or on the car.

The supporting material are two examples that would permit application of elevator traveling cables in their original sheath in lengths greater than the current 6 ft limitation of NFPA 70, 620.44 in the hoistway and on the car. Elevator traveling cables are designed to be hung at great lengths within the hoistway, and when secured and protected from physical damage the use of raceways within the hoistway are not necessary.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-15 Log #77 NEC-P12 **Final Action: Accept**
(620.51(A))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 12-51
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal since the sentence requiring the disconnecting means to be listed is in two different locations in the accepted text in Proposals 12-51 and 12-52. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC. See panel action and statement on Comment 12-17.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-16 Log #78 NEC-P12 **Final Action: Accept**
(620.51(A))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 12-52
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal since the sentence requiring the disconnecting means to be listed is in two different locations in the accepted text in Proposals 12-51 and 12-52. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC. See panel action and statement on Comment 12-17.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-17 Log #553 NEC-P12 **Final Action: Accept in Principle**
(620.51(A))

Submitter: Andy Juhasz, Kone, Inc. / Rep. National Elevator Industry Inc. (NEII)
Comment on Proposal No: 12-51
Recommendation: Revise the text shown in the ROP under the Panel Action as follows:

The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed. Portable means for adding a lock to the switch or circuit breaker shall not be permitted, other than means to add multiple locks such as a multiple lock hasp.

Substantiation: While Mr. White has a valid concern and comment, it should be made clear that portable means, other than those legitimately needed, are not to be permitted.
Panel Meeting Action: Accept in Principle
Revise the sentence that reads, "Portable means for adding a lock to the switch or circuit breaker shall not be permitted" of committee action on Proposal 12-51 to read as follows:
"Portable means for adding a lock to the switch or circuit breaker shall not be permitted as the means required to be installed at and remain with the equipment."

The text of the committee action on Proposal 12-51 as modified here is to be located before the sentence "The disconnecting means shall be a listed device."
Panel Statement: See panel statement on Comment 12-4.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
QUAVE, D.: See my Explanation of Affirmative Vote on Comment 12-4.

12-18 Log #1854 NEC-P12 **Final Action: Accept in Principle**
(620.51(A))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 12-51
Recommendation: Revise text to read as follows:
The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed. ~~Portable means for adding a lock to the switch or circuit breaker shall not be permitted.~~
Substantiation: The last sentence that was added by the panel "Portable means for adding a lock to the switch or circuit breaker shall not be permitted." Will prohibit the use of portable devices that provide for the attachment of multiple locks (i.e. Scissors) to the locking mechanism. The sentence should be removed.
Panel Meeting Action: Accept in Principle
Revise the sentence that reads, "Portable means for adding a lock to the switch or circuit breaker shall not be permitted" of committee action on Proposal 12-51 to read as follows:
"Portable means for adding a lock to the switch or circuit breaker shall not be permitted as the means required to be installed at and remain with the equipment."
The text of the committee action on Proposal 12-51 as modified have is to be located before the sentence "The disconnecting means shall be a listed device."
Panel Statement: See panel statement on Comment 12-4.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
QUAVE, D.: See my Explanation of Affirmative vote on Comment 12-4.

12-20 Log #554 NEC-P12 **Final Action: Accept in Principle**
(620.51(A) Exception)

Submitter: Andy Juhasz, Kone, Inc. / Rep. National Elevator Industry Inc. (NEII)
Comment on Proposal No: 12-56
Recommendation: Revise the text shown in the ROP under the Panel Action as follows:
The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed. Portable means for adding a lock to the switch or circuit breaker shall not be permitted, other than means to add multiple locks such as a multiple lock hasp.
Substantiation: Coordinate with same change made in Proposal 12-51.
Panel Meeting Action: Accept in Principle
Revise the sentence that reads, "Portable means for adding a lock to the switch or circuit breaker shall not be permitted" of committee action on Proposal 12-56 to read as follows:
"Portable means for adding a lock to the switch or circuit breaker shall not be permitted as the means required to be installed at and remain with the equipment."
Panel Statement: See panel statement on Comment 12-4.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
QUAVE, D.: See my Explanation of Affirmative Vote on Comment 12-4.

12-19 Log #2093 NEC-P12 **Final Action: Accept in Principle**
(620.51(A) Exception No. 2)

Submitter: Kevin L. Brinkman, AEMA, Dave Balmer
Comment on Proposal No: 12-57
Recommendation: Please consider approval as modified:
620.51 Disconnecting Means.
Add to end of Exception for (A) the following:
Where an individual branch circuit supplies a stairway chairlift, the stairway chairlift shall be permitted to be cord-and-plug connected provided it complies with 422.16(A).
Substantiation: Stairway chairlifts are typically supplied with a flexible cord for connection to a receptacle. This type of equipment may need to be removed for service, similar to many appliances. A cord-and-plug connected stairway chairlift allows the unit to be easily disconnected for service. The proposal has been reworded to use language similar to that in 422.16 for cord-and-plug connected appliances.
Panel Meeting Action: Accept in Principle
Number the existing exception as Exception No.1 and add the following new Exception No. 2:
Exception No. 2: Where an individual branch circuit supplies a stairway chairlift, the stairway chairlift shall be permitted to be cord-and-plug connected, provided it complies with 422.16(A) and the cord does not exceed 1.8m (6 ft) in length.
Panel Statement: The panel agrees with the intent of this comment and believes the revised wording meets the intent of the submitter.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-21 Log #2092 NEC-P12 **Final Action: Reject**
(620.51(C))

Submitter: Kevin L. Brinkman, AEMA, Dave Balmer
Comment on Proposal No: 12-60
Recommendation: Please consider approval as modified.
620.51 Disconnecting Means.
(C) Location.
(4) On Wheelchair Lifts and Stairway Chairlifts. On wheelchair lifts and stairway chairlifts, the disconnecting means shall be located within sight of the motor controller. Where the disconnecting means cannot be located within sight of the motor controller lift shall be provided with a manually operated switch in the control circuit to prevent starting. The manually operated switch shall be located adjacent to the equipment.
Substantiation: On most platform (wheelchair) lifts the motor controller is located within the structure of the lift mechanism and the lift is installed within a runway enclosure, unlike an elevator that traditionally has had a separate machine room or space. The running clearance requirements in ASME A18.1 do not allow sufficient room within the runway to mount the disconnecting means and provide working clearance; therefore, the disconnecting means needs to be mounted outside the runway. Also, for curved stairway lifts that may have the motor controller on the platform, it is not possible to have the disconnecting means within sight of the controller on the platform. The following revised proposal addresses the Panel's statement regarding the runway door and uses requirements similar to those in 620.51(C)(1).
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided sufficient technical substantiation for the change. Furthermore, the comment would create contradictory requirements within the Code.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-22 Log #1326 NEC-P12 **Final Action: Accept in Principle**
(620.51(C)(1))

Submitter: Kevin S. Arnold, Bussmann
Comment on Proposal No: 12-58
Recommendation: Add this new text to the end of the proposed text: "The additional switch shall be a listed device." proposed by the original proposal. This switch shall comply with 620.91(C) if connected on the line side of the elevator controller if additionally powered by an emergency or standby power system.
Substantiation: We feel that this additional text should be added for safety reasons. Adding an additional disconnect within slight is intended to increase the level of safety for this type of installation. The traditional shunt trip disconnect that is used to disconnect the elevator motor has an auxiliary contact that is mechanically connected to the disconnecting mechanism of the switch so it disconnects all power sources, both the normal power and the emergency or standby power which, for a hydraulic elevator, controls a solenoid to a piston drain valve. Adding an additional non-fused disconnect will negate this safety feature if it does not also disconnect both normal and emergency or standby power. Just disconnecting the non-fused switch for normal power will still leave the emergency or standby power operable, providing power to the solenoid and allowing the piston drain valve to open which allows the elevator to move and create a safety issue. Therefore, where an emergency or standby power source is connected to the controller, the new additional disconnect must be required to disconnect both the normal and emergency or standby power.
Overall, we feel this will provide for a safer system as long as all power to the elevator motor is disconnected by this requirement.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept in Principle
Revise the last sentence of the committee action on Proposal 12-58 to read as follows:
The additional switch shall be a listed device and shall comply with 620.91(C).
Panel Statement: The revised wording meets the intent of the submitter.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-23 Log #555 NEC-P12 **Final Action: Accept in Principle (620.53)**

Submitter: Andy Juhasz, Kone, Inc. / Rep. National Elevator Industry Inc. (NEII)
Comment on Proposal No: 12-63
Recommendation: Revise the text shown in the ROP under the Panel Action as follows:

The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed. Portable means for adding a lock to the switch or circuit breaker shall not be permitted, other than means to add multiple locks such as a multiple lock hasp.

Substantiation: Coordinate with same change made in Proposal 12-51.
Panel Meeting Action: Accept in Principle
Revise the sentence that reads, "Portable means for adding a lock to the switch or circuit breaker shall not be permitted" of committee action on Proposal 12-63 to read as follows:

"Portable means for adding a lock to the switch or circuit breaker shall not be permitted as the means required to be installed at and remain with the equipment."

Panel Statement: See panel statement on Comment 12-4.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
QUAVE, D.: See my Explanation of Affirmative Vote on Comment 12-4.

12-24 Log #556 NEC-P12 **Final Action: Accept in Principle (620.54)**

Submitter: Andy Juhasz, Kone, Inc. / Rep. National Elevator Industry Inc. (NEII)
Comment on Proposal No: 12-66
Recommendation: Revise the text shown in the ROP under the Panel Action as follows:

The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed. Portable means for adding a lock to the switch or circuit breaker shall not be permitted, other than means to add multiple locks such as a multiple lock hasp.

Substantiation: While Mr. White has a valid concern and comment, it should be made clear that portable means other than those legitimately needed are not to be permitted.
Panel Meeting Action: Accept in Principle
Revise the sentence that reads, "Portable means for adding a lock to the switch or circuit breaker shall not be permitted" of committee action on Proposal 12-66 to read as follows:

"Portable means for adding a lock to the switch or circuit breaker shall not be permitted as the means required to be installed at and remain with the equipment."

Panel Statement: See panel statement on Comment 12-4.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
QUAVE, D.: See my Explanation of Affirmative Vote on Comment 12-4.

12-25 Log #1856 NEC-P12 **Final Action: Accept in Principle (620.54)**

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 12-66
Recommendation: Revise text to read as follows:

The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed. ~~Portable means for adding a lock to the switch or circuit breaker shall not be permitted.~~

Substantiation: The last sentence that was added by the panel "Portable means for adding a lock to the switch or circuit breaker shall not be permitted." Will prohibit the use of portable devices that provide for the attachment of multiple locks (i.e. Scissors) to the locking mechanism. The sentence should be removed.
Panel Meeting Action: Accept in Principle
Revise the sentence that reads, "Portable means for adding a lock to the switch or circuit breaker shall not be permitted" of committee action on Proposal 12-66 to read as follows:

"Portable means for adding a lock to the switch or circuit breaker shall not be permitted as the means required to be installed at and remain with the equipment."

Panel Statement: See panel statement on Comment 12-4.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
QUAVE, D.: See my Explanation of Affirmative Vote on Comment 12-4.

12-26 Log #557 NEC-P12 **Final Action: Accept in Principle (620.55)**

Submitter: Andy Juhasz, Kone, Inc. / Rep. National Elevator Industry Inc. (NEII)
Comment on Proposal No: 12-67
Recommendation: Revise the text shown in the ROP under the Panel Action as follows:

The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed. Portable means for adding a lock to the switch or circuit breaker shall not be permitted, other than means to add multiple locks such as a multiple lock hasp.

Substantiation: Coordinate with same change made in Proposal 12-51.
Panel Meeting Action: Accept in Principle
Revise the sentence that reads, "Portable means for adding a lock to the switch or circuit breaker shall not be permitted" of committee action on Proposal 12-67 to read as follows:
"Portable means for adding a lock to the switch or circuit breaker shall not be permitted as the means required to be installed at and remain with the equipment."
Panel Statement: See panel statement on Comment 12-4.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
QUAVE, D.: See my Explanation of Affirmative Vote on Comment 12-4.

12-27 Log #1858 NEC-P12 **Final Action: Accept in Principle (620.55)**

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 12-67
Recommendation: Revise text to read as follows:

The provision for locking or adding a lock to the disconnecting means shall be installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place with or without the lock installed. ~~Portable means for adding a lock to the switch or circuit breaker shall not be permitted.~~

Substantiation: The last sentence that was added by the panel "Portable means for adding a lock to the switch or circuit breaker shall not be permitted." Will prohibit the use of portable devices that provide for the attachment of multiple locks (i.e. Scissors) to the locking mechanism. The sentence should be removed.
Panel Meeting Action: Accept in Principle
Revise the sentence that reads, "Portable means for adding a lock to the switch or circuit breaker shall not be permitted" of committee action on Proposal 12-67 to read as follows:

"Portable means for adding a lock to the switch or circuit breaker shall not be permitted as the means required to be installed at and remain with the equipment."

Panel Statement: See panel statement on Comment 12-4.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11
Comment on Affirmative:
QUAVE, D.: See my Explanation of Affirmative Vote on Comment 12-4.

12-28 Log #954 NEC-P12 **Final Action: Accept (620.62)**

Submitter: John Cool, PowerPlus Engineering Inc
Comment on Proposal No: 12-72
Recommendation: The Technical Panel should continue to reject this proposal.
Substantiation: Selective coordination is an important requirement for elevator circuits. Elevators are used for egress of building inhabitants during emergency situations and can be vital to firefighters for effective and rapid deployment. This requirement has been in several code cycles and there are several viable solutions to achieve selective coordination for elevator circuits. Our firm has done many jobs and easily meets the selective coordination requirements as well as other important life safety elevator system requirements. This requirement can be achieved with either fusible systems or circuit breaker systems.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-29 Log #1349 NEC-P12 **Final Action: Accept**
(620.62)

Submitter: Bruce W. Blouin, Power Analysis Associates Inc
Comment on Proposal No: 12-72
Recommendation: The Panel should continue to reject this Proposal.
Substantiation: New York City has had a requirement for Selective Coordination for decades. The NEC has also required selective coordination for ground faults in health care facilities for decades. Requirements for selectively coordinated overcurrent protective devices in elevator circuits have existed in the NEC since the 1993 edition. Beginning with the 2005 NEC, requirements were added for selective coordination of emergency circuits and legally required standby systems. We've found design solutions to meet these requirements, with both circuit breakers and fused switches, without compromising safety or reliability, and wonder what all the fuss is about.

We are a consulting engineering firm that specializes in short-circuit and coordination studies, so we are intimately familiar with what it takes to selectively coordinate both fuses and circuit breakers. It does take sharp engineering skills to design both a selectively coordinated system and at the same time to minimize arc-flash energies and equipment short-circuit damage, but that is precisely what's needed for critical circuits such as are found in elevator, emergency systems, and legally required standby systems. But, it can be and is achieved on a regular basis. Requiring total selectivity does not tie our hands when it comes to multiple emergency generators. We can design in transfer switches. We've heard of complaints about two devices in series of the same size not coordinating. Simply making the downstream disconnecting means a non-fused switch solves that problem. There is enough latitude in 450.3 to choose the overcurrent protective devices on the line side and load side of a transformer so that they will selectively coordinate. We also do not see any issues with violations of other NFPA Standards that call out for "optimized" selective coordination. To us, optimized means the very best that you can do, and total selectivity is certainly the very best that you can do. Finally, there are arguments that there needn't be a requirement to selectively coordinate in the short-circuit range because short-circuits rarely happen. If that were the case, we don't need Sections 110.9 and 110.10 in the NEC. Nor do we need the new requirements for marked short-circuit current ratings on industrial machinery or industrial control panels. Do you insure your home for just $5,000 because most claims are under that amount? Or, do you insure it for the full value, just in case it does burn to the ground or get blown away in a storm? Of course you insure it for the full value, even though a total loss may be an unusual event. Needless to say, we believe the Panel should continue to support the requirement for selective coordination in elevator circuits.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-30 Log #1401 NEC-P12 **Final Action: Accept**
(620.62)

Submitter: Merrell Young, Herzig Engineering
Comment on Proposal No: 12-69
Recommendation: Panel 12 needs to continue to Reject this and similar proposals that remove the requirement for total selective coordination of elevator circuits.
Substantiation: I would consider our consulting firm as experts on arc-flash, short-circuit, and coordination studies. As such, we have been able to meet the selective coordination requirements found in 700.27, 701.18, and 620.62, while at the same time, minimizing arc-flash hazards and improving reliability and continuity of service. We are able to obtain selective coordination for both overload and short-circuit conditions by utilizing various design techniques. For example, we can specify zone selective interlocking with short-time delay on the upstream circuit breaker so that upstream and downstream circuit breakers will coordinate in both the overload zone and the short-circuit zone, and provide for instantaneous reaction time for short circuits (including arcing faults), between the circuit breakers, which keeps arc-flash hazards to a minimum. Where our customers want fuses, we specify current-limiting fuses that can both selectively coordinate and minimize arc-flash hazards. We are able to design with transfer switches and different relaying schemes in order to utilize multiple emergency generators in parallel, for the greatest reliability. As far as ground faults are concerned, we sometimes add an additional layer of ground fault protection in order to selectively coordinate under phase to ground faults, utilizing the same approach as is already required for health care facilities. In short, we don't have to compromise to meet the selective coordination requirements, minimize personnel hazards, and protect equipment. It does take time and requires a thorough understanding of the entire electrical system, and that's what consulting engineers get paid to do.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-31 Log #2086 NEC-P12 **Final Action: Reject**
(620.62)

Submitter: Philip M. Piqueira, General Electric Co.
Comment on Proposal No: 12-72
Recommendation: I disagree with the panel action. Accept Proposal 12-72 as written.
Substantiation: Selective coordination is a system design issue, not a Code issue.

Systems are normally designed for selective coordination in the overload region of the overcurrent device time-current curves. If this were not so, they would not operate under normal conditions, so what is really being called for in this requirement is overload and short circuit selective coordination. In order to achieve total short circuit selective coordination, the size of upstream overcurrent protective devices may need to be increased and/or time delay trip characteristics increased, thereby possibly increasing the arc flash hazard. In other words, by forcing selective coordination for an event that most likely will never occur, namely a bolted fault, the hazards involved in performing tasks which most likely will occur, namely system maintenance, may be increased. This is why system designers need the flexibility to optimize the design of a system, which the current requirement does not allow.

The need for the flexibility to optimize the design of a system is recognized in IEEE Standard 242-2001 (The Buff Book). Section 15.1 states, "In applying protective devices, it is occasionally necessary to compromise between protection and selectivity. While experience may suggest one alternative over another, the preferred approach is to favor protection over selectivity. Which choice is made, however, is dependent on the equipment damage and the effect on the process."

In summary, GE strongly supports selective coordination as a valuable safety asset in the current range where overloads most often occur. However, GE does not support the mandate for Selective Coordination for ALL current ranges and ALL overcurrent devices because safety and reliability can both actually be diminished, thus the section should be deleted.
Panel Meeting Action: Reject
Panel Statement: The Code is not a design specification but does provide the minimum requirements. Article 620 provides additional needed requirements for increased reliability and safety of elevator circuits. The selective coordination requirement increases reliability in elevator circuits. How selective coordination is achieved is up to the design engineer.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-32 Log #2195 NEC-P12 **Final Action: Accept**
(620.62)

Submitter: Peter R. Walsh, Peter R. Walsh, P.E. & Associates
Comment on Proposal No: 12-71
Recommendation: The Panel should continue to Reject this Proposal.
Substantiation: The NEC has required selective coordination for elevator circuits for years without major problems. The recent expansion of requirements makes good sense for the users of the buildings. Who wants to to be stranded in an elevator or suffer from a blackout as a result of non-selective coordination? Engineers have software programs, like Easy Power Version 8.0 that can automate selective coordination.

With Zone Selective Coordination trips, almost anything can be coordinated. Arc flash can be adjusted by proper trips. The code making panel should require reliable power through selective coordination of important circuits.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-33 Log #2345 NEC-P12 **Final Action: Reject**
(620.62)

Submitter: Alan Manche, Square D Company
Comment on Proposal No: 12-72
Recommendation: Accept the Proposal in Principle and revise the present text to read:

620.62 Selective Coordination. Where more than one driving machine disconnecting means is supplied by a single feeder, the overcurrent protective devices in each disconnecting means shall be selected to optimize selective coordination with only the immediate line side feeder device ahead of the machine disconnecting means.
Substantiation: It is clearly recognized in the NEMA comment that selective coordination can compromise reliability and safety if the engineering community is not provided appropriate latitude to ensure all performance aspects are addressed. If the panel is not willing to delete this section then it is prudent that the panel recognize this requirement can negatively impact safety and reliability and utilize similar language offered by Mr. Lottmann at NEMA to "optimize selective coordination."

The present wording is often misunderstood across the industry. The wording in 700.27 has likely created this issue by requiring ALL supply side devices to the selective and 620 using the phrase "…any supply side… devices…" Recognizing the reason selectivity was put in place in 620 was to address an identification issue of not knowing the location of the feeder, selectivity was intended to address only that concern not any other safety issue. The historical records are clear and simple. I would invite you to read Mr. Lawry's substantiation in 12-84 and negative comments from panel chair Mr. Trout in the TCR for the 1993 NEC. The panel then decided to addresses the identification issue in a later cycle and did not remove selectivity. The confusion comes into play with the present wording of "…coordinated with any other supply side overcurrent protective device."

Once again, if this is read to be applied back to the service, consider a campus style electrical system arrangement making it impossible to comply with the NEC. One can only conclude that if that is the intent of the panel that this section is not perceived as a safety issue and not being enforced. It also would not address all of the other branch circuits or feeders that are not selective or simply become overloaded and could trip a feeder on the system that supplies the feeder for the elevator. The intent as documented in the historical documents points only between the branch and immediate feeder devices and the challenge of finding the line side overcurrent device that tripped. A revision as provided above would clarify that "optimizing" selectivity on the branch and feeder would be required and remove most of the concerns that create a challenge for maximizing safety, reliability and performance.

Panel Meeting Action: Reject

Panel Statement: The panel does not agree that the requirements for selective coordination reduce the level of reliability based on the substantiation provided. The rule exists to require a certain level of performance that provides the level of reliability needed for elevator circuits. Sufficient technical substantiation is not provided for removal of this requirement.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

12-34 Log #79 NEC-P12 **Final Action: Accept**
(620.91, FPN)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 12-74
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal with respect to the appropriateness of the word "requirement". This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Revise the recommendation of Proposal 12-74 to remove the word "requirement."

Panel Statement: The panel accepts the direction of the TCC and has removed the word "requirement" from the FPN.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-35 Log #80 NEC-P12 **Final Action: Accept**
(620.91, FPN)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 12-75
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal with respect to the appropriateness of the word "requirement". This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC. See panel action and statement on Comment 12-34.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ARTICLE 625 — ELECTRIC VEHICLE CHARGING SYSTEM EQUIPMENT

12-36 Log #533 NEC-P12 **Final Action: Reject**
(625.28)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-80
Recommendation: Accept the proposal.
Substantiation: Requirement is superfluous. Hazardous (classified) areas are required to comply with Articles 500 through 516 by 90.3. There are, for example, no specific requirements for wet locations since it is unnecessary; 90.3 indicates Chapters 1 through 4 apply where such locations are covered.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its position. No new substantiation was supplied with the comment.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

12-37 Log #81 NEC-P12 **Final Action: Accept**
(626 (New))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 12-81
Recommendation: The Technical Correlating Committee advises that Article placement, titles and scope statements are the responsibility of the Technical Correlating Committee and, based on the current content of the Article, the Technical Correlating Committee directs that the Title and Scope be rewritten to read as follows:

"Article 626 Electrified Truck Parking Spaces

626.1 Scope. The provisions of this article cover the electrical conductors and equipment external to the truck or transport refrigerated unit that connect trucks or transport refrigerated units to a supply of electricity, and the installation of equipment and devices related to electrical installations within an electrified truck parking space."

This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC. See panel action on Comment 12-44.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

12-38 Log #279 NEC-P12 **Final Action: Reject**
(626 (New))

Submitter: Stanley J. Folz, Morse Electric, Inc.
Comment on Proposal No: 12-81
Recommendation: Delete entire new Article.
Substantiation: All of the information to wire an Electrified Parking Space is already contained in the NEC. Is it the intention of the NEC to provide Articles for every specialized application that exists?
Panel Meeting Action: Reject
Panel Statement: Although many of the actual requirements for an electrified truck parking space are found in Chapters 1 though 4 of the existing NEC Code, there are additional requirements and choices needed to provide a consistent and safe installation as described in the new Article 626, "Electrified Truck Parking Spaces".
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:

QUAVE, D.: The panel action should have been to accept. The submitter's substantiation is correct.

12-39 Log #883 NEC-P12 **Final Action: Reject**
(626 (New))

Submitter: Dan Kelly, St. Louis, MO
Comment on Proposal No: 12-81
Recommendation: The Panel action should have been Reject.
Substantiation: The proposed new Article 626 does not contain any material that supplements or modifies any materials in Chapters 1-4. Therefore, the new article is not needed. Also, there is not any special equipment involved.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 12-38.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:
QUAVE, D.: See my Explanation of Negative Vote on Comment 12-38.

12-40 Log #1327 NEC-P12 **Final Action: Reject**
(626 (New))

Submitter: Robert Clarke, Truck Manufacturers Association
Comment on Proposal No: 12-81
Recommendation: Relative to the currently proposed version of Article 626, we offer the following recommendations:

● Battery chargers, small inverter systems, fuel heaters, fuel/water separator and heaters, and oil pan heaters should be included in the exceptions list, along with engine block heaters. These systems, just as engine block heaters, are employed in past and current tractor models, as well as in future product. We have proposed language, underlined, in the following excerpt which includes sections Twenty-Ampere Power-Supply Assembly [section 626.30.30(1) on page 70-671]; Conductors [section 626.30.30(2)(F)(1) on page 70-671]; Cord [section 626.30.30(2)(F)(2) on page 70-672]:

30.30 Separable Power-Supply Cable Assembly. Where a separable power-supply cable assembly consisting of a cord with a female connector and attachment plug is provided, the vehicle shall be equipped with a permanently mounted, flanged surface inlet in accordance with 626.32(A), wired directly to the panelboard by an approved wiring method. The attachment plug shall be of a listed type. The power-supply cable assembly or assemblies shall be identified OEM (factory) supplied or OEM or factory approved, and be of one of the following types and rating specified herein. Cords with adapters and pigtail ends, extension cords, and similar items shall not be attached to, provided or shipped with a truck.

A. Rating(s).

(1) Twenty-Ampere Power-Supply Assembly. Trucks wired with a 20-ampere, 125-volt truck inlet, in accordance with 626.21(F)(1), shall use a listed 20-ampere power-supply assembly.

Exception: A listed separable power supply cable assembly, either hard-service or extra hard service and rated 15-amperes, 125 volts may be provided for connection to an engine block heater [, battery charger, inverter system using less than 15 amps, fuel heater, oil pan heater, or fuel/water separator/ heater] for legacy vehicles.

(2) Thirty-Ampere Power-Supply Assembly. Trucks wired with a 30-ampere, 120/208-volt truck inlet, in accordance with 626.21(F)(2) shall use a listed 30-ampere main power-supply assembly.

(F) Listed Cord Assemblies.

(1) Conductors. The cord shall be a listed type with three or four conductors, for single phase connection, one of which shall be identified by a continuous green color for use as the equipment grounding conductor.

Exception: A separate listed three conductor separable power supply cable assembly, having one conductor identified by a continuous green color for use as the equipment grounding conductor, and rated 15 amperes, 125-volts may be provided for connection to an engine block heater [, battery charger, inverter system of 1000W or less, fuel heater, oil pan heater, or fuel/water separator/ heater] for legacy vehicles.

(2) Cord. Extra-hard usage flexible cords and cables rated not less than 194°F (90°C), 600 volts; listed for both wet locations and sunlight resistance; and having an outer jacket rated to be resistant to temperature extremes, oil, gasoline, ozone, abrasion, acids, and chemicals shall be permitted where flexibility is necessary between the electrified truck parking space supply equipment and the panelboard and inlet(s) on the truck.

Exception: Cords for the separable power supply cable assembly for 15 and 20A connections may be a hard-service type.

(3) Attachment Plug. The attachment plug(s) shall be listed, by itself or as part of a cord set, for the purpose and shall be molded to or installed on the flexible cord so that it is secured tightly to the cord at the point where the cord enters the attachment plug. If a right-angle cap is used, the configuration shall be oriented so that the grounding member is farthest from the cord. Where a flexible cord is provided with an equipment grounding conductor and equipped with an attachment plug, the attachment plug shall comply with 250.138(A) and 250.138(B).

(3) Connection to a 20-Ampere Receptacle. A separable power supply cable assembly for connection to a truck having a 20-ampere inlet shall have an attachment plug that shall be 2-pole, 3-wire, grounding type, rated 20 amperes, 125 volts and intended for use with the 20-ampere, 125-volt receptacle, conforming to the configuration shown in Figure xxx.21(e). 626.30(c)

Exception: A separable power supply cable assembly, rated 15A, provided for the connection of an engine block heater [, a battery charger, an inverter system of 1000W or less, a fuel heater, an oil pan heater, and/or a fuel/water separator/ heater] only, shall have an attachment plug that shall be 2-pole, 3-wire, grounding type, rated 15 amperes, 125 volts, conforming to the configuration shown in Figure 626.30(c) xxx.21(d).

FPN: Complete details of the 15- or 20-ampere plug and receptacle configuration can be found in the National Electrical Manufacturers Association Standard for Dimensions of Attachment Plugs and Receptacles, ANSI/NEMA WD 6-2002, Figure 5-15 or 5-20.

● Section 626.32.32 proposes specifications for on-board equipment yet vehicle specification standards are the purview of the Society of Automotive Engineers J2698 document. The following two parts of Section 626.32.32 indicated in strikethrough format should therefore be removed:

32.32 Truck/Vehicle Coupler.

(A) Inlet Rating and Configuration. Truck Inlet.

~~(1) Each truck shall be provided with not more than two inlets corresponding to the type and rating of connector of the power supply cable truck parking space supply equipment to which it is intended to be connected. See 626.30(C)~~

~~(D) Protection Against Corrosion and Mechanical Damage. Permanent provisions shall be made for the protection of the inlet and truck distribution panel, attachment plug of the power supply cord and any connector cord assembly or receptacle against corrosion and mechanical damage if such devices are in an exterior location while the truck is in transit.~~

● Section 626.34.34 proposes specifications for on-board equipment and should be removed. The condition of loss of power of the primary power source is accounted for in the Society of Automotive Engineers J2698 document. The following part indicated in strikethrough format should therefore be removed:

~~34.34 Loss of Primary Power Source. Means shall be provided such that, upon loss of voltage from the utility or other electric system(s), energy cannot be back fed through the truck and the truck supply equipment to the electrified truck parking space wiring system unless permitted by 626.36.~~

Substantiation: TMA appreciates the opportunity to provide comments on this latest version of the proposed 2008 National Electrical Code, Article 626: Electrified Truck Parking Space Equipment [hereinafter Article 626]. TMA represents the following companies: Ford Motor Company, Freightliner LLC, General Motors Corporation, International Truck and Engine Corporation, Isuzu Commercial Truck of America, Inc., Kenworth Truck Company, Mack Trucks, Inc., Peterbilt Motors Company, Sterling Truck Company, Volvo Truck North America, Inc., and Western Star Trucks. Many of the recommendations we offered in our September 23, 2005, letter have been addressed in this latest version; we appreciate the NEC code article committee's responsiveness in this regard. A few issues remain, however.

Paralleling the NEC effort, we can report that the corresponding SAE Task Force has balloted SAE J2698 - Primary Single Phase Nominal 120 VAC Wiring Distribution Assembly Design. This document, while still in the approval process, will provide the basis for the on-board vehicle wiring assemblies to which parking space electrical connections can be made. It is critical to the successful implementation of truck stop electrification that the two documents provide a consistent and compatible interface between the vehicle and the electrified parking space.

The following compatibility issues remain crucial to enabling trucks to connect to off-board power:

1. TMA maintains our previous recommendation that a minimum of two 20-ampere, 120-volt AC connections are needed at electrified truck parking spaces. Depending on environmental conditions, the driver and vehicle may not utilize this full capacity, but this minimum availability is necessary for a viable electrified truck parking space system.

2. Trucks may be equipped with: NEMA 5-15P or NEMA 5-20P plugs and/or vehicle shore power connectors for engine block heaters, battery chargers, inverter systems of 1000 watts or less, fuel heaters, fuel/water separator and heaters, and oil pan heaters; and with NEMA 5-20P plugs and/or vehicle shore power connectors for on-board 120VAC systems.

3. At this time, TMA members do not envision their customers needing a 30-ampere, 120/208 volt AC configuration on board the truck. While it is difficult to predict future power configurations, our members who are participating in the SAE J2698 standard development process are only able to identify need for 120-volt AC systems.

Panel Meeting Action: Reject
Panel Statement: The panel realizes that there are many on-board loads but on-board systems are beyond the scope of this article.
The requirements for protection against corrosion and mechanical damage and loss of primary source are necessary and should not be deleted. See panel action and statement on Comment 12-44.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

12-41 Log #1420 NEC-P12 **Final Action: Accept in Principle**
(626 (New))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 12-81
Recommendation: [Section numbering in this Comment replaces "**xxx**" from the original Proposal with "**626**" in specific numbering, based on the assignment of this Proposal as new Article 626.]

The Proposal should be Accepted in Principle, with the following specific modifications:

626.3 General Requirements.

A. Systems. This article covers 120-, ~~120/208-, or~~ 120/240-, 208Y/120-, 480-, or 480Y/277-volts, nominal, single-or three-phase, 3 or 4-wire power systems respectively, with ground. [remainder unchanged]

II. Electrified Parking Space Electrical Wiring System. [insert after 626.4, before 626.5]

626.x Hazardous (Classified) Locations.

(A) Motor Fuel Dispensing Stations. Electrified parking space electrical wiring systems located at or serving motor fuel dispensing stations shall comply with Article 514 in addition to the requirements of this article.

(B) Vehicle Repair and Storage Facilities. Electrified parking space electrical wiring systems located at facilities for the repair or storage of self-propelled vehicles that use volatile flammable liquids or flammable gases for fuel or power shall comply with Article 511 in addition to the requirements of this article.

FPN: For additional information, see NFPA 30A, 2003, Motor Fuel Dispensing Facilities and Repair Garages.

[revised 626.5 to reference above]

626.5 Other Articles. Except where required by 626.x, wherever ~~Whenever~~ the requirements of articles of this Code and Article 626 differ, the requirements of Article 626 apply.

626.20(B) Type Receptacles Provided. [626.20(B) main paragraph and 626.20(B)(1) unchanged]

(2) One 30-ampere, 120/208-volt, 3-pole, 4-wire receptacle or one 30-ampere, 125/250-volt, 3-pole, 4-wire receptacle.

~~FPN: Complete details of the 30 ampere plug and receptacle configuration can be found in the Standard for Pin and Sleeve Configurations, UL1686, Configuration sections, Part C2.10 or C3.~~

~~FPN: See Figure 626.21 for details regarding receptacle types.~~

626.21(D) Attachment Plug. [626.21(D) main paragraph and 626.21(D)(1) unchanged]

(2) Connection to a 30-Ampere Receptacle.

(a) rated 30 amperes, 120/208 volts and intended for use with the 30-ampere, 120/208-volt receptacle~~, conforming to the configuration shown in Figure 626.21(g) and intended for use with 120/208 volt switched receptacle configuration conforming to the configuration shown in Figure 626.21(c),~~ or

(b) rated 30 amperes, 125/250 volts and intended for use with the 30-ampere, 125/250-volt receptacle~~, conforming to the configuration shown in Figure 626.21(f) and intended for use with 125/250 volt receptacle configuration conforming to the configuration shown in Figure 626.21(b)~~

~~FPN: Complete details of the 30-ampere plug and receptacle configuration can be found in the Standard for Pin and Sleeve Configurations, UL1686, Configuration sections, Part C2.10 or C3.~~

[next paragraph of 626.21(D) unchanged]

Figure 626.21

[delete configurations (b), (c), (f), and (g) and their rows]

626.21(E) Connector. [626.21(E)(1) unchanged]

(2) The connector for a separable power supply cable assembly, as specified in 626.21(A)(2), shall be a 3-pole, 4-wire grounding type, either:

(a) rated 30 amperes, 120/208 volts, ~~switched inlet connector type, conforming to the configuration shown in Figure 626.21(c) and~~ intended for use with 120/208-volt ~~switched~~ inlet, ~~conforming to the configuration shown in Figure 626.21(c),~~ or

(b) rated 30 amperes, 125/250 volts, ~~conforming to the configuration shown in Figure 626.21(f) and~~ intended for use with 125/250-volt inlet ~~configuration conforming to the configuration shown in Figure 626.21(b)~~.

~~FPN: Complete details of the 30 ampere plug and receptacle configuration can be found in the Standard for Pin and Sleeve Configurations, UL1686, Configuration sections, Part C2.10 or C3.~~

FPN: The connector in 626.21(E)(2)(b) may be used on a 120/208-volt, single-phase circuit.

~~626.20(D) Switch-Rated or Interlocked Receptacles.~~ [delete 626.20(D) in its entirety]

626.21(A) Rating. [626.21(A) main paragraphs unchanged]

(1) Twenty-Ampere Power-Supply Assembly. Trucks wired with a 20-ampere, 125-volt truck inlet, in accordance with ~~626.21(F)(1)~~ 626.21(G)(1), shall use a listed 20-ampere power-supply assembly.

Exception: [unchanged]

(2) Thirty-Ampere Power-Supply Assembly. Trucks wired with a 30-ampere, 120/208- or 125/250-volt truck inlet, in accordance with ~~626.21(F)(2)~~ 626.21(G)(2), shall use a mating listed 30-ampere main power-supply assembly having the same voltage rating.

~~626.21(F) Switch-Rated or Truck Coupler.~~ [delete 626.21(F) in its entirety]

626.21(G) Truck Coupler.

(2) Construction and Installation. The truck coupler shall be ~~constructed in accordance with 626.21(F) and~~ be installed so as to guard against inadvertent personal contact ~~by persons~~ with parts made live from the electrified parking space supply equipment or truck.

~~626.28(D) Switch-Rated or Interlocked Receptacles.~~ [delete 626.28(D) in its entirety]

626.11 Calculations, Table 626.10 Demand Factors for Services and Feeders, and USDA Agriculture Plant Hardiness Zone Map.

This proposal's sole mandatory method to correlate Demand Factor to the USDA Agriculture Plant Hardiness Zone Map should be a nonmandatory FPN (as one possible alternative) to allow the AHJ to select alternative methods to establish the applicable Demand Factor.

Reevaluate the percentage Demand Factors assigned to any given Zone based upon the year-round data, rather than solely upon January data, to ensure that those values reflect the relative balance between heating and cooling loads that shift in the various climatic zones as the summer months approach. Also, the percentage Demand Factors should be based upon coincident peak daily demand rather than average daily demand.

Substantiation: NEMA supports proposed new Article 626 in Principle but disagrees with some specifics within the Proposal, as revised above the substantiated as follows:

626.3: The proposed Article 626 covers Transport Refrigerated Units, also known as Refrigerated Transport Units. American National Standard ANSI/UL1686, Figures C2.11 and C2.12, defines the configurations for receptacles/cord connectors and plugs/inlets, respectively, for such refrigerated transport units and already specifies the North American rating as 30 amperes at 440 volts 3-phase (nominal voltage 480 volts 3-phase). Furthermore, proposed 626.5(A) addresses "480Y/277, and 480 volts". Include 480- and 480Y/277-volts in the 626.3 delineation of covered system voltages. Editorial: show "120/208-" as "208Y/120-" to be consistent with 220.5(A).

626.x Hazardous (Classified) Locations. 626.5: Electrified parking spaces at trucking stops have the potential of being in close proximity to occupancies for fuel dispensing and for vehicle repair and storage; these occupancies are hazardous (classified) locations. Proposed 626.5 is ambiguous and may be misconstrued to mean that specific requirements of Article 626 intended solely for ordinary locations might also be sufficient for hazardous (classified) locations as well and would incorrectly take precedence over requirements of Articles 514 and 511 in those classified locations. Arcing devices such as plugs, outlets, switches, switchgear, etc., should not be used in hazardous (classified) locations, unless evaluated and Listed as suitable for such locations. Revision in accordance with this Comment removes that ambiguity. 626.x(A) and 626.x(B) for trucking vehicles parallel similar established requirements in 555.21 and 555.22, respectively, for boating vehicles.

626.20(B)(2), 626.20(B)(2) FPNs (two), 626.21(D)(2)(a), 626.21(D)(2)(b), 626.21(D)(2) FPN, Figure 626.21, 626.21(E)(2)(a), 626.21(E)(2)(b), 626.21(E)(2) first FPN: Presently, 30-ampere 208Y/120 V or 125/250 V, 3-pole 4-wire, is new to truck stop electrification and there are no specific plug/receptacle configurations standardized for this application either by a ratified consensus standard or by established *de facto* universal practices.

Consequently, unilateral assignment of specific configurations would be prescriptive, rather than postscriptive, on the part of NFPA. There are many eligible plug/receptacle configurations at these ratings. Unilateral assignment by NFPA to these ratings of a specific plug/receptacle configuration neither standardized for this application either by a ratified consensus standard or by established *de facto* practices may raise legal or regulatory issues for NFPA. If nothing else, the Code should not be used as a design manual.

Furthermore, the referenced standard UL1686 Part C (or Part B as well) contains no configurations where 2 ungrounded conductors (2 of 3), 1 grounded conductor (neutral) and 1 grounding conductor (equipment grounding/bonding) are derived from a 208Y/120 V 3-phase + neutral + grounding (5-wire) system. The 2P+N+G configurations indicated as (c) and (g) are not extracted from the published ANIS/UL1686 standard. They may represent a proprietary configuration for a proprietary, patented system of plugs and receptacles.

When Article 625 was established, similar consensus could not be reached on competing configurations and there were no established *de facto* configurations for that new application. Consequently, Article 625 was not permitted to include configurations prescriptively and indeed none are reflected. This same situation exists for Article 626 and these proposed 30-ampere configurations should not be included.

By contrast, the proposal for Article 626 does not reflect the ANSI- and internationally-standardized configuration specifically for the application for refrigerated units (RTU or TRU), in ANSI/UL1686 Figures C2.11 and C2.12, for 30-ampere (North America)/32-ampere (elsewhere), 440-volt/380-volt, 60/50 Hz. Since this plug/receptacle configuration is indeed formally standardized for this specific application, this ANSI- and internationally-standardized configuration should be explicitly included in Article 626.

626.20(D), 626.21(F), 626.21(G)(2), 626.28(D): The proposer's Substantiation for 626.20(D) and 626.21(F) incorrectly state "standard NEMA receptacles, plugs, connectors and inlets have not been rated for make and break under load and may be damaged as a result of repeated connection or disconnection under load."

Standards ANSI/UL498 and ANSI/UL1682 in fact specifically test bladed and pin-and-sleeve devices, respectively, for Overload and Resistance-To-Arcing cycling endurance while rupturing 150 percent of ampere-rated current (some are additionally current-rupture tested based upon horsepower rating) as part of a sequence that includes temperature rise and may include contact

weight retention. Indeed, some NEMA devices are additionally evaluated for 200 percent cycling current rupture for Federal Specification applications. The Substantiation offered no rationale or justification for the 35 kA short circuit withstand rating. Indeed, for decades receptacles, plugs and couplers in the existing ANSI- and internationally-standardized configuration specifically used with refrigerated units (RTU or TRU) are neither mandated to be switch-rated nor to have a short circuit withstand rating at all; per 90.1(C), the Code is not intended as a design specification.

626.21(A)(1), 626.21(A)(2): Incorrectly referenced to subparagraphs in 626.21(F) that does not exist. It would appear to be the subparagraph in 626.21(G) that was intended. 626.21(A)(2) also omitted the 30-ampere, 125/250 V rating present elsewhere.

626.11 Calculations, Table 626.10 Demand Factors for Services and Feeders, and Agriculture Plant Hardiness Zone Map: The Demand Factor is established by Climatic Temperature Zones derived from the USDA Agriculture Plant Hardiness Zone Map. This method to correlate Demand Factor may be difficult for the AHJ to interpret locally and enforce. Locating any particular jurisdiction on the Agriculture Plant Hardiness Zone Map may be difficult in areas bordering zone transitions and may result in conflicting values. This particular methodology should be an optional FPN rather than mandated as the only method to allow the AHJ discretion in selecting alternative methods to establish the applicable demand factor. The AHJ may be faced with drastic changes in elevation within that jurisdiction (mountain passes, canyons, etc.) and may warrant local deviations from the broadly assigned climatic zones.

Per the Proposal Substantiation for 626.10, the assigned percentage Demand Factors are based solely upon January data. Those values may differ at other times of the year where the relative balance between heating and cooling loads shift in the various climatic zones as the summer months approach. Consequently, the profile of kW per occupied space versus USDA Plant Hardiness Zones may differ throughout the year. Also, it is unclear whether peak or average daily demand was used to establish those values. The Proposal Substantiation for 626.10 indicates that "truck stops with electrified parking spaces are filled to capacity or near capacity during the evening rest hours and are virtually empty during the day." The values for demand factors should, therefore, be based on peak daily demand when loads are coincident.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 12-44, which meets the intent of the submitter.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:
QUAVE, D.: This proposal brings up some very good questions about the mandatory enforcement of the hardiness zone map for calculating load demands. Without this, there is not any new material in this new Article 626 and should eliminate the entire article.

12-42 Log #1726 NEC-P12 **Final Action: Accept in Principle**
(626 (New))

Submitter: Brian Sisco, Southern California Edison
Comment on Proposal No: 12-81
Recommendation: Accept the Proposal for a new Article 626.
Substantiation: In response to the comment made by Mr. T. Hedges:

The article is necessary because: (1) it contains requirements that are essential for safety and unique to this application, (2) it disallows unsafe options that would otherwise be permitted by the existing code, and (3) it defines the boundaries for electrical inspectors while establishing a safe infrastructure up to that boundary in anticipation of potentially unsafe conditions outside the jurisdiction of the code. Specifically, requirements unique to this application not covered by Chapters 1 through 4 of the Code are: (1) Demand factors based upon climatic temperatures at the site location. (2) Physical layout and configuration of equipment. The article excludes the "turtle back or speed bump" design since such designs are easily damaged by snow removal equipment as well as water and flooding in truck parking sites. This article identifies the post, pedestal, overhead gantry, and raised concrete pad configurations as acceptable types, thereby disallowing so-called turtle-back or speed bump designs that have been shown to be inherently unsafe due to susceptibility to flooding or severe damage by snow plows. (3) Location or placement (height) of equipment at sites where existing/known flood plains exist. (4) Limitations to the maximum length of separable cable assemblies to minimize damage to the cables and prevent use of "daisy-chained" cord sets. Present Code requirements do not limit the length of the cable assemblies that could reach 85 - 90 ft. Such lengths would promote the use of multiple cable assemblies connected in series, unacceptable voltage drops, an increased likelihood of damage to the cable assemblies, and exposure of the series connection (i.e., connector plug) to possible immersion, disconnection under load, etc. (5) Strain relief and breakaway requirements to prevent permanent equipment damage and exposure of live parts for cable assemblies permanently attached to the equipment. (6) Preventing backfeed of energy where not intended. The aftermarket modification of vehicles, which is outside the jurisdiction of electrical inspectors or the OEMs, poses unique problems in that modifications to the trucks may not have or provide appropriate protection. For example, aftermarket auxiliary power units (APU's) and generators are commonly used to supply power to the truck when the engine is shut down. Improper installation of these power sources can result in the backfeed of energy into the grid creating an unsafe condition for electric utility workers. This article defines the boundaries while providing safety up to the point of connection to the equipment. Chapters 1 through 4 do not address the issue of energy back feed.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 12-44, which meets the intent of the submitter to include provisions for electrified truck parking spaces.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

12-43 Log #1984 NEC-P12 **Final Action: Reject**
(626 (New))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 12-81
Recommendation: This Proposal should have been Rejected.
Substantiation: More consideration should be given to the explanation of negative by Mr. Hedges. This article does not add very much significantly new or different material other than the definition and the use of a specified connection means. Since Chapter 6 is titled "Special Equipment," and a primary function of Chapter 6 is to provide rules that are different in some respect from other requirements in the first four chapters, there should be something different or special about this equipment and it appears that there is little that is special or different. If a new article must be added, it should be limited in content to those requirements that are special or different. This proposed article contains mostly requirements that are found elsewhere in the NEC. Adding additional unnecessary regulations and bulk to the NEC is not in the interest of usability of this code. Furthermore, this article adds requirements that apply to the truck itself, which is not, according to 90.2(B)(1), even within the scope of the NEC.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 12-38.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:
QUAVE, D.: The panel action should have been to accept. The submitter's substantiation is correct

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12-44 Log #2025 NEC-P12 **Final Action: Accept in Principle**
(626 (New))

TCC Action: The Technical Correlating Committee directs that the following actions be taken:

1. 626.4(D) is to be deleted because it is outside the scope of the NEC.

2. In 626.22(C), the last sentence is to be deleted as it is already covered in 110.26.

3. In 626.2, make the following revisions to the definition to read as follows:

"Cord Connector. A device which, by inserting it into a truck flanged surface inlet, establishes an electrical connection to the truck for the purpose of providing power for the on-board electric loads and may provide a means for information exchange. This device is part of the truck coupler."

4. In 626.4, revise the wording to read as follows:

"626.4 General Requirements.

(A) Not Covered. The provisions of this article shall not apply to that portion of other equipment in residential, commercial or industrial facilities that require electric power for devices used to load and unload cargo and equipment, operate conveyors, and other devices on the site or truck."

5. In 626.10 Branch Circuit, revise the text to read as follows:

"Electrified truck parking space single-phase branch circuits shall be derived from a 208Y/120 volt, 3-phase, 4-wire system or a 120/240 volt, single phase, 3-wire system."

6. Delete 626.20 as it is already covered by Article 250.

7. In the last sentence of 626.24(B), add "(B)(1) and (B)(2)" after the word "with". Also, revise (B)(1) from "…on an individual…" to "… connected to an individual…".

8. In 626.25(A)(1) and (A)(2), delete the word "wired".

9. In 626.25(B)(1) revise the wording to read as follows:

"(1) Conductors. The cord shall be a listed type with three or four conductors, for single-phase connection, one conductor of which shall be identified in accordance with 400.23.

Exception: It shall be permitted to use a separate listed three conductor separable power supply cable assembly, one conductor of which shall be identified in accordance with 400.23, and rated 15 amperes, 125-volts for connection to an engine block heater for existing vehicles."

10. In 626.25(B)(2), revise the wording to read as follows:

"(2) Cord. Extra-hard usage flexible cords and cables, rated not less than 90°C (194°F), 600 volts; listed for both wet locations and sunlight resistance; and having an outer jacket rated to be resistant to temperature extremes, oil, gasoline, ozone, abrasion, acids, and chemicals shall be permitted where flexibility is necessary between the electrified truck parking space supply equipment, the panelboard, and flanged surface inlet(s) on the truck."

11. In 626.30, replace the word "mentioned" with the word "required".

12. In 626.30(B), replace "Part III" with "Part III of Article 626."

13. In 626.32(B), in the first sentence, add the word "equipment" before the words "grounding conductor".

14. Revise 626.32(C)(1) and (2) to read: "(1) 30-ampere, 480-volt, 3-phase, 3-pole, 4-wire and intended for use with 30-ampere 480-volt, 3-phase, 3-pole 4-wire receptacles and inlets respectively, or
(2) 60-ampere, 208-volt, 3-phase, 3-pole, 4-wire and intended for use with 60-ampere, 208-volt, 3-phase, 3-pole, 4-wire receptacles and inlets,

respectively."
15. In 626.31(B), change "762 mm" to "750 mm".
16. Delete 626.21 as it is already covered in Article 225.
17. Add "Electrified Truck Parking Space" and "Article 626" to Table 210.2 Specific-Purpose Branch Circuits.
18. Add "Electrified Truck Parking Space" and "Article 626" to Table 220.3 Additional Load Calculation References.
Submitter: Roger D. McDaniel, McDonough, GA
Comment on Proposal No: 12-81
Recommendation: Revise Article 626 as follows:
Revise as follows:
Article 626
Electrified Truck Parking Spaces ~~Equipment~~
I. General
626.1 Scope. The provisions of this article cover the electrical conductors and equipment external to the truck or transport refrigerated unit that connect trucks or and transport refrigerated units to a supply of electricity, and the installation of equipment and devices related to electrical installations within an electrified truck parking space.
626.2 Definitions. ~~(See Article 100 for additional definitions.)~~
~~Air Conditioning or Comfort Cooling Equipment. All of that equipment intended or installed for the purpose of processing the treatment of air so as to control simultaneously its temperature, humidity, cleanliness, distribution to meet the requirements of the conditioned space.~~
~~Appliance, Portable. An appliance that is actually moved or can easily be moved from one place to another in normal use.~~
~~article, the following major appliances, other than built are considered portable if cord connected, refrigerators, cook tops, range, television, or other similar appliances.~~
~~FPN: For the purpose of this article, the following major appliances, other than built are considered portable if cord connected: refrigerators, cook tops, range, television, or other similar appliances.~~
Cable management system. An apparatus designed to control and organize unused lengths of cable or cord at electrified truck parking spaces.
Cord Connector. A device that, by insertion into a truck inlet, establishes an electrical connection to the truck for the purpose of providing power for the on-board electric loads and may provide a means for information exchange. This device is part of the truck coupler.
~~Converter. A device that changes electrical energy from one form to another, as from alternating current to direct current.~~
Disconnecting Means, Parking Space. The necessary equipment usually consisting of a circuit breaker or switch and fuses, and their accessories, located near the point of entrance of supply conductors in an electrified truck parking space and intended to constitute the means of cutoff for the supply to that truck.
Electrified Truck Parking Space. A truck parking space that has been provided with an electrical system that allows truckers to "plug in" their vehicles while stopped, and use off-board power sources in order to operate on-board systems such as air conditioning, heating and appliances, without any engine idling.
FPN: An electrified truck parking space may also include dedicated parking areas for heavy duty trucks at travel plazas, warehouses, shipper and consignee yards, depot facilities, border crossings, etc. It does not include areas such as the shoulders of on and off highway ramps and access roads, camping and recreational vehicle sites, residential and commercial parking areas used for automotive parking or other areas where ac power is provided solely for the purpose of connecting automotive and other light electrical loads, such as engine block heaters, and at private residences.
~~Electrified Truck Parking Space Supply Equipment, also known as Truck Stop Electrification Equipment. The conductors, including the ungrounded, grounded and equipment grounding conductors, and the connectors, attachment plugs, and all other fittings, devices, interlocking mechanisms, power outlets, circuit breakers, switches, and fuses, and their related accessories, located near the point of entrance of supply conductors to a electrified parking space, installed specifically for the purpose of delivering energy from the electrified truck parking space wiring system to the truck service equipment within the truck and that is intended to constitute the disconnecting means for the supply to the truck.~~
~~FPN: The electrified parking space supply equipment may be configured in three basic styles (i.e., pedestal, overheat gantry, and raised concrete pad design) for use at different electrified parking spaces in different climatic zones and for different parking configurations, see XXX.18(A).~~
Electrified Truck Parking Space Wiring Systems. All of the electrical wiring, equipment, and appurtenances related to electrical installations within an electrified truck parking space including the electrified parking space supply equipment.
~~Frame Chassis rail and any welded addition thereto metal thickness of 1.35 mm (0.053 in.) or greater Low-voltage. An electromotive force rated 24 volts, nominal, or less, supplied from a transformer, converter, or battery.~~
Overhead Gantry. A structure consisting of horizontal framework supported by vertical columns spanning above electrified truck parking spaces that supports equipment, appliances, raceway and other necessary components for the purpose of supplying electrical, HVAC, internet, communications, and other services to the spaces.
Separable Power Supply Cable Assembly. A flexible cord or cable, including ungrounded, grounded, and equipment grounding conductors, provided with a female connector, an attachment plug and all other fittings, grommets, or devices installed for the purpose of delivering energy from the source of electrical supply to the inlet installed within the truck.
~~Transformer. A device that, when used, raises or lowers the voltage of alternating current of the original source.~~
Transport Refrigerated Unit (TRU), also known as Refrigerated Transport Units (RTU). A trailer with ~~an~~ integrated heating and/or cooling ~~device~~ for the purpose of maintaining the desired environment of temperature-sensitive goods or products ~~(being transported in trucks, trailers, etc.)~~
Truck. ~~A heavy duty vehicular type unit primarily designed for commercial transportation of goods and equipment, which has its own motive power. It is built on a permanent chassis, typically designed with but not required to include a sleeper berth and without a permanent foundation where connected to the required utilities and that may include heating, air conditioning, and electric systems contained therein.~~
Motor vehicle ~~primarily~~ designed for the transportation of goods, services, and equipment.

Truck Coupler. A mating truck inlet and connector set.
Truck Flanged Surface Inlet. The device(s) on the truck into which the connector(s) is inserted for providing electric energy. It may also be used for the exchange of information. This device is part of the truck coupler. For the purposes of this code, the truck flanged surface inlet is considered to be part of the truck and not part of the electrified truck parking space supply equipment.
~~Truck Parking Space. An area within a truck stop vehicle park set aside and identified for the accommodation of a truck on a temporary basis.~~
Truck ~~Service~~ Supply Equipment. The on-board equipment ~~attached to or connected to~~ of the truck containing the disconnecting means, overcurrent protective devices, and flanged surface inlets or other means for connecting the truck to the electrified truck parking space supply equipment.
~~Truck Stop. A plot of land upon which two or more truck parking sites are located, established, or maintained for occupancy by trucks for resting purposes.~~
~~FPN: An electrified parking space may also include dedicated parking areas for heavy duty trucks at travel plazas, warehouses, shipper and consignee yards, depot facilities, border crossings, etc. It does not include areas such as the shoulders of on and off highway ramps and access roads, camping and recreational vehicle sites, residential and commercial parking areas used for automotive parking or other areas where ac power is provided solely for the purpose of connecting automotive and other light electrical loads, such as engine block heaters, and at private residences.~~
~~Truck Stop Electrification. An electrical system that allows truckers to "plug in" their vehicles while stopped, and use off board power sources in order to opeate on board systems such as air conditioning, heating and appliances, without any engine idling.~~
~~Truck Stop Feeder Circuit Conductors. The conductors from the electrified parking space service-equipment to the electrical parking space supply equipment.~~
626.3 Other Articles. Whenever the requirements of other articles of this code and Article 626 differ, the requirements of Article 626 shall apply.
626.4 General Requirements.
~~(A)~~(A) Not Covered. The provisions of this article do not apply to that portion of other equipment in residential, commercial or industrial facilities that require electric power for devices used to load and unload cargo and equipment, operate conveyors, and other devices on the site or truck.
(B) Distribution System Voltages. Unless other voltages are specified, the nominal ac system voltage of 120, 120/240, 208Y/120, 240, or 480Y/277, ~~and 480 volts~~ shall be used to supply equipment covered by this article.
(B)(C) ~~Systems. This article covers 120, 120/240, 120308Y/208120, 480Y277, or 120/240 volts volts nominal single or three phase, 3 or 4 wire ac power supply systems respectively, with ground. Where a different voltage is required by either design or available power supply system, adjustment shall be made in accordance with other articles and sections for the voltage used.~~
~~(C)~~ Connection to Wiring System. The provisions of this article shall apply to the electrified truck parking space supply equipment intended for conection to a wiring system as defined in 626.10(A)~~4~~(B)(3(A).
~~(D)~~(D) Illumination. Illumination shall be provided ~~required~~ to facilitiate safe use of electrified truck parking spaces.
~~625.5 Listed or Labeled. All electrical materials, devices, appliances, fittings, and other equipment shall be listed or labeled by a qualified testing agency and shall be connected in an approved manner when installed.~~
~~Reserved~~
~~I.~~II. Electrified Truck Parking Space Electrical Wiring Systems.
626.10 Branch Circuits. Electrified truck parking space single phase branch circuits shall be derived from a 208Y/120 ~~120/208~~ volt 3-phase system or a 120/240 volt single-phase system.
~~626.6 Primary Distribution Systems.~~
~~(B)(A) Distribution System Voltages. Unless other voltages are specified, the nominal as system voltages of 120, 120/240, 208Y/120, 240, or and 480Y/277, and 480 volts shall be used to supply equipment covered by this article.~~
~~626.4 Other Articles. Whenever the requirements of other articles of this code and article xxx differ, the requirements of Article xxx apply.~~
~~(C) Secondary Distribution Parking Space Supply System. The electrified truck parking space secondary electrical distribution system to electrified truck parking space supply equipment shall be single phase derived from 208Y/120 120/208 volt three phase, four-wire system or 120/240 volt split single phase system.~~
Exception: A 120-volt distribution system ~~Existing electrified truck parking space equipment~~ shall be permitted to supply existing electrified truck parking spaces ~~may also be provided with a 120 volt distribution systems for use by legacy vehicles.~~
~~626.8 Underground Service, Feeder, Branch-Circuit, and Electrified Parking Space Feeder-Circuit Conductors.~~
~~(A) General. All direct-burial conductors, including the equipment grounding~~

conductor if of aluminum shall be insulated and identified for the use. All conductors shall be continuous from equipment to equipment. All splices and taps shall be made in approved junction boxes or by use of material listed and identified for the purpose.

(B) Protection Against Physical Damage. Direct buried conductors and cables entering or leaving a trench shall be protected by rigid metal conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, lLiquidtight flexible metal conduit, or other approved raceways or enclosures. Where subject to physical damage, the conductors or cables xhall be protected by rigid metal conduit, intermediate metal conduit, or Schedule 80 rigid nonmetallic conduit. All such protection shall extend at least 450 mm (18 in.) into the trench from finished grade.

FPN: See 300.5 and Article 340 for conductors or Type UF cable used underground or in direct burial in earth.

626.10 626.11 Feeder and Service Load Calculations.

(A) General. The calculated load of a feeder or service shall not be less than the sum of the loads on the branch circuits, supplied, as determined by Part III of this article, as calculated in section 626.12, after any applicable demand factors permitted have been applied.

FPN: See Examples D1(A) through D10 in Annex D.

(B) Demand Factors. Electrified truck parking space electrical wiring systems are based upon the climatic zone in which the equipment is installed.

626.12 Calculations.

(A) Parking Space VA Electrical service and feeders shall be calculated on the basis of not less than 1100 volt-amperes per electrified truck parking space.

(B) Demand Factors. The demand factors set forth in Table xxx.10 626.12(B) shall be the minimum allowable demand factors that shall be permitted in calculating load for service and feeders.

Where the electrical supply for a truck parking space has more than one receptacle, the calculated load shall be calculated for all receptacles. No demand factor shall be allowed for any other load, except as provided in this code.

Table xxx 10 626.12(B) Demand Factors for Services and Feeders

Climatic Temperature Zone Hardiness Zone see Figures 626.12(B)(1) & (2)	Demand Factor (Percent)
1	70%
2a	67%
2b	62%
3a	59%
3b	57%
4a	55%
4b	51%
5a	47%
5b	43%
6a	39%
6b	34%
7a	29%
7b	24%
8a	21%
8b	20%
9a	20%
9b	20%
10a	21%
10b	23%
11	24%

FPN: The Climatic Temperature (hardiness) Zone defines different areas across the country according to temperature zones. These zones are used to correlate power and energy requirements with ambient weather conditions. Data indicates that the HVAC has the highest power requirement in cold climates, with the heating demand representing the greatest load, which in turn is dependent on outside temperature. In very warm climates, where no heating load is necessary, the cooling load increases as the outdoor temperature rises. The U.S. Department of Agriculture (USDA) has developed a commonly used "Plant Hardiness Zone" map that is publicly available. The map provides guidance for determining the Climatic Temperature Zone shown in Table 626.12B.

Figure 626.12(B)(1) US Department of Agriculture Plant Hardiness Zone Map

Figure 626.12(B)(2) US USDA Hardiness Zones and Average Annual Minimum Temperature Range.

(C) Two or More Vehicles. Where the electrical supply is in a location that serves two or more trucks, the equipment for each site shall must comply with xxx.10 626.12(A) and the calculated load shall be computed on the basis of each parking site. No demand facor shall be allowed for any other load, except as provided in this Code.

(D) Conductor Capacity Rating. Truck site branch circuit conductors shall have an capacity ampacity not less than the loads supplied.

626.14 Overcurrent Protection. Overcurrent protection shall be provided in accordance with Article 240.

626.18 Grounding. All electrical equipment and installations in truck parks shall be grounded as required by Article 250.

626.17626.16 Reserved

II.III. Electrified Truck Parking Space Supply Equipment (Off board)

626.18 626.20 Grounding.

(A) Exposed Non-Current-Carrying Metal Parts. Exposed non-current carrying metal parts of fixed equipment, metal boxes, cabinets, and fittings that are not electrically connected to grounded equipment shall be grounded by a continuous equipment grounding conductor run with the circuit conductors from the service equipment or from the transformer of a secondary distribution system. Equipment grounding conductors shall be sized in accordance with 250.122. and shall be permitted to be spliced by listed means.

The arrangement of equipment grounding connections shall be such that the disconnection or removal of a receptacle or other device will not interfere with, or interrupt, the grounding continuity.

(C)(B) Secondary Distribution System Grounding. Each secondary distribution system shall be grounded at the transformer secondary.

(C) Neutral Grounded Conductor Not to Be Used as an Equipment Grounding Conductor. The neutral grounded conductor shall not be used as an equipment grounding conductor fro trucks or equipment within the truck park.

(C) NoLoad-Side Grounding Connections. Bonding Connection to the Grounded Conductor on the Load Side. A grounding connection shall not be made to any grounded conductor on the load side of the service disconnecting means. No connection to a grounding electrode shall be made to the neutral conductor on the load side of the service disconnecting means except as covered in 250.30(A) for separately derived systems. and 250.32(B)(2) for separate buildings.

626.21 Clearances for Overhead Conductors Clearance.

(A)(A) Conductors Not Over 600 Volts. Open cConductors or cables of not over 600 volts, nominal, shall have a vertical clearance of not less than 55 m (18 ft) measured from the surface of the parking lot and a horizontal clearance of not less than 900 mm (3 ft) in all areas subject to truck movement. In all other areas, clearances shall conform to 225.18 and 225.19.

(B) Conductors Over 600 Volts. (B) Conductors Over 600 Volts.

FPN: For clearances of cConductors and cables over 600 volts, nominal, shall conform to 225.60 and 225.61.

626.22 Wiring Methods and Installation Materials.

(A) Electrified Truck Parking Space Supply Equipment Type. The electrified truck parking space supply equipment shall be provided in one of the following forms:

(1) Post or Pedestal.

(2) Overhead Gantry.

(3) Raised Concrete Pad.

(B) Mounting Heights. Post Ppedestal, and raised concrete pad types of electrified truck parking space supply equipment shall be not less than 600 mm (2 ft) above ground, Oor above, the height of the point identified as the prevailing highest water level mark or an equivalent benchmark based on seasonal or storm-driven flooding from the authority having jurisdiction, flood plain level, whichever is greater.

(C) Access and Working Space. All electrified truck parking space supply equipment shall be accessible by an unobstructed entrance or passageway not less than 600 mm (2 ft) wide and not more than 2.0 m (6 ft. 6 in.) high. Working Space. Sufficient space shall be provided in and maintained about all electrical equipment to permit ready and safe operation, in accordance with 110.26.

(D) Facility Disconnecting Means. A disconnecting switch or circuit breaker shall be provided to disconnect one or more electrified truck parking space supply equipment sites from a remote location. in the site supply equipment for disconnecting the power supply to a section of the truck stop. The facility disconnecting means shall be provided and installed in a readily readily visible and accessible location and shall be capable of being locked in the open position. Portable means for adding a lock to the switch or circuit breaker shall not be permitted.

626.23 Overhead Gantry or Cable Management System. Electrified truck parking space equipment provided from either overhead gantry or cable management systems shall be permitted to utilize may be provided with a permanently attached power supply cable in electrified truck parking space supply equipment. Cable(s) It shall be permitted permitted to be permitted to may also include or have be separate an from optional hybrid data, communications, optical fiber cable(s), shielding, and so forth etc.

The cable or cables shall be permitted to terminate in an electrified truck parking space supply equipment module that contains receptacles as described in 626.28(B). The power supply cable shall be connected directly to the terminals of the panelboard or conductors within a junction box in the equipment. and provided with a A mMeans to prevent strain from being transmitted to the terminals shall be provided.

A pPermanently attached The power supply cable(s) shall be provided with a means to de-energize the cable conductors and power service delivery device upon exposure to strain that could result in either cable damage rapture or separation of the cable from the power service delivery device and exposure of live parts.

626.24 Means for Connecting to Electrified Truck Parking Space Supply Equipment.

(A) General Each Ttrucks shall be supplied from electrified truck parking space supply equipment through not more than two suitable extra hard service cables or cords. Each connection to the equipment shall be by a single separable power supply cable assembly.

(B) Type Receptacles Provided NEMA Configurations. All receptacles shall be of the grounding type. A maximum of three receptacles shall be provided. Every truck parking space with electrical supply shall be equipped with:

(1) Two 20-ampere, single receptacles each shall be 125 volt single receptacles 2-pole 3-wire grounding type, rated 20 amperes, 125 volts, conforming to the configurations shown in Figure 626.30(C24(B) view(a), NEMA type 5.20R, and

FPN: For Complete details of the 15 or nonlocking and grounding-type 20-ampere plug and receptacle configuration, see can be found in the National Electrical Manufacturers Association Standard for Dimensions of Attachment Plugs and Receptacles, ANSI/NEMA WD 6-2002, Figure 5.20.

(2) One single receptacle 3-pole, 4-wire grounding type, single phase rated either 30-amperes, 208Y/120/208 volts or 125/250-volts, ~~3 pole, 4 wire receptacle, conforming to the configurations shown in Figure 626.30(C24(B) view (b) or (c)~~. The 125/250-volt receptacle shall be permitted to be used on a 208Y/120-volt, single-phase circuit.

FPN 1: For various configurations. ~~Complete details~~ of ~~the~~ 30-ampere ~~plug~~ pin and sleeve receptacles, see ANSI/UL 1686, ~~configuration can be found in~~ the Standard for Pin and Sleeve Configurations, ~~UL 1686, Cofigurations section~~ Parts Figure C2.~~10~~.9 or Part C3.

~~FPN 2: See Figure 626.30(C) for details regarding receptacle types.~~

Exception: Where electrified truck parking space supply equipment provides the air-conditioning and comfort cooling function without requiring a direct electrical connection at the truck, only the two receptacles identified in 626.2~~12~~524(B)(1) need be provided.

~~Additional receptacles shall be permitted for the connection of electrical equipment outside the truck within the electrified truck parking space.~~

FPN: For Transport Refrigerated Units. (TRU), see Part IV ~~CHECK EDITORIAL~~

~~(D)~~(C) Disconnecting Means, Parking Space. The electrified truck parking space supply equipment shall be provided with a ~~disconnecting~~ switch or circuit breaker for disconnecting the power supply ~~to the individual truck service equipment.~~

~~(E)Switch-Rated or Interlocked Receptacles.~~ Means to Prevent Connection or Disconnection Under Load. Each single receptacle provided by the electrified truck parking space supply equipment and connected to a power supply cable assembly supplying the truck flanged surface inlet shall be either a switch rated receptacle-plug combination, include an interlocked receptacle with an associated switching device of an interlocking type, or provided with an equivalent means to prevent connection or disconnection under load. ~~The switching device shall be marked with a short circuit current rating rated to close into and withstand short-circuit (fault currents of at least 35kA.~~

~~(C)~~(D) The switch rated receptacle-lug combination, the interlocked plug and receptacle combination, or other means provided shall ensure that the ~~use~~ no live parts are exposed to contact, ~~r has no access to live parts.~~

(E)(~~F~~) Ground-Fault Circuit-~~I~~nterrupter Protection for Personnel ~~(GFCI)~~. The electrified truck parking space equipment shall be designed and constructed such that all receptacle outlets are provided with ground-fault circuit interrupter protection ~~GFCI protection~~ for personnel.

626.25 Separable Power-Supply Cable Assembly. ~~Where a~~A separable power-supply cable assembly, consisting of a cord with a female connector ~~and~~ and attachment plug ~~is provided and~~ intended for connection with ~~, the vehicle shall be equipped with a~~ truck permanently ~~mounted,~~ flanged surface inlet, ~~in accordance with **626.32(A),** wired directly to the panelbard by an approved wiring method. The attachment plug~~ shall be of a listed type. The power-supple cable assembly or assemblies shall be ~~i~~ndentified ~~OEM (factory) supplied or OEM or factory approved~~, and be of one of the following types and ratings specified herein. Cords with adapters and pigtail ends, extension cords, and similar items shall not be used ~~attached to, provided or shipped with a truck.~~

~~A.~~(A). Ratings(s).

(1) Twenty-Ampere Power-Supply Cable Assembly. ~~Trucks~~ Equipment wired with a 20-ampere, 125-volt ~~truck inlet~~ receptable, in accordance with 626.2~~1~~24(F~~G~~B)(1), shall use a listed 20-ampere power-supply cable assembly.

Exception: A listed separable power supply cable assembly, either hard-service or extra hard service and rated 15-amperes, 125 volts may be provided for connection to an engine block heater for legacy vehicles.

(2) Thirty-Ampere Power-Supply Cable Assembly. ~~Trucks~~ Equipment wired with a 30-ampere, 208Y/120~~/208~~ volt or 125/250-volt ~~truck inlet~~ receptacle, in accordance with 626.2~~1~~24(F~~G~~B)(2) shall use a listed 30-ampere main power-supply cable assembly.

(~~C~~)(B) Listed Cord Assemblies.

(1) Conductors. The cord shall be a listed type with three or four conductors, for single phase connection, one of which shall be identified by a continuous green color for use as the equipment grounding conductor.

Exception: A separate listed three conductor separable power supply cable assembly, having one conductor identified by a continuous green color for use as the equipment grounding conductor, and rated 15 amperes, 125-volts may be provided for connection to an engine block heater for legacy vehicles.

~~Cord.~~

(2) Cord. Extra-hard usage flexible cords and cables rated not less than ~~194°F~~ (90°C) (194°F), 600 volts; listed for both wet locations and sunlight resistance; and having an outer jacket rated to be resistant to temperature extremes, oil, gasoline, ozone, abrasion, acids, and chemicals shall be permitted where flexibility is necessary between the electrified truck parking space supply equipment and the panelboard and inlet(s) on the truck.

Exception: Cords for the separable power supply cable assembly for 15 and 20 A connections may be a hard-service type.

(3) Cord Overall Length. The exposed cord length shall be measured from the face of the attachment plug to the point of entrance to the truck or the face of the flanged surface inlet or to the point where the cord enters the truck. The overall length of the cable shall not exceed 7.5 m (25 ft) unless equipped with a cable management system that is listed as suitable for the purpose.

~~(2)flexibility is necessary between the electrified truck parking space supply equipment and the panelboard and inlet(s) on the truck.~~

~~Exception: Costs for the separable power supply cable assembly for 15 and 20 A connections may be a hard service type.~~

~~(3)~~ (4) Attachment Plug. The attachment plug(s) shall be listed, by itself or as part of a cord set, for the purpose and shall be molded to or installed on the flexible cord so that it is secured tightly to the cord at the point where the cord enters the attachment plug. If a right-angle cap is used, the configuration shall be oriented so that the grounding member is farthest from the cord. Where a flexible cord is provided, ~~with an equipment grounding conductor and equipped with an attachment plug,~~ the attachment plug shall comply with 250.138(A) ~~and 250.138(B)~~.

~~(1)~~(a) Connection to a 20-Ampere Receptacle. A separable power supply cable assembly for connection to a truck having a 20-ampere inlet shall have a~~n~~ nonlocking-type attachment plug that shall be 2-pole, 3-wire, grounding type, rated 20 amperes, 125 volts and intended for use with the 20-amperes, 125-volt receptacles~~, conforming to the configuration shown in Figure xxx.21(e), 626.3025(A) view (e)~~.

Exception: A separable power supply cable assembly, rated 15 A, provided for the connection of an engine block heater only, shall have an attachment plug that shall be 2-pole, 3-wire, grounding type, rated 15 amperes, 125 volts, conforming to the configuration shown in Figure 626.3025(B) view (cd) xxx.21(d).

FPN: For nonlocking- and grounding-type ~~Complete details of the~~ 15- or 20-ampere plug and receptacle configuration~~s~~, see ~~can be found in the~~ National Electrical Manufacturers Association *Standard for Dimensions of Attachment Plugs and Receptacles*, ANSI/NEMA WD 6-2002, Figure 5-15 or 5-20.

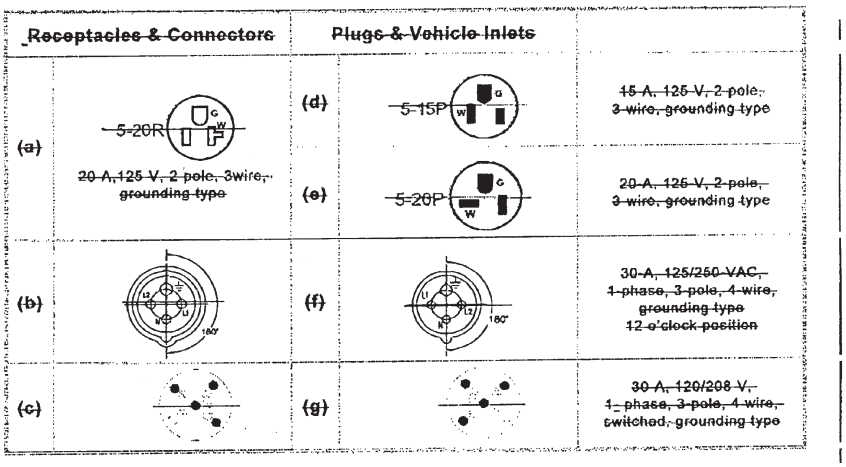
~~(2)~~(b) Connection to a 30-Ampere Receptacle. A separable power supply cable assembly for connection to a truck having a 30-ampere inlet shall have an attachment plug that shall be 3-pole, 4-wire, grounding type, rated 30-amperes, 208Y/120-volts or 125/250-volts, and intended for use with the receptacle in accordance with 626.24(B)(2). The 125/250-volt attachment plug shall be permitted to be used on a 208Y/120-volt, single-phase circuit. ~~either:~~

~~(a)(1)(i) rated 30 ampere, 120/208Y/120 volts and intended for use with the 30 ampere, 120/208Y120volt receptacle, conforming to the configuration shown in Figure 626.30, 25(b) and intended for use with 120/208Y/120 volt switched receptacle configuration conforming to the configuration shown in Figure 626.3025(B), or~~

~~(b)(2)(ii) rated 30 amperes, 125/250 volts and intended for use with the 30 ampere, 125/250 volt receptacle, conforming to the configuration shown in Figure 626.30 25(B) and intended for use with 125/250 volt receptacle configuration conforming to the configuration shown in Figure 626.3025(B).~~

FPN: For various configurations ~~Complete details of the~~ 30 ampere pin and sleeve plugs, see ANSI/UL 1686, *~~and receptacle configuration can be found in the~~ Standard for Pin and Sleeve Configurations*, ~~UL 1636, Configurations section, Parts~~ Figure C2.10 or Part C3.

~~FPN No. 2: The attachment plug in 626.25(B)(4)(b)(2) may be used on a 120/208 volt, single phase circuit.~~



~~Figure 626.25(B)(4)(a) Receptacle, Connector, Attachment Plug and Inlet Configurations, 2-Pole, 3 Wire and 3 Pole, 4 Wire Grounding Types, Used for Electrified Truck Parking Space Supply Equipment, Separable Power Supply Cable Assemblies and Truck Inlets.~~

(5) Cord Connector.

~~(1)~~ The cord for a separable power supply cable assembly, as specified in ~~xxx~~626.25.~~21~~(~~AB~~A)(1), shall be a 2-pole, 3-wire grounding type, rated 20 amperes, 125 volts.

Exception: The cord connector for a separable power supply cable assembly, rated 15A, provided for the connection of an engine block heater ~~only~~ for legacy vehicles, shall have an attachment plug that shall be 2-pole, 3-wire, grounding type, ~~NEMA 5 15R configuration,~~ rated 15 amperes, 125 volts.

~~(2)~~ The cord connector for a separable power supply cable assembly, as specified in ~~xxx.21(A)(2~~626.25(~~B~~A)(2)~~)~~, shall be a 3-pole, 4-wire grounding type, rated 30-amperes, 208Y/120-volts or 125/250 volts. The 125/250-volt cord connector shall be permitted to be used on a 208Y/120-volt, single-phase circuit. ~~either.~~

~~(a)(a)rated 30 amperes, 120/208Y/120 volts, switched inlet connector type, conforming to the configuration shown in Figure xxx.21(c)626.25(B)(4)(a)(view c) and intended for use with 120/208Y/120 volt switched inlet, conforming to the configuration shown in Figure xxx.21(g), 626.25(B)(4)(a)(view g) or~~

~~(b)(b) rated 30 amperes, 125/250 volts, conforming to the configuration shown in Figure 626.25(B)(4)(a)(view b) xxx.21(b) and intended for use with 125/250 volt inlet, conforming to the configuration shown in Figure 626.25(B)(4)(a)(view f) xxx.21(f).~~

FPN: For various configurations ~~Complete details of the~~ 30-ampere cord connectors, ~~plug and receptacle configuration can be found in the~~ these ANSI/UL 1686 *Standard for Pin and Sleeve Configurations*, ~~UL 1686, Configurations section, Parts~~ Figure C2.~~10~~.9 or Part C3.

~~FPN No. 2: The cord connector in xxx.21(E)(b)626.26(B)(5)(b) may be used on a 120/208 volt, single phase circuit.~~

(5~~6~~) Switch-Rated or Interlocked Truck Coupler. Each connector provided by the separable power-supply assembly for use with the electrified truck parking space supply equipment shall be a part of either a switch rated connector-inlet combination, be used with an interlocked connector–inlet combination with an associated switching device of an interlocking type, or provided with an equivalent means to prevent connection or disconnection under load. ~~The switching device shall be marked with a short-circuit current rating rated to close into and withstand short circuit fault currents of at least 35 kA.~~

The switch rated connector-inlet combination, the interlocked connector and inlet combination, or other means provided shall ensure that ~~the user has~~ no ~~access to~~ live parts are exposed to contact.

~~(A) Inlet Rating and Configuration . Truck Inlet.~~

~~(1) Each truck shall be provided with not more than two inlets corresponding to the type and rating of connector of the power-supply cable assemblies provided and the rating of the receptacle in the electrified truck parking space supply equipment to which it is intended to be connected. See 626.30(C).~~

~~(2) Construction and Installation. The truck coupler shall be constructed in accordance with 626.30(C) and be installed so as to guard against inadvertent contact by persons with parts made live from the electrified truck parking space supply equipment or truck. Grounding pole. The truck coupler shall be provided with a grounding pole, unless part of a system identified and listed as suitable for the purpose in accordance with Article 250, Grounding Pole Requirements. The truck coupler shall be so designed that the grounding pole connection is the first to make and the last to break contact.~~

~~(B) Cord Overall Length. The exposed cord length shall be measured from the face of the attachment plug to the point of entrance to the truck or the face of the flanged surface inlet or to the point where the cord enters the truck. The overall length of the cable shall not exceed 7.5 m (25 ft) unless equipped with a capable management system that is listed as suitable for the purpose.~~

~~(C) Point of Entrance. Truck/Vehicle Inlet Location. The point of entrance of the separable power supply cable assembly to the truck or location of the truck inlet shall be in the exterior wall, either in front of or behind the driver door located at a height of not less than 600 mm (24 in.) and not more than 1.8 m (5.2 ft) above the parking surface.~~

~~(D) Protection Against Corrosion and Mechanical Damage. Permanent provisions shall be made for the protection of the inlet and truck distribution panel, attachment plug of the power supply cord and any connector cord assembly or receptacle against corrosion and mechanical damage if such devices are in an exterior location while the truck is in transit.~~

~~626.34~~ Loss of Primary Power ~~Source~~. Means shall be provided such that, upon loss of voltage from the utility or other electric system(s), energy cannot be backfed through the truck and the truck supply equipment to the electrified truck parking space wiring system unless permitted by 626.~~36~~27.

~~626.36~~ 626.27 Interactive Systems. Electrified truck parking space supply equipment and other parts of a system, either on-board or off-board the vehicle, that are identified for and intended to be interconnected to a vehicle and also serve as an optional standby system or an electric power production source or provide for the bi-directional power feed shall be listed as suitable for that purpose. When used as an optional standby system, the requirements of Article 702 shall apply, and when used as an electric power production source, the requirements of Article 705 shall apply.

~~Reserved~~

~~III. H.~~ IV Transport~~ation~~ Refrigerated Units (TRU)

~~626.38~~ 626.30 Transport Refrigerated Units. ~~A number of~~ electrical truck parking spaces ~~with electrical supply~~ intended to supply Transport Refrigerated Units shall ~~may each~~ include ~~be~~ a dedicated ~~equipped with additional~~ circuit and receptacle a~~c grid power capacity to provide~~ for operation of the heating/refrigeration units. The receptacle associated with the ~~For electrified truck parking space equipment covered by Parts I – II, a separate receptacle shall be provided for~~ Transport Refrigerated Units~~. This receptacles~~ shall ~~would~~ be provided ~~used~~ in addition to the three receptacles mentioned in 626.~~30~~284(B~~C~~).

(A) Branch Circuits ~~General Requirements Systems~~. TRU spaces shall be supplied from 208-volt 3-phrase or 480-volt 3-phase branch circuits with equipment grounding conductor. ~~This part covers 208Y/120 120/208, 480Y/277 277/480 volts, three phase, 3 or 4 wire ac power supply systems respectively, with ground. Where different voltage is required by either design or available power supply system, adjustment shall be made in accordance with other articles and sections for the voltage used.~~

(B) Electrified Truck Parking Space Supply Equipment. The electrified truck parking space supply equipment, or portion thereof, providing electrical power for the operation of TRUs ~~transport refrigerated units~~ shall comply with Part IV.

~~(E)~~(D) Reserved

~~626.40~~ 626.31 Disconnecting Means and Branch-Circuit Protective Equipment

(A) Disconnecting Means. Disconnecting means shall be provided to isolate each refrigerated unit from its supply connection.

~~(B) Permitted Disconnect Types. The disconnecting means shall be permitted to consist of a circuit breaker, motor circuit, or both, and shall be properly identified as to which receptacle it controls.~~

~~(C)~~ (B) Disconnect Location. The disconnecting means shall be readily accessible, located not more than 762 mm (30 in.) from the receptacle it controls, and shall be located in the supply circuit ahead of the receptacle. Circuit breakers or switches located in power outlets complying with this section shall be permitted as the disconnecting means.

~~(D)~~ (C) Means to Prevent Connection or Disconnection Under Load. ~~Switch Rated or Interlocked Receptacles~~. Each receptacle provided by the electrified truck parking space supply equipment shall be either a switch rated receptacle-plug combination, include an interlocked receptacle with an associated switching device of an interlocking type, or provided with an equivalent means to prevent connection or disconnection under load. ~~The switching device shall be marked with a short circuit current rating rated to close into and withstand short circuit fault currents of at least 35 kA.~~ The switch rated receptacle-plug combination, the interlocked plug and receptacle combination, or other means provided ~~shall~~ shall ensure that no live parts are exposed to contact.

(D ~~E~~) ~~NEMA Configuration~~ Receptacle Requirements. ~~Type Receptacles Provided.~~ All receptacles shall be of the grounding type. Every electrified truck parking space intended to provide an electrical supply for transport refrigerated units shall be equipped with either a:

(1) ~~(1)~~ 30 ampere, 480-volt, ~~3-phase~~ 3-phase receptacle, or

(2) ~~(2)~~ 60 ampere, 208-volt, 3-~~3~~phase receptacle.

FPN: Complete details of the 30-ampere pin and sleeve receptacle configuration for refrigerated containers (transport refrigerated units) can be found in ANSI/UL 1686, *Standard for Pin and Sleeve Configurations*, Figure C2.11. For various configurations of 60-ampere pin and sleeve receptacles, see ANSI/UL 1686, *Standard for Pin and Sleeve Configurations.*

~~*These electrical supplies shall be permitted to include additional receptacles that have configurations in accordance with xxx.21(B).*~~

~~626.42~~ 626.32 Power Supply Cable Assembly. ~~Where a~~A power supply cable assembly, consisting of a cord with an attachment plug and cord connector, shall ~~is provided, it shall be wired directly to the panelboard by an approved wiring method. The attachment plug shall be of a listed type. The power supply cable assembly or assemblies shall be OEM (factory) supplied or OEM or factory approved, and~~ be of one of the following types and rating specified herein. Cords with adapters and pigtail ends, extension cords, and similar items shall not be used. ~~attached to, provided or shipped with a truck.~~

(A) Rating(s). The power supply cable assembly shall be listed and rated:

(1) -30 ampere, 480-volt, ~~three phase~~ 3-phase, or

(2) -60 ampere, 208-volt, ~~three phase~~ 3-phase.

~~626.42~~ Power Supply Cable Assembly ~~Conductors.~~

~~(A)~~ (B) Listed Cord Assemblies. The cord shall be a listed type with four conductors, for ~~three phase~~ 3-phase connection, one of which shall be identified by a continuous green color for use as the grounding conductor. ~~Cord.~~ Extra-hard usage cables rated not less than 90˚C (194˚F) ~~(90˚C)~~, 600 volts; listed for both wet locations and sunlight resistance; and having an outer jacket rated to be resistant to temperature extremes, oil, gasoline, ozone, abrasion, acids, and chemicals shall be permitted where flexibility is necessary between the electrified truck parking space supply equipment and ~~the panelboard and~~ the inlet(s) on the truck.

~~(B)~~ (C) Listed Attachment Plug(s) and Cord Connector(s). Where a flexible cord is provided ~~with an equipment grounding conductor and equipped~~ with an attachment plug and cord connector, they ~~attachment plug~~ shall comply with 250.138(A). ~~and 250.138(B)~~. An attachment plug and cord connector for the connection of a truck or trailer shall be either:

(1) rated 30 ampere, 480-volt, ~~three phase~~ 3-phase and intended for use with a 480-volt, ~~three phase~~ 3-phase receptacle, or

(2) rated 60 ampere, 208-volt, ~~three phase~~ 3-phase and intended for use with the 60-ampere, 208-volt, ~~three phase~~ 3-phase receptacle ~~and intended for use with 208 volt, three phase receptacle.~~

FPN: Complete details of the 30-ampere pin and sleeve attachment plug and cord connector configurations for refrigerated containers (transport refrigerated units) can be found in ANSI/UL 1686, Standard for Pin and Sleeve Configurations, Figures C2.12 and C2.11. For various configurations of 60-ampere pin and sleeve attachment plugs and cord connectors, see ANSI/UL 1686, Standard for Pin and Sleeve Configurations.

~~FPN: Complete details of the 30-ampere and 60-ampere plug and cord connector configurations can be found in the Standard for Pin and Sleeve Configurations, UL 1686, Configurations section, Part C2 and Part C3.~~

The attachment plug(s) and cord connector(s) shall be listed, by itself or as part of the power supply cable assembly, for the purpose and shall be molded to or installed on the flexible cord so that it is secured tightly to the cord at the point where the cord enters the attachment plug or cord connector. If a right-angle cap is used, the configuration shall be oriented so that the grounding member is farthest from the cord.

~~(C) Truck/Vehicle Point of Entrance Location. The point of entrance of the power supply cable assembly to the truck or location of the transport refrigerated unit inlet shall be located at a height of not less than 600 m (24 in.) above the parking surface.~~

~~(D) Protection Against Corrosion and Mechanical Physical Damage. Permanent provisions shall be made for the protection of the power supply cable assembly, attachment plug and any other exposed portions of the transport refrigeration unit distribution system against corrosion and mechanical damage if such devices are in an exterior location while the truck or trailer is in transit.~~

~~(E)(B) Reserved.~~

Substantiation: The Code Making Panel 12 Chair, Tim Croushore formed a task group of Panel 12 members to develop a comment for proposed Article 626 "Electrified Truck Parking Spaces." The task group members are Roger McDaniel (chairman), William Anderson, Jeff Holmes, Ron Janikowski, Robert Jones, Todd Lottman, and Craig Sato.

The TCC directive was followed concerning the scope and title.

The TCC directive was followed regarding the rewrite of the proposed article for clarity, compliance with the NEC style Manual, and consistency of terminology. Several additions or deletions reflect relocation for clarity.

The article was rewritten to remove any requirements that are not within the scope of NFPA 70 (i.e., onboard truck/transport refrigerated units (TRU) equipment.)

The article was rewritten to remove any requirements that are addressed in other parts of the code. A FPN was added to further identify what an electrified truck parking space consists of and possible locations.

The definitions included in this article were modified to exclude definitions appearing in Article 100 or that related to onboard equipment outside the scope of this article.

Figures 626.12(B)(1) and (2) were deleted per NFPA request because the NEC is not printed in color and the colored map would be confusing to the user. The idea of including a website reference to the map was dismissed because of NFPA requirements as well. More detailed data was retrieved and included in the fine print note following Table 626.12(B) from the HTTP:// www.usna usda.gov/hardzone/ushzmap.html web site which includes the following statement. "Note: This publication is not copyrighted, and permission to reproduce all or any part of it is not required."

The mounting height datum in 626.22(B) was revised for consistency with terminology in Section 682.2(3). Permissive language was changed to mandatory language in 626.23 to prevent the maximum height of a connection from being beyond reach of 6 ft 7 in. height.

Section 626.32 was revised to r
efer to portable cable assemblies that are provided as a part of the means to connect the power supply equipment to the truck/trailer.

Figure 626.25(B)(4)(a) Receptacle, Connector, Attachment Plug, and Inlet Configurations was removed from this article. While the Task Group recognizes the need for standardization of configurations utilized with electrified truck parking spaces, the NEC and Code Making Panels is not the forum for establishing product standards nor in a position to endorse proprietary, patented connection products.

Panel Meeting Action: Accept in Principle

Revise Article 626 to read as follows:

ARTICLE 626
Electrified Truck Parking Spaces

I. GENERAL

626.1 Scope. The provisions of this article cover the electrical conductors and equipment external to the truck or transport refrigerated unit that connect trucks or transport refrigerated units to a supply of electricity, and the installation of equipment and devices related to electrical installations within an electrified truck parking space.

626.2 Definitions.

Cable Management System. An apparatus designed to control and organize unused lengths of cable or cord at electrified truck parking spaces.

Cord Connector. A device which, by inserting it into a truck flanged surface inlet, establishes an electrical connection to the truck for the purpose of providing power for the on-board electric loads and shall be permitted to provide a means for information exchange. This device is part of the truck coupler.

Disconnecting Means, Parking Space. The necessary equipment usually consisting of a circuit breaker or switch and fuses, and their accessories, located near the point of entrance of supply conductors in an electrified truck parking space and intended to constitute the means of cutoff for the supply to that truck.

Electrified Truck Parking Space. A truck parking space that has been provided with an electrical system that allows truck operators to connect their vehicles while stopped, and use off-board power sources in order to operate on-board systems such as air conditioning, heating and appliances, without any engine idling.

FPN: An electrified truck parking space also includes dedicated parking areas for heavy duty trucks at travel plazas, warehouses, shipper and consignee yards, depot facilities and border crossings. It does not include areas such as the shoulders of highway ramps and access roads, camping and recreational vehicle sites, residential and commercial parking areas used for automotive parking or other areas where ac power is provided solely for the purpose of connecting automotive and other light electrical loads, such as engine block heaters, and at private residences.

Electrified Truck Parking Space Wiring Systems. All of the electrical wiring, equipment, and appurtenances related to electrical installations within an electrified truck parking space including the electrified parking space supply equipment.

Overhead Gantry. A structure consisting of horizontal framework supported by vertical columns spanning above electrified truck parking spaces that supports equipment, appliances, raceway and other necessary components for the purpose of supplying electrical, HVAC, internet, communications and other services to the spaces.

Separable Power Supply Cable Assembly. A flexible cord or cable, including ungrounded, grounded, and equipment grounding conductors, provided with a cord connector, an attachment plug and all other fittings, grommets, or devices installed for the purpose of delivering energy from the source of electrical supply to the truck or TRU flanged surface inlet.

Transport Refrigerated Unit (TRU). A trailer or container, with integrated cooling and / or heating, used for the purpose of maintaining the desired environment of temperature-sensitive goods or products.

Truck. Motor vehicle designed for the transportation of goods, services, and equipment.

Truck Coupler. A truck flanged surface inlet and mating cord connector

Truck Flanged Surface Inlet. The device(s) on the truck into which the connector(s) is inserted providing electric energy and other services. This device is part of the truck coupler. For the purposes of this article, the truck flanged surface inlet is considered to be part of the truck and not part of the electrified truck parking space supply equipment.

626.3 Other Articles. Wherever the requirements of other articles of this Code and Article 626 differ, the requirements of Article 626 shall apply. Unless electrified truck parking space wiring systems are supported or arranged in such a manner that they cannot be used in or above locations classified in 511.3 or 514.3 or both, they shall comply with 626.3(A) and 626.3(B) in addition to the requirements of this article.

(A) Vehicle Repair and Storage Facilities. Electrified truck parking space electrical wiring systems located at facilities for the repair or storage of self-propelled vehicles that use volatile flammable liquids or flammable cases for fuel or power shall comply with Article 511.

(B) Motor Fuel Dispensing Stations. Electrified truck parking space electrical wiring systems located at or serving motor fuel dispensing stations shall comply with Article 514.

FPN: For additional information see NFPA 88A-2002, Standard for Parking Structures and NFPA 30A-2003, Code for Fuel Dispensing Facilities and Repair Garages.

626.4 General Requirements.

(A) Not Covered. The provisions of this article do not apply to that portion of other equipment in residential, commercial or industrial facilities that require electric power for devices used to load and unload cargo and equipment, operate conveyors, and other devices on the site or truck.

(B) Distribution System Voltages. Unless other voltages are specified, the nominal ac system voltages of 120, 120/240, 208Y/120, 240, or 480Y/277, shall be used to supply equipment covered by this article.

(C) Connection to Wiring System. The provisions of this article shall apply to the electrified truck parking space supply equipment intended for connection to a wiring system as defined in 626.10(A).

(D) Illumination. Illumination shall be provided to facilitate safe use of electrified truck parking spaces.

II. Electrified Truck Parking Space Electrical Wiring Systems

626.10 Branch Circuits. Electrified truck parking space single phase branch circuits shall be derived from a 208Y/120 volt 3-phase system or a 120/240 volt single-phase system.

Exception: A 120-volt distribution system shall be permitted to supply existing electrified truck parking spaces.

626.11 Feeder and Service Load Calculations.

(A) Parking Space Load. The calculated load of a feeder or service shall not be less than the sum of the loads on the branch circuits. Electrical service and feeders shall be calculated on the basis of not less than 11 kVA per electrified truck parking space.

(B) Demand Factors. Electrified truck parking space electrical wiring system demand factors shall be based upon the climatic temperature zone in which the equipment is installed. The demand factors set forth in Table 626.11(B) shall be the minimum allowable demand factors that shall be permitted in calculating load for service and feeders. No demand factor shall be allowed for any other load, except as provided in this Article.

Table 626.11(B) Demand Factors for Services and Feeders

Climatic Temperature Zone (USDA Hardiness Zone) See Note	Demand Factor (percent)
1	70%
2a	67%
2b	62%
3a	59%
3b	57%
4a	55%
4b	51%
5a	47%
5b	43%
6a	39%
6b	34%
7a	29%
7b	24%
8a	21%
8b	20%
9a	20%
9b	20%
10a	21%
10b	23%
11	24%

Note: The climatic temperature zones shown in Table 626.11(B) correlate with those found on the "USDA Plant Hardiness Zone Map," and the climatic temperature zone selected for use with the table shall be determined through the use of this map based on the installation location.

FPN: The US Department of Agriculture (USDA) has developed a commonly used "Plant Hardiness Zone" map that is publicly available. The map provides guidance for determining the Climatic Temperature Zone. Data indicates that the HVAC has the highest power requirement in cold climates, with the heating demand representing the greatest load, which in turn is dependent on outside temperature. In very warm climates, where no heating load is necessary, the cooling load increases as the outdoor temperature rises.

(C) Two or More Electrified Truck Parking Spaces. Where the electrified truck parking space wiring system is in a location that serves two or more electrified truck parking spaces, the equipment for each space shall comply with 626.11(A) and the calculated load shall be computed on the basis of each parking space.

(D) Conductor Rating. Truck space branch circuit conductors shall have an ampacity not less than the loads supplied.

III. Electrified Truck Parking Space Supply Equipment

626.20 Grounding.

(A) Exposed Non-Current-Carrying Metal Parts.

(1) **Fixed Equipment.** Exposed non-current-carrying metal parts of fixed equipment, metal enclosures, and fittings that are not electrically connected to grounded equipment shall be bonded by a continuous equipment grounding conductor run with the circuit conductors from the service equipment or from the transformer of a secondary distribution system. Equipment grounding conductors shall be sized in accordance with 250.122.

(2) **Grounding Connections.** The arrangement of equipment grounding connections shall be such that the disconnection or removal of a receptacle or other device will not interfere with, or interrupt, the grounding continuity.

(B) Distribution System Grounding. Each distribution system shall be grounded at the transformer secondary in accordance with 250.30(A).

(C) Load-Side Grounding Connections. A grounding connection shall not be made to any grounded conductor on the load side of the service disconnecting means except in accordance with 250.30(A) for separately derived systems.

626.21 Overhead Clearances.

(A) Conductors Not Over 600 Volts. Conductors or cables of not over 600 volts, nominal, shall conform to 225.18 and 225.19.

(B) Conductors Over 600 Volts. Conductors and cables over 600 volts, nominal, shall conform to 225.60 and 225.61.

626.22 Wiring Methods and Materials.

(A) Electrified Truck Parking Space Supply Equipment Type. The electrified truck parking space supply equipment shall be provided in one of the following forms:

(1) Post or Pedestal

(2) Overhead Gantry

(3) Raised Concrete Pad

(B) Mounting Height. Post, pedestal, and raised concrete pad types of electrified truck parking space supply equipment shall be not less than 600 mm (2 ft.) above ground or above the point identified as the prevailing highest water level mark or an equivalent benchmark based on seasonal or storm-driven flooding from the authority having jurisdiction.

(C) Access and Working Space. All electrified truck parking space supply equipment shall be accessible by an unobstructed entrance or passageway not less than 600 mm (2 ft.) wide and not more than 2.0 m (6 ft. 6 in.) high. Sufficient space shall be provided and maintained about all electrical equipment to permit ready and safe operation, in accordance with 110.26.

(D) Disconnecting Means. A disconnecting switch or circuit breaker shall be provided to disconnect one or more electrified truck parking space supply

equipment sites from a remote location. The disconnecting means shall be provided and installed in a readily accessible location and shall be capable of being locked in the open position. Portable means for adding a lock to the switch or circuit breaker shall not be permitted as the means required to be installed at and remain with the equipment.

626.23 Overhead Gantry or Cable Management System.

(A) Cable Management. Electrified truck parking space equipment provided from either overhead gantry or cable management systems shall utilize a permanently attached power supply cable in electrified truck parking space supply equipment. Other cable types and assemblies listed as being suitable for the purpose, including optional hybrid communications, signal, and optical fiber cables, shall be permitted.

(B) Strain Relief. Means to prevent strain from being transmitted to the wiring terminals shall be provided. Permanently attached power supply cable(s) shall be provided with a means to de-energize the cable conductors and power service delivery device upon exposure to strain that could result in either cable damage or separation from the power service delivery device and exposure of live parts.

626.24 Electrified Truck Parking Space Supply Equipment Connection Means.

(A) General. Each truck shall be supplied from electrified truck parking space supply equipment through suitable extra hard service cables or cords. Each connection to the equipment shall be by a single separable power supply cable assembly.

(B) Receptacle. All receptacles shall be listed and of the grounding type. Every truck parking space with electrical supply shall be equipped with:

(1) Two single receptacles, each shall be 2-pole 3-wire grounding type, rated 20 amperes, 125 volts, and shall be on an individual branch circuit, and

FPN: For the nonlocking-type and grounding-type 20-ampere receptacle configuration, see National Electrical Manufacturers Association *Standard for Dimensions of Attachment Plugs and Receptacles*, ANSI/NEMA WD6-2002, Figure 5-20.

(2) One single receptacle 3-pole, 4-wire grounding-type, single phase rated either 30-amperes 208Y/120-volts or 125/250-volts. The 125/250-volt receptacle shall be permitted to be used on a 208Y/120-volt, single-phase circuit.

FPN: For various configurations of 30-ampere pin and sleeve receptacles, see ANSI/UL1686, *Standard for Pin and Sleeve Configurations*, Figure C2.9 or Part C3.

Exception: Where electrified truck parking space supply equipment provides the air-conditioning and comfort cooling function without requiring a direct electrical connection at the truck, only the two receptacles identified in 626.24(B)(1) shall be required.

(C) Disconnecting Means, Parking Space. The electrified truck parking space supply equipment shall be provided with a switch or circuit breaker for disconnecting the power supply to the electric truck parking space. A disconnecting means shall be provided and installed in a readily accessible location and shall be capable of being locked in the open position. Portable means for adding a lock to the switch or circuit breaker shall not be permitted as the means required to be installed at and remain with the equipment.

(D) Ground-Fault Circuit-Interrupter Protection for Personnel. The electrified truck parking space equipment shall be designed and constructed such that all receptacle outlets in 626.24 are provided with ground-fault circuit-interrupter protection for personnel**.**

626.25 Separable Power-Supply Cable Assembly.

A separable power-supply cable assembly, consisting of a power supply cord, a cord connector, an attachment plug and intended for connection with a truck flanged surface inlet, shall be of a listed type. The power-supply cable assembly or assemblies shall be identified and be of one of the following types and ratings specified herein. Cords with adapters and pigtail ends, extension cords, and similar items shall not be used.

(A) Rating(s).

(1) Twenty-Ampere Power-Supply Cable Assembly. Equipment wired with a 20-ampere, 125-volt receptacle, in accordance with 626.24(B)(1), shall use a listed 20-ampere power-supply cable assembly.

Exception: It shall be permitted to use a listed separable power supply cable assembly, either hard-service or extra hard service and rated 15- amperes, 125 volts for connection to an engine block heater for existing vehicles.

(2) Thirty-Ampere Power-Supply Cable Assembly. Equipment wired with a 30-ampere, 208Y/120-volt or 125/250-volt receptacle, in accordance with 626.24(B)(2) shall use a listed 30-ampere main power-supply cable assembly.

(B) Power Supply Cord.

(1) Conductors. The cord shall be a listed type with three or four conductors, for single phase connection, one of which shall be identified in accordance with 400.23.

Exception: It shall be permitted to use a separate listed three conductor separable power supply cable assembly, having one of which shall be identified in accordance with 400.23, and rated 15 amperes, 125-volts for connection to an engine block heater for existing vehicles.

(2) Cord. Extra-hard usage flexible cords and cables rated not less than 90°C (194°F), 600 volts; listed for both wet locations and sunlight resistance; and having an outer jacket rated to be resistant to temperature extremes, oil, gasoline, ozone, abrasion, acids, and chemicals shall be permitted where flexibility is necessary between the electrified truck parking space supply equipment and the panel board and flanged surface inlet(s) on the truck.

Exception: Cords for the separable power supply cable assembly for 15 and 20 ampere connections shall be permitted to be a hard-service type.

(3) Cord Overall Length. The exposed cord length shall be measured from the face of the attachment plug to the point of entrance to the truck or the face of the flanged surface inlet or to the point where the cord enters the truck. The overall length of the cable shall not exceed 7.5 m (25 ft) unless equipped with a cable management system that is listed as suitable for the purpose.

(4) Attachment Plug. The attachment plug(s) shall be listed, by itself or as part of a cord set, for the purpose and shall be molded to or installed on the flexible cord so that it is secured tightly to the cord at the point where the cord enters the attachment plug. If a right-angle cap is used, the configuration shall be oriented so that the grounding member is farthest from the cord. Where a flexible cord is provided, the attachment plug shall comply with 250.138(A).

(a) Connection to a 20-Ampere Receptacle. A separable power supply cable assembly for connection to a truck flanged surface inlet, rated at 20 amperes, shall have a nonlocking-type attachment plug that shall be 2-pole, 3-wire, grounding type, rated 20 amperes, 125 volts and intended for use with the 20-ampere, 125-volt receptacle.

Exception: A separable power supply cable assembly, rated 15 amperes, provided for the connection of an engine block heater, only, shall have an attachment plug that shall be 2-pole, 3-wire, grounding type, rated 15 amperes, 125 volts.

FPN: For nonlocking- and grounding-type 15- or 20-ampere plug and receptacle configurations, see National Electrical Manufacturers Association *Standard for Dimensions of Attachment Plugs and Receptacles*, ANSI/NEMA WD6-2002, Figure 5-15 or 5-20.

(b) Connection to a 30-Ampere Receptacle. A separable power supply cable assembly for connection to a truck flanged surface inlet, rated at 30 amperes, shall have an attachment plug that shall be 3-pole, 4-wire, grounding type, rated 30-amperes, 208Y/120-volts or 125/250-volts, and intended for use with the receptacle in accordance with 626.24(B)(2). The 125/250-volt attachment plug shall be permitted to be used on a 208Y/120-volt, single-phase circuit.

FPN: For various configurations of 30-ampere pin and sleeve plugs, see ANSI/UL1686, *Standard for Pin and Sleeve Configurations*, Figure C2.10 or Part C3.

(5) Cord Connector. The cord connector for a separable power supply cable assembly, as specified in 626.25(A) (1), shall be a 2-pole, 3-wire grounding type, rated 20 amperes, 125 volts. The cord connector for a separable power supply cable assembly, as specified in 626.25(A)(2), shall be a 3-pole, 4-wire grounding type, rated 30-amperes, 208Y/120-volts or 125/250-volts. The 125/250-volt cord connector shall be permitted to be used on a 208Y/120-volt, single-phase circuit.

Exception: The cord connector for a separable power supply cable assembly, rated 15 amperes, provided for the connection of an engine block heater for existing vehicles, shall have an attachment plug that shall be 2-pole, 3-wire, grounding type, rated 15 amperes, 125 volts.

FPN: For various configurations of 30-ampere cord connectors, see ANSI/UL1686 *Standard for Pin and Sleeve Configurations*, Figure C2.9 or Part C3.

626.26 Loss of Primary Power. Means shall be provided such that, upon loss of voltage from the utility or other electric supply system(s), energy cannot be back-fed through the truck and the truck supply equipment to the electrified truck parking space wiring system unless permitted by 626.27.

626.27 Interactive Systems. Electrified truck parking space supply equipment and other parts of a system, either on-board or off-board the vehicle, that are identified for and intended to be interconnected to a vehicle and also serve as an optional standby system or an electric power production source or provide for bi-directional power feed shall be listed as suitable for that purpose. When used as an optional standby system, the requirements of Article 702 shall apply, and when used as an electric power production source, the requirements of Article 705 shall apply.

IV. Transport Refrigerated Units (TRU)

626.30 Transport Refrigerated Units. Electrified truck parking spaces intended to supply Transport Refrigerated Units shall include an individual branch circuit and receptacle for operation of the refrigeration/heating units. The receptacle associated with the Transport Refrigerated Units shall be provided in addition to the receptacles mentioned in 626.24(B).

(A) Branch Circuits. TRU spaces shall be supplied from 208-volt 3-phase or 480-volt 3-phase branch circuits and with an equipment grounding conductor in accordance with 250.118

(B) Electrified Truck Parking Space Supply Equipment. The electrified truck parking space supply equipment, or portion thereof, providing electrical power for the operation of TRU's shall be independent of the loads in Part III.

626.31 Disconnecting Means and Receptacles.

(A) Disconnecting Means. Disconnecting means shall be provided to isolate each refrigerated unit from its supply connection. A disconnecting means shall be provided and installed in a readily accessible location and shall be capable of being locked in the open position. Portable means for adding a lock to the switch or circuit breaker shall not be permitted as the means required to be installed at and remain with the equipment.

(B) Location. The disconnecting means shall be readily accessible, located not more than 762 mm (30 in.) from the receptacle it controls, and shall be located in the supply circuit ahead of the receptacle. Circuit breakers or switches located in power outlets complying with this section shall be permitted as the disconnecting means.

(C) Receptacles. All receptacles shall be listed and of the grounding type. Every electrified truck parking space intended to provide an electrical supply for transport refrigerated units shall be equipped with one or both of the following:

(1) a 30 ampere, 480-volt, 3-phase, 3 pole, 4 wire receptacle,

(2) a 60 ampere, 208-volt, 3-phase, 3 pole, 4 wire receptacle

FPN: Complete details of the 30-ampere pin and sleeve receptacle configuration for refrigerated containers (transport refrigerated units) can be found in ANSI/UL1686 *Standard for Pin and Sleeve Configurations*, Figure C2.11. For various configurations of 60-ampere pin and sleeve receptacles, see ANSI/UL1686 *Standard for Pin and Sleeve Configurations.*

626.32 Separable Power Supply Cable Assembly. A separable power supply cable assembly, consisting of a cord with an attachment plug and cord connector, shall be of one of the following types and rating specified below. Cords with adapters and pigtail ends, extension cords, and similar items shall not be used.

(A) Rating(s). The power supply cable assembly shall be listed and rated:

(1) 30 ampere, 480-volt, 3-phase, or

(2) 60 ampere, 208-volt, 3-phase

(B) Cord Assemblies. The cord shall be a listed type with four conductors, for 3-phase connection, one of which shall be identified in accordance with 400.23 for use as the grounding conductor. Extra-hard usage cables rated not less than 90°C (194°F), 600 volts, listed for both wet locations and sunlight resistance; and having an outer jacket rated to be resistant to temperature extremes, oil, gasoline, ozone, abrasion, acids, and chemicals, shall be permitted where flexibility is necessary between the electrified truck parking space supply equipment and the inlet(s) on the TRU.

(C) Attachment Plug(s) and Cord Connector(s). Where a flexible cord is provided with an attachment plug and cord connector, they shall comply with 250.138(A). The attachment plug(s) and cord connector(s) shall be listed, by itself or as part of the power supply cable assembly, for the purpose and shall be molded to or installed on the flexible cord so that it is secured tightly to the cord at the point where the cord enters the attachment plug or cord connector . If a right-angle cap is used, the configuration shall be oriented so that the grounding member is farthest from the cord. An attachment plug and cord connector for the connection of a truck or trailer shall be either:

(1) Rated 30 ampere, 480-volt, 3-phase, 3pole, 4 wire and intended for use with a 30 ampere 480-volt, 3-phase, 3 pole 4 wire receptacles and inlets respectively, or

(2) Rated 60 ampere, 208-volt, 3-phase, 3 pole, 4 wire and intended for use with a 60-ampere, 208-volt, 3-phase, 3 pole, 4 wire receptacles and inlets respectively

FPN: Complete details of the 30-ampere pin and sleeve attachment plug and cord connector configurations for refrigerated containers (transport refrigerated units) can be found in ANSI/UL1686, *Standard for Pin and Sleeve Configurations*, Figures C2.12 and C2.11. For various configurations of 60-ampere pin and sleeve attachment plugs and cord connectors, see ANSI/UL1686, *Standard for Pin and Sleeve Configurations.*

Panel Statement: The work on Article 626 was a result of a balanced task group assigned by the chairman of CMP-12 to address the issue of electrified truck parking spaces.
This article reflects input from representatives of all facets of the electrical industry. The task group also used expertise from other representatives of the truck parking space industry and technology.
CMP-12 recommends the that the TCC consider the following for correlation with the addition of this new article:

1. Add "Electrified Truck Parking Space" and "Article 626" to Table 210.2 Specific-Purpose Branch Circuits.
2. Add "Electrified Truck Parking Space" and "Article 626" to Table 220.3 Additional Load Calculation References.
3. Add "Electrified Truck Parking Space" and "Article 626" to Table 250.3 Additional Grounding Requirements.

Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:
QUAVE, D.: This proposal was completely overhauled at the panel meeting. Changes were made to require the outlets to be fed from individual branch circuits. All the interlocking features (safety measures) were eliminated. These are just some of the major changes that need more time to be reviewed.

12-45 Log #1728 NEC-P12 **Final Action: Reject**
(626.2)

Submitter: Brian Sisco, Southern California Edison
Comment on Proposal No: 12-81
Recommendation: Retain the original text.
Substantiation: The considerations and substantiation for this article were based on the use of this equipment by the heavy-duty truck industry and truck drivers who are required to stop for a rest period. The revised definition implies that other motor vehicles and the general public could use the equipment. Other potential users of this equipment, as implied by the modified definition, may raise additional concerns with regard to their skills in connecting their vehicles to this equipment, and the connection means, including various types of adapters, they may use in utilizing the electrified truck parking space equipment. This article was intended to serve the only commercially feasible user of electrified truck parking spaces at this time, that is, a heavy-duty truck as included in the original definition.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 12-42.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

12-46 Log #2307 NEC-P12 **Final Action: Accept in Principle**
(626.3)

Submitter: Brian Rock, Hubbell Incorporated
Comment on Proposal No: 12-81
Recommendation: Revise text to read as follows:
626.3 Other Articles. Wherever the requirements of articles of this Code and Article 626 differ, the requirements of Article 626 shall apply. Unless electrified truck parking space wiring systems are supported or arranged in such a manner that they cannot be used in or above locations classified in 511.3 or 514.3 or both, they shall comply with 626.3(A) and 626.3(B) in addition to the requirements of this article.
(A) Vehicle Repair and Storage Facilities. Electrified parking space electrical wiring systems located at facilities for the repair or storage of self-propelled vehicles that use volatile flammable liquids or flammable gases for fuel or power shall comply with Article 511.
(B) Motor Fuel Dispensing Stations. Electrified parking space electrical wiring systems located at or serving motor fuel dispensing stations shall comply with Article 514.
Revise text to read as follows:FPN: For additional information, see NFPA 88A—2002, *Standard for Parking Structures*, and NFPA 30A—2003, *Code for Fuel Dispensing Facilities and Repair Garages*.
Substantiation: Requirements of Article 626 as proposed are intended solely for ordinary locations. Electrified truck parking spaces, however, may be located adjacent to Special Occupancies for fuel dispensing and for vehicle repair and storage; these occupancies are frequently hazardous (classified) locations. As re-titled, Article 626 might be misconstrued as being a Special Occupancy rather than Special Equipment. Consequently, unrevised 626.3 could be misconstrued to mean that specific requirements of Article 626 might also be sufficient for hazardous (classified) locations as well and that Article 626 incorrectly takes precedence over requirements of Articles 511 and 514 in those classified locations. Arcing devices such as switchgear, switches, plugs, outlets, etc., shouldn't be used in hazardous (classified) locations, unless evaluated and Listed as suitable for such locations. Furthermore, Articles 511 and 514 have requirements for wiring and equipment installed above, as well as in, Class I locations. Revision in accordance with this Comment removes that ambiguity. 626.3(A) and 626.3(B) for electrical systems serving trucks are similar to established requirements 555.22 and 555.21, respectively, for electrical systems serving boats.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 12-44, which meets the intent of the submitter.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

12-47 Log #1735 NEC-P12 **Final Action: Reject**
(626.10 and 626.12)

Submitter: Adam McCall, IdleAire Technologies Corporation
Comment on Proposal No: 12-81
Recommendation: Retain the original text.
Substantiation: In the substantiation provided with the original proposal, it was indicated that additional data from various truckstops, where electrified parking space equipment has been installed, would continue to be collected and be available for further review.
The additional data continues to show the Electrified Truck Parking Spaces (ETPS) will not be able to provide sufficient heating and cooling capacity if only two single-phase, 120Vac/20A circuits were provided to a parked truck. This can be clearly seen through the data I have submitted. The compilation of over 1 million hours of service has proven that the current proposed article is correct in suggesting that the required capacity to be delivered to a parked truck will require the 30A 208Vac circuit.
We believe there are two commercially-supported means for justifying this statement - by use of the existing ETPS field data and by reviewing the design capacity for some of the most popular on-board auxiliary power units. The existing ETPS field data continues to show the average demand varying with t he outdoor air temperature, as listed in the Demand Load graph provided in the original substantiation. This graph provided a design basis for the average total site load given the most probable occupancy of an ETPS user and the duty cycles present during the various ambient conditions.
It should be noted that the peak HVAC load present is greater than these averages and thus should be considered when evaluating the requirements for input power loads. The field data shows that in almost all weather conditions, a parked truck could require loads that exceed the available power capacity of a single-phase 20A/120Vac (2400W) branch circuit.
Furthermore, the market today for on-board systems, referred to herein as auxiliary power units (APUs), also suggests that the design requirements have moved well beyond the 2400W range. A quick look at five of the most commonly used APUs shows that the average cooling capacity for APU air conditioning units is 17,200 Btu/Hr, which corresponds to 42A @ 120Vac. This value far exceeds the single 120Vac/20A circuit rating and can only be provided by way of the proposed single-phase 30A 208Vac circuit.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The panel rejects the original wording. It does not provide clarity in accordance with the NEC Style Manual.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

12-48 Log #2344 NEC-P12 **Final Action: Accept in Principle in Part**
(626.20.B)

Submitter: Jeff Kim, Shurepower, LLC
Comment on Proposal No: 12-81
Recommendation: Revise text to read as follows:
B. Type Receptacles Provided. All receptacles shall be of the grounding type. ~~A maximum of three receptacles shall be provided~~. Every truck parking space with electrical supply shall be equipped with:
(1) Two 20-ampere, 125-volt single receptacles, NEMA type 5-20R, and
FPN: Complete details of the 15-or 20-ampere plug and receptacle configuration can be found in the National ElectricalManufacturersAssociationStandar dforDimensionsofAttachmentPlugsandReceptacles, ANSI/NEMAWD6-2002, Figure 520.
(2) ~~One 30-ampere, 120/208-volt, 3-pole, 4-wire receptacle.~~
~~FPN: Complete details of the 30-ampere plug and receptacle configuration can be found in the Standard for Pin and Sleeve Configurations, UL 1686, Configurations section, Parts C2.10 or C3.~~
Substantiation: If power for TRUs is to be supplied there may be 4 or more receptacles for each truck parking space.
All currently available trucks with shore power connections use the 120-volt, type 5-20R or 5-15R receptacles. There is currently no reason to require a 120/208-volt connection. This requirement will only increase the overall cost of the infrastructure and could slow growth or this industry. It should be up to technology provider to decide if the third receptacle is necessary and will meet the needs of their customers. The higher amp connection may also encourage higher energy consumption. Future load requirements could be reduced with the use of energy management systems and insulation of the cab envelope.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: The panel accepts in principle the removal of the maximium number of receptacles. See panel action on Comment 12-44 which meets the intent of the submitter.
The panel does not accept the recommendation for the removal of the 30-ampere receptacle. The substantiation does not allow for future 30-ampere configurations.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

12-49 Log #2350 NEC-P12 **Final Action: Accept in Principle (626.20.D)**

Submitter: Jeff Kim, Shurepower, LLC
Comment on Proposal No: 12-81
Recommendation: Revise text to read as follows:

D. Switch-Rated or Interlocked Receptacles. Each receptacle provided by the electrified parking space supply equipment shall be either a switch rated receptacle- plug combination, include an interlocked receptacle with an associated switching device of an interlocking type, or provided with an equivalent means to prevent connection or disconnection under load. The switching device shall be rated to close-into and withstand short circuit fault currents of at least 35 kA.

The switch rated receptacle-plug combination, the interlocked plug and receptacle combination, or other means provided shall ensure that the user has no access to live parts.

Exception: NEMA type 5-20R and 5-15R.

Substantiation: NEMA type 5-15R and 5-20 receptacles are not interlocked, therefore, they should not be required to have an interlock.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel has removed the requirement for interlocking on any types of receptacles. See panel action on Comment 12-44.
However, the panel does not agree with the submitter's substantiation that the limitation for interlocking be limited to NEMA Type 5-20R and 5-15R configuration receptacles. These configurations can be interlockable.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 9 Negative: 1
Explanation of Negative:

QUAVE, D.: The interlocking of the receptacles in order to protect the user from making or breaking "HOT" electrical circuits was a major selling point of this article. Now that it is to be eliminated, the entire article should be reconsidered.

12-50 Log #2356 NEC-P12 **Final Action: Accept in Principle (626.28)**

Submitter: Brian Rock, Hubbell Incorporated
Comment on Proposal No: 12-81
Recommendation: *[Section numbering in this Comment replaces "626.28(B)" from the ROP Panel Meeting Action with "626. 24(B)" to be used in the CP12 Public Comment renumbering developed by the CP12 Ad Hoc Task Group on new Article 626. Figure 626.30(C) is numbered in accordance with the ROP Panel Meeting Action and may possibly be shown as Figure 626.25(B)(4)(a) in the CP12 Public Comment renumbering developed by the CP12 Ad Hoc Task Group on new Article 626.]*

Delete Figure 626.30(C) for Receptacle, Connector, Attachment Plug and Inlet Configurations

~~626.28~~ 626.24 Means for Connecting to Electrified Truck Parking Space Supply Equipment.

[626.24(A) in-between]

(B) ~~Type~~ Receptacles Provided ~~– NEMA Configurations~~. All receptacles shall be of the grounding type. ~~A maximum of three receptacles shall be provided.~~ Every truck parking space with electric supply shall be provided with:

(1) Two ~~20-ampere, 125-volt,~~ single receptacles, each shall be 2-pole, 3-wire grounding type, rated 20 amperes, 125 volts, ~~conforming to the configurations shown in Figure 626.30(C) view (a), NEMA type 5-20R,~~ and

FPN: For ~~Complete details of the 15- or~~ nonlocking- and grounding-type 20-ampere ~~plug and~~ receptacle configuration, see ~~can be found in~~ the National Electrical Manufacturers Association Standard for Dimensions of Attachment Plugs and Receptacles, ANSI/NEMA WD6-2002, Figure 5-20.

(2) One single receptacle, 3-pole, 4-wire grounding type, single-phase rated either 30 amperes, 208Y/120 volts or 125/250 volts ~~30-ampere, 120/208-volt, 3-pole, 4-wire single receptacle conforming to the configurations in Figure 626.30(C) view (b) or (c)~~. The 125/250-volt receptacle shall be permitted to be used on a 208Y/120-volt, single-phase circuit.

FPN 1: For various configurations ~~Complete details~~ of ~~the~~ 30-ampere ~~plug~~ pin and sleeve receptacles ~~configuration, see can be found in the~~ ANSI/UL1686, *Standard for Pin and Sleeve Configurations*, ~~UL1686, Parts~~ Figure ~~C2.10~~ C2.9 or Part C3.

~~FPN 2: See Figure 626.30(C) for details regarding receptacle types.~~

Exception: Where electrified truck parking space supply equipment provides the air-conditioning and comfort cooling function without requiring a direct electrical connection at the truck, only the two receptacles identified in ~~626.21(B)(1)~~ 626.24(B)(1) ~~need~~ shall be ~~provided~~ required.

FPN 2: For Transport Refrigerated Units (TRU), see Part ~~VI~~ IV.

Substantiation: Mandatory specification of a proprietary, patented, closed-license receptacle and plug configuration violates "GUIDELINE ON REFERENCES IN NFPA DOCUMENTS TO PROPRIETARY PRODUCTS AND SERVICES" in the NFPA Committee Officers Guide.

The configuration for the 20-ampere receptacle is a de facto standard via the widespread usage of the compatible NEMA 5-15 inlet for truck engine block heaters. The specific configuration for that 20-ampere receptacle is documented dimensionally in the Standard for Dimensions of Attachment Plugs and Receptacles, ANSI/NEMA WD6. The FPN directs the reader to the application-specific reference for this dedicated configuration.

Presently, there is no installed base of 30-ampere receptacles for truck applications. No accepted standards organization representing users has adopted the depicted configurations. NFPA should not be put in the position of being the sole standards-setting body determining which eligible receptacle and plug configurations should be permitted or excluded.

Furthermore, UL has indicated that the depicted configuration for the switch-rated 208Y/120-volt device is not among those in ANSI/UL1686 and will only be considered under "new business" upon issuance of the Third Edition after publication of the 2008 NEC®. UL also indicates there is no certainty any "new business" proposal will be adopted into the new edition.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 12-44, which meets the intent of the submitter.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

12-51 Log #2259 NEC-P12 **Final Action: Accept in Principle (626.28(D))**

Submitter: Michael Beanland, Vancouver, WA
Comment on Proposal No: 12-81
Recommendation: Add (3) One 30-ampere 125/250-volt 3-pole, 4-wire, grounding receptacle conforming to the configuration shown in Figure 626.30.
Substantiation: Section 626.30(A)(4)(b) includes the use of a 30-ampere 125/250-volt plug, however, 626.28(D)(2) does not allow installation of the receptacle.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 12-44, which meets the intent of the submitter.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

12-52 Log #2261 NEC-P12 **Final Action: Accept in Principle (626.28(D))**

Submitter: Michael Beanland, Vancouver, WA
Comment on Proposal No: 12-81
Recommendation: Receptacles Provided - NEMA Configurations. All receptacles shall be of the grounding type. ~~A maximum of three receptacles shall be provided.~~ Every truck parking space with electrical supply may ~~shall~~ be equipped with:
Substantiation: This section is in conflict with the requirements for TRU powering (626.38). If both TRU and cab powering (626.32) is to be implemented, more than three receptacles may be required. If universal TRU and cab powering is offered, 480-volt, 208-volt, 208Y/120-volt 2-phase, 125/250V, and 120-volt may all be needed at each pedestal. If such an installation is properly designed, there is no safety issue with having more than 3 receptacles. The limit of 3 receptacles cannot be justified.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 12-44, which meets the intent of the submitter.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

12-53 Log #1723 NEC-P12 **Final Action: Accept in Principle (626.30(4)(a) and Figure 626.30(c))**

Submitter: Brian Sisco, Southern California Edison
Comment on Proposal No: 12-81
Recommendation: Retain the original text.
Substantiation: In response to comment by Mr. T. Lottmann (NEMA):

The proposed article included a choice of two possible means of connection (i.e., receptacle, plug, and connector) for the 30 ampere, 120/208 volt wiring devices. The article did not limit this means of connection to a single proprietary configuration.

The article provides for two means of safely connecting and disconnecting devices that are carrying a load. One is to interlock the receptacle with a separate switching device; the other is to incorporate the switch into the plug and receptacle. Both are commonly used throughout industry and both provide the desired level of safety for this application. Allowing both makes the code open to various technologies and provides equipment suppliers, truckstop operators and users the flexibility of using either of the technologies commonly used today.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 12-44, which meets the intent of the submitter.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

12-54 Log #2260 NEC-P12 **Final Action: Accept in Principle**
(626.30(A)(2))

Submitter: Michael Beanland, Vancouver, WA
Comment on Proposal No: 12-81
Recommendation: Revise text to read as follows:
Trucks wired with a 30-ampere 120/208-volt or 125/250-volt truck inlet, in accordance...
Substantiation: 626.30(A)(4)(b) permits the use of 125/250-volt connections. 626.30(A)(1)(2) does not permit 125/250-volt connections. Wording must be added to correct this issue.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 12-44, which meets the intent of the submitter.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

12-55 Log #1727 NEC-P12 **Final Action: Accept in Principle**
(626.30(F))

Submitter: Brian Sisco, Southern California Edison
Comment on Proposal No: 12-81
Recommendation: Retain the original text.
Substantiation: The text corresponding to the (cord) connector appears to have been deleted in error. The "cord connector" is a part of the separable power supply cable assembly and should be included in this article.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 12-44, which meets the intent of the submitter.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

12-56 Log #2331 NEC-P12 **Final Action: Accept in Principle**
(626.40(E))

Submitter: Brian Rock, Hubbell Incorporated
Comment on Proposal No: 12-81
Recommendation: *[Section numbering in this Comment replaces "**626.40(E)**" from the ROP Panel Meeting Action with "**626.31(D)**" to be used in the CP12 Public Comment renumbering developed by the CP12 Ad Hoc Task Group on new Article 626.]*
Revise text and add FPN to 626.31(D).
~~626.40~~ 626.31 Disconnecting Means and Branch-Circuit Protective Equipment
~~(E)~~ (D) ~~NEMA Configuration~~ Receptacle Requirements ~~Type Receptacles Provided~~. All receptacles shall be of the grounding type. Every electrified truck parking space intended to provide an electrical supply for transport refrigerated units shall be equipped with either a:
(1) 30-ampere, 480-volt, 3-phase receptacle, or
(2) 60-ampere, 208-volt, 3-phase receptacle.
FPN: Complete details of the 30-ampere pin and sleeve receptacle configuration for refrigerated containers (transport refrigerated units) can be found in ANSI/UL1686, *Standard for Pin and Sleeve Configurations*, Figure C2.11. For various configurations of 60-ampere pin and sleeve receptacles, see ANSI/UL1686, *Standard for Pin and Sleeve Configurations.*
Substantiation: The configuration for the 30-ampere receptacles, attachment plugs, cord connectors and inlets is already American- and internationally-standardized specific to the refrigerated container (transport refrigerated unit) application. These receptacles, attachment plugs, cord connectors and inlets are not bladed NEMA configurations (ANSI/NEMA WD6), so the indication of "NEMA Configuration" should be deleted. The specific configuration for that 30-ampere receptacle is documented dimensionally in the ANSI/UL *Standard for Pin and Sleeve Configurations*, ANSI/UL1686, in Figure C2.11 for outlet devices (receptacles and cord connectors). The FPN directs the reader to the application-specific reference for this dedicated configuration.
Presently, there is no standardized refrigerated container usage at either 60 amperes or at 208 volts. Consequently, for this application, there is no standardized configuration for receptacles, attachment plugs, cord connectors and inlets. The FPN for the 60-ampere configuration is purely an informative reference, without prejudice or endorsement, to a number of potentially eligible pin and sleeve configuration schemes that could serve the purpose.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 12-44, which meets the intent of the submitter.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

12-57 Log #2336 NEC-P12 **Final Action: Accept in Principle**
(626.42, 626.42(B))

Submitter: Brian Rock, Hubbell Incorporated
Comment on Proposal No: 12-81
Recommendation: *[Section numbering in this Comment replaces "**626.42**" and "**626.42(B)**" from the ROP Panel Meeting Action with "**626.32**"and "**626.32(C)**" to be used in the CP12 Public Comment renumbering developed by the CP12 Ad Hoc Task Group on new Article 626.]*
Revise wording to comply with TCC directive and add FPN to 626.32(C). NOTE: 626.32(C) wording differs from that developed by the CP12 Ad Hoc Task Group.
~~626.42~~ 626.32 Power Supply Cable Assembly. ~~Where a~~ A power supply cable assembly, consisting of a cord with an attachment plug and a cord connector, ~~is provided, it~~ shall ~~be wired directly to the panelboard by an approved wiring method. The attachment plug shall be of a listed type. The power supply cable assembly or assemblies shall be OEM (factory) supplied or OEM or factory approved, and~~ be one of the following types and rating specified herein. Cords with adapters and pigtail ends, extension cords, and similar items shall not be ~~attached to, provided or shipped with a truck~~ used.
[626.32(A) and 626.32(B) in-between]
~~(B)~~ (C) Listed Attachment Plug(s) and Cord Connector(s). Where a flexible cord is provided ~~with an equipment grounding conductor and equipped~~ with an attachment plug and a cord connector, ~~the attachment plug~~ they shall comply with 250.138(A) ~~and 250.138(B)~~. An attachment plug and cord connector for connection of a truck or trailer shall be either:
(1) rated 30-ampere, 480-volt, ~~three-phase~~ 3-phase, and intended for use with ~~a~~ 30-ampere, 480-volt, ~~three-phase~~ 3-phase receptacles and inlets, respectively, or
(2) rated 60-ampere, 208-volt, ~~three-phase~~ 3-phase, and intended for use with ~~a~~ 60-ampere, 208-volt, ~~three-phase~~ 3-phase receptacles and inlets, respectively.
FPN: Complete details of the 30-ampere pin and sleeve attachment plug and cord connector configurations for refrigerated containers (transport refrigerated units) can be found in ANSI/UL1686, *Standard for Pin and Sleeve Configurations*, Figures C2.12 and C2.11. For various configurations of 60-ampere pin and sleeve attachment plug and cord connectors, see ANSI/UL1686, *Standard for Pin and Sleeve Configurations*.
The attachment plug(s) and cord connector(s) shall be listed, by itself themselves or as part of the power supply cable assembly, for the purpose and shall be molded to or installed on the flexible cord so that it is they are secured tightly to the cord at the point where the cord enters the attachment plug or cord connector. If a right-angle cap attachment plug or cord connector is used, the configuration shall be oriented so that the grounding member contact is farthest from the cord.
Substantiation: Per TCC action, the Article is to cover the electrical equipment external to the truck or transport refrigerated unit. Consequently, the cord connector must be defined since the power supply cable assembly must be a cord set consisting of an attachment plug, flexible cable and cord connector rather than a power supply cord consisting of an attachment plug and terminated free end of cable.
The configuration for the 30-ampere receptacles, attachment plugs, cord connectors and inlets is already American- and internationally-standardized specific to the refrigerated container (transport refrigerated unit) application. These receptacles, attachment plugs, cord connectors and inlets are not bladed NEMA configurations (ANSI/NEMA WD6), so the indication of "NEMA Configuration" should be deleted. The specific configuration for that 30-ampere receptacle is documented dimensionally in the ANSI/UL *Standard for Pin and Sleeve Configurations, ANSI/UL1686*, in Figure C2.12 for plug devices (attachment plugs and inlets) and Figure C2.11 for outlet devices (receptacles and cord connectors). The FPN directs the reader to the application-specific reference for this dedicated configuration.
Presently, there is no standardized refrigerated container usage at either 60 amperes or at 208 volts. Consequently, for this application, there is no standardized configuration for receptacles, attachment plugs, cord connectors and inlets. The FPN for the 60-ampere configuration is purely an informative reference, without prejudice or endorsement, to a number of potentially eligible pin and sleeve configuration schemes that could serve the purpose.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 12-44, which meets the intent of the submitter.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

ARTICLE 640 — AUDIO SIGNAL PROCESSING, AMPLIFICATION, AND REPRODUCTION EQUIPMENT

12-58 Log #544 NEC-P12 **Final Action: Accept**
(640.3)

Submitter: Richard P. Owen, City Of St. Paul
Comment on Proposal No: 12-87
Recommendation: Reject this proposal.
Substantiation: This comment was written by a Task Group consisting of Stan Kaufman and Randy Ivans (Panel 16), John Mortimer (Panel 12) and Ron Maassen, Paul Casparro (Panel 3) plus Task Group Chair Richard Owen (Panel 3). The Task Group was directed by the Technical Correlating Committee to examine proposals submitted to all three Panels concerning abandoned cable and other related issues covered by the Panels.

The Task Group came to consensus on the following issues and submitted comments to the Panels as appropriate:

1) On the issue of abandoned cable removal, the task group agreed that only the accessible portions of abandoned cable should be removed. To require removal of all cable could, in some cases, necessitate demolition of the building finish in order to access cables that were properly fastened to the building in accordance with the rules in the various code articles. Furthermore, the task group agreed that the requirements for abandoned cable removal should not be in Section X.3 (Locations and Other Articles) but should be relocated into the general requirements of each article.

2) The task group also agreed to recommend the addition of a new Fine Print Note to further explain the removal requirement. This addition was thought to be necessary to address a common practice of cables that are "fished" inside existing walls. These cables, if abandoned, can be disconnected from their junction point in a wall and pulled out of the wall without having to harm the building finish. At present, in many cases, these cables are being cut off above the wall and left to drop into the wall space.

3) On the issue of "tagged for future use", the Task Group agreed that it was not necessary to require anything more than the cable tag being "...of sufficient durability to withstand the environment involved." This phrase is used in several other places in the NEC and leaves it up to the AHJ as to what is suitable. This language does not add requirements that are difficult, if not impossible, to enforce by adding unclear requirements for rodent-resistance, etc.

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-59 Log #1432 NEC-P12 **Final Action: Accept**
(640.3)

Submitter: Allen C. Weidman, The Society of the Plastics Industry, Inc.
Comment on Proposal No: 12-87
Recommendation: Reject this proposal.
Substantiation: The Society of the Plastics Industry supports the removal of abandoned cables. One of our member companies is in the business of removing abandoned cables from buildings.
Section 300.11 (Securing and Supporting) requires that "Raceways, cable assemblies, boxes, cabinets, and fittings shall be securely fastened in place." It is not possible to remove all abandoned cables if the installation complies with 300.11 and the cables are installed behind a wall.

Proposal 12-87 in one of a series of proposals submitted to panels 3, 12 and 16.

Panel 3 rejected proposals 3-147 and 3-218 with the statement:

"This proposed change would make it a requirement that removal of abandoned cable never damage the building finish or compromise adjacent wiring systems or components. This expectation is unrealistic. If the building owner wants to take a ceiling down to access and remove abandoned cables, the NEC should not and cannot restrict this action. In regard to the removal of accessible cable, the panel refers to the definition of Accessible as it applies to wiring methods."

Panel 16 rejected proposals 16-28, 16-72, 16-176, 16-190, 16-258, 16-323 and 16-364 with the statement:

"The proposed requirement presents a compliance conundrum to installers. Without access, it is impossible to remove cables that are securely fastened without damaging the building or adjacent cables. Gaining access may sometimes require disassembly of part of the building. This is not the intent of the panel. The current requirement to remove only the accessible portion is reasonable."

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-60 Log #1611 NEC-P12 **Final Action: Accept**
(640.3)

Submitter: Allen C. Weidman, Society of the Plastics Industry, Inc.
Comment on Proposal No: 12-87
Recommendation: Reject this proposal.
Substantiation: The Society of the Plastics Industry supports the removal of abandoned cables. One of our member companies is in the business of removing abandoned cables from buildings.

Section 300.11 (Securing and Supporting) requires that "Raceways, cable assemblies, boxes, cabinets, and fittings shall be securely fastened in place." It is not possible to remove all abandoned cables if the installation complies with 300.11 and the cables are installed behind a wall.

Proposal 12-87 in one of a series of proposals submitted to panels 3, 12 and 16.

Panel 3 rejected proposals 3-147 and 3-218 with the statement:

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Panel 16 rejected proposals 16-28, 16-72, 16-176, 16-190, 16-258, 16-323 and 16-364 with the statement:

"The proposed requirement presents a compliance conundrum to installers. Without access, it is impossible to remove cables that are securely fastened without damaging the building or adjacent cables. Gaining access may sometimes require disassembly of part of the building. This is not the intent of the panel. The current requirement to remove only the accessible portion is reasonable."

Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-61 Log #240 NEC-P12 **Final Action: Accept in Principle**
(640.3(A) and 640.6(C))

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 12-101
Recommendation: Accept this proposal in principle by modifying 640.6(C) as shown.

(C) Abandoned Audio Distribution Cables. The accessible portion of abandoned ~~Abandoned~~ audio distribution cables shall be removed.

Substantiation: The panel action on proposal 12-101 was to accept in principle with a reference to the action on proposal 12-94. Proposal 12-101 recommended moving the requirement to remove abandoned cables to a more appropriate section. The panel action on proposal 12-94 accomplished that objective. However, the panel action on 12-94 also changed the requirement from the removal of only the accessible portion of the cables to requiring the removal of all the cables, including those stapled to studs behind a sheetrock wall.

See proposal 16-27; panel 16 in its rejection statement stated:

"The proposal would require all abandoned cable to be removed, irrespective of accessibility, presenting a compliance conundrum to installers. Without access, it is impossible to remove cables that are securely fastened without damaging the building or adjacent cables. The submitter's substantiation states: "It is not reasonable or necessary to install cables in a manner that prevents their eventual removal." However, the panel previously imposed additional securing and supporting requirements by referencing 300.11 in 800.24. Gaining access may sometimes require disassembly of part of the building. This is not the intent of the panel. The current requirement to remove only the accessible portion is reasonable. The submitter further proposes to add an FPN following 800.3(C) that is already contained in 800.24."

Panel Meeting Action: Accept in Principle
Panel Statement: Refer to the panel action and statement on Comment 12-67.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:

QUAVE, D.: See my Explanation of Affirmative Vote on Comment 12-67.

12-62 Log #1433 NEC-P12 **Final Action: Accept in Principle**
(640.3(A) and 640.6(C))

Submitter: Allen C. Weidman, The Society of the Plastics Industry, Inc.
Comment on Proposal No: 12-94
Recommendation: Modify the panel action on 640.6(C) as shown.
(C) Abandoned Audio Distribution Cables. The accessible portion of abandoned ~~Abandoned~~ audio distribution cables shall be removed.

Substantiation: The Society of the Plastics Industry supports the removal of abandoned cables. One of our member companies is in the business of removing abandoned cables from buildings.

The current requirement for the removal of abandoned cable is in 640.3 Locations and Other Articles. It requires the removal of only the accessible portion of audio distribution cables.

"(A) Spread of Fire or Products of Combustion. The accessible portion of abandoned audio distribution cables shall be removed. See 300.21."

Proposals 12-101 and 12-102 recommended moving the requirement to remove abandoned cables to a more appropriate section. The panel action on proposal 12-94 accomplished that objective.

However, the panel action on 12-94 also changed the requirement from the removal of only the accessible portion of the cables to requiring the removal of all the cables, including those that are inaccessible.

Section 640.9(A)(3) Other Wiring requires compliance with Article 725. Article 725 permits the substitution of Article 800 cables. Both Articles 725 and 800 require the removal of only the accessible portion of abandoned cables.

Continued acceptance of the text in 640.6(C) will produce a conflict in the code. Acceptance of this comment will remove the conflict.

Panel Meeting Action: Accept in Principle

Panel Statement: Refer to the panel action and statement on Comment 12-67.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

QUAVE, D.: See my Explanation of Affirmative Vote on Comment 12-67.

12-63 Log #1605 NEC-P12 **Final Action: Accept in Principle (640.3(A) and 640.6(C))**

Submitter: Allen C. Weidman, Society of the Plastics Industry, Inc.

Comment on Proposal No: 12-94

Recommendation: Modify the panel action on 640.6(C) as shown.

(C) Abandoned Audio Distribution Cables. The accessible portion of abandoned ~~Abandoned~~ audio distribution cables shall be removed.

Substantiation: The Society of the Plastics Industry supports the removal of abandoned cables. One of our member companies is in the business of removing abandoned cables from buildings.

The current requirement for the removal of abandoned cable is in 640.3 Locations and Other Articles. It requires the removal of only the accessible portion of audio distribution cables.

"(A) Spread of Fire or Products of Combustion. The accessible portion of abandoned audio distribution cables shall be removed. See 300.21."

Proposals 12-101 and 12-102 recommended moving the requirement to remove abandoned cables to a more appropriate section. The panel action on proposal 12-94 accomplished that objective.

However, the panel action on 12-94 also changed the requirement from the removal of only the accessible portion of the cables to requiring the removal of all the cables, including those that are inaccessible.

Section 640.9(A)(3) Other Wiring requires compliance with Article 725. Article 725 permits the substitution of Article 800 cables. Both Articles 725 and 800 require the removal of only the accessible portion of abandoned cables.

Continued acceptance of the text in 640.6(C) will produce a conflict in the code. Acceptance of this comment will remove the conflict.

Panel Meeting Action: Accept in Principle

Panel Statement: Refer to the panel action and statement on Comment 12-67.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

QUAVE, D.: See my Explanation of Affirmative Comment on 12-67.

12-64 Log #82 NEC-P12 **Final Action: Accept (640.6)**

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 12-94

Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC. See panel action and statement on Comment 12-67.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-65 Log #276 NEC-P12 **Final Action: Accept in Principle (640.6)**

Submitter: John H. Mortimer, Inductotherm Industries, Inc.

Comment on Proposal No: 12-94

Recommendation: Revise text to read as follows:

640.6(D)(1) Cables identified for future use shall be marked with a tag ~~in accordance with the following~~: of sufficient durability to withstand the environment involved.

~~(a) Tag is impervious to the effects of temperature and dampness.~~

~~(b) Tag is resistant to the effects of gnawing by rodents.~~

640.6(D)(2) Cables shall have the following information on the tag: ~~or in the database.~~

Substantiation: This comment was prepared by a Task Group after further consideration of the comments expressed in the voting as directed by the Technical Correlating Committee. The revised wording of the section was developed by a Task Group consisting of: Thomas Burke, Jeffrey Holmes, Ron Janikowski, Robert Johnson, John Mortimer, and Kenneth White.

Panel Meeting Action: Accept in Principle

Panel Statement: Refer to the panel action and statement on Comment 12-67.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

QUAVE, D.: See my Explanation of Affirmative Vote on Comment 12-67.

12-66 Log #485 NEC-P12 **Final Action: Reject (640.6)**

Submitter: Timothy P. McNeive, Thomas & Betts Corporation

Comment on Proposal No: 12-92

Recommendation: Change the panel action to Accept in Principle. Add the additional text suggest in the comment on affirmative vote by Mr. Lottmann:

"Cable ties that provide primary support for such cables shall have a minimum loop tensile strength of 23 kg (50 lbs)."

Substantiation: "Minimum loop tensile" strength is commonly marked on packages of cable ties. The 23 kg minimum for cable support is well representative of typical straps, hangers and staples listed for flexible conduit and cable support in accordance with UL 2239, Hardware for Support of Conduit, Tubing and Cable. The panel is also asked to follow the long time position of CMP-7 and not consider in its final decision the requirement that cable ties or other support hardware to be listed.

Panel Meeting Action: Reject

Panel Statement: The cable tie strength or failure has not been illustrated as a problem.

The submitter has not provided definitive technical substantiation for the inclusion of minimum loop tensile strength to the requirement.

Cable ties can be used for securing and supporting cables in a number of Chapter 3 wiring methods without any requirements for a minimum loop tensile strength of 23 kg (50 Ib), or in fact any particular minimum strength. For example, 334.30 covers securing and supporting of "nonmetallic-sheathed cable" and requires "supporting and securing by staples, cable ties, straps, hangers, or similar fittings designed and installed so as not to damage the cable, at intervals not exceeding 1.4 m (4 1/ 2 ft) and within 300 mm (12 in.) of every outlet box, junction box, cabinet, or fitting." It does not have any recommendation for the support strength or similar special considerations. In fact, the cable tie may not be providing any support at all when the tie wrap is simply anchoring the cable to a beam or joist. Types AC and MC cable also give similar permission to use cable ties for securing and supporting these cables in 320.30 and 330.30, respectively. There is not a need to complicate the installation.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-67 Log #545 NEC-P12 **Final Action: Accept in Principle (640.6)**

TCC Action: The Technical Correlating Committee directs that the Fine Print Note contained in the panel action be deleted because it contains a statement of intent. The Technical Correlating Committee notes that the rule as written in (C) is clear in that it applies to the accessible portion of the abandoned cable.

Submitter: Richard P. Owen, City Of St. Paul

Comment on Proposal No: 12-94

Recommendation: Revise text to read as follows:

640,6 (C) Abandoned Audio Distribution Cables.The accessible portion of abandoned ~~Abandoned~~ audio distribution cables shall be removed.

FPN : See Article 100 for a definition of accessible. It is desirable to remove as much abandoned cable as is practical but it is not the intent of this clause to require construction or renovation specifically to facilitate the removal of abandoned cable.

640.6 D(1) Cables identified for future use shall be marked with a tag ~~in accordance with the following:~~ of sufficient durability to withstand the environment involved.

640.6D (1) ~~(a.) Tag is impervious to the effects of temperature and dampness.~~

640.6D (1) ~~(b) Tag is resistant to the effects of gnawing by rodents.~~.....

640.6D (2) Cables shall have the following the following information on the tag: ~~or in a database.~~

Substantiation: This comment was written by a Task Group consisting of Stan Kaufman and Randy Ivans (Panel 16), John Mortimer (Panel 12) and Ron Maassen, Paul Casparro (Panel 3) plus Task Group Chair Richard Owen (Panel 3). The Task Group was directed by the Technical Correlating Committee to examine proposals submitted to all three Panels concerning abandoned cable and other related issues covered by the Panels.

The Task Group came to consensus on the following issues and submitted comments to the Panels as appropriate:

1) On the issue of abandoned cable removal, the task group agreed that only the accessible portions of abandoned cable should be removed. To require removal of all cable could, in some cases, necessitate demolition of the building finish in order to access cables that were properly fastened to the building in accordance with the rules in the various code articles. Furthermore, the task group agreed that the requirements for abandoned cable removal should not be in Section X.3 (Locations and Other Articles) but should be relocated into the general requirements of each article.

2) The task group also agreed to recommend the addition of a new Fine Print Note to further explain the removal requirement. This addition was thought to be necessary to address a common practice of cables that are "fished" inside existing walls. These cables, if abandoned, can be disconnected from their junction point in a wall and pulled out of the wall without having to harm the building finish. At present, in many cases, these cables are being cut off above the wall and left to drop into the wall space.

3) On the issue of "tagged for future use", the Task Group agreed that it was not necessary to require anything more than the cable tag being "...of sufficient durability to withstand the environment involved." This phrase is used in several other places in the NEC and leaves it up to the AHJ as to what is suitable. This language does not add requirements that are difficult, if not impossible, to enforce by adding unclear requirements for rodent-resistance, etc.

Panel Meeting Action: Accept in Principle

Revise 640.6(C) and 640.6(D) of the committee action on Proposal 12-94 to read as follows:

(C) Abandoned Audio Distribution Cables.The accessible portion of abandoned audio distribution cables shall be removed.

FPN : See Article 100 for a definition of Accessible. It is desirable to remove as much abandoned cable as is practical but it is not the intent of this clause to require construction or renovation specifically to facilitate the removal of abandoned cable.

(D) Installed Audio Distribution Cable Identified for Future Use.

(1) Cables identified for future use shall be marked with a tag of sufficient durability to withstand the environment involved.

(2) Cable tags shall have the following information:

(a) Date cable was identified for future use

(b) Date of intended use

(c) Information relating to the intended future use of cable

Panel Statement: The panel accepts the recommendation of the two task groups who worked extensively on this material. The panel has shown the text to clarify the requirement, since the recommended text of Comment 12-67 is not clearly presented.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

QUAVE, D.: FPN should be changed to be consistent with CMP-16.

FPN: See Article 100 for definition of Accessible (as applied to wiring methods). It is desirable to remove as much abandoned cable as is practical. ~~but it is not the intent of this section to require construction or renovation specifically to facilitate the removal of abandoned cable.~~

12-68 Log #680 NEC-P12 **Final Action: Reject (640.6)**

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 12-91

Recommendation: The Panel Action to Accept in Principle is correct, however, the reference to "300.11(A)" should be changed back to "300.11" as it appears in the 2005 Code.

Substantiation: The submitter did not request deletion of (A) after 300.11 and neither the submitter nor the Panel provided any substantiation that the other sections of 300.11, [(B) and (C)], should not apply. The panel's acceptance of Proposal 12-92 further indicates that 300.11(B) and (C) should apply since it would be logical to use cable ties to support Article 640 wiring from raceways or other cables.

The deletion of (A) was not requested in any of the three Proposals addressing this section, 12-91, 12-92, or 12-94.

Panel Meeting Action: Reject

Panel Statement: The ROP panel action recognizes that the technology addressed in Article 640 requires the reference only to 300.4 and 300.11(A), not 300.11(B) and (C). The panel does not agree with the substantiation that cable ties are allowed as support from other cables or raceways.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-69 Log #681 NEC-P12 **Final Action: Accept (640.6)**

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 12-94

Recommendation: I support the Panel Action to delete the FPN from the end of 640.6.

Substantiation: The Panel Action and the Panel Statement indicate that the FPN was deleted, however, the NEC 2008 draft at ROP stage still contains the FPN.

Panel Meeting Action: Accept

Panel Statement: The panel acknowledges the deletion of the FPN from the end of 640.6. The panel notes the panel action text on Proposal 12-94 properly excluded the FPN. (The ROP draft incorrectly contains the FPN.)

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-70 Log #888 NEC-P12 **Final Action: Accept in Principle (640.6)**

Submitter: Robert Kelleher, Paramount Electrical Services

Comment on Proposal No: 12-94

Recommendation: Continue to accept in principle in part to delete the FPN.

Substantiation: CMP-12 is correct, the addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical code. The NEC is not a training manual. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement, for generic, readily available, information, which must be purchased by the code user. Code Making Panel 12 has acted to coordinate with the other technical committees in the NEC project. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this fine print note is in direct conflict with 90.1(C). In the action to reject Proposal 8-3, one technical committee member promotes NECA Standards as "... a tool to assist untrained electricians to make safer and better installations." The TCC should intervene, uphold the provisions of 90.1(C) and prohibit these types of Fine Print Notes. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of fine print note is included in any form, an annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes coupons should be included.

Panel Meeting Action: Accept in Principle

Panel Statement: The panel agrees with the recommendation to maintain the deletion of the FPN. The panel does not agree with the submitter's substantiation. The panel agrees with the action based on the substantiation provided in Comment 12-69.

The panel notes that changes to Proposal 12-94 have been made through the panel action on Comment 12-67.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

QUAVE, D.: See my Explanation of Affirmative Vote on Comment 12-67.

12-71 Log #2168 NEC-P12 **Final Action: Accept in Principle (640.6)**

Submitter: Ray R. Keden, Erico, Inc. / Rep. BICSI

Comment on Proposal No: 12-94

Recommendation: Revise accepted text:

(C) Abandoned Audio Distribution Cables. The accessible portion of abandoned audio distribution cables shall be removed.

Substantiation: Cables may be installed in walls or conduit where removal can only be done of the accessible portion.

Panel Meeting Action: Accept in Principle

Panel Statement: Refer to the panel action and statement on Comment 12-67.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

QUAVE, D.: See my Explanation of Affirmative Vote on Comment 12-67.

12-72 Log #864 NEC-P12 **Final Action: Accept (640.6, FPN)**

Submitter: John P. Masarick, Independent Electrical Contractors Inc.

Comment on Proposal No: 12-95

Recommendation: The panel is encouraged to continue to Accept in Principle Proposal 12-95.

Substantiation: The reasons to continue to Accept in Principle the Proposal are as follows:

1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Accept
Panel Statement: The panel agrees with the recommendation to maintain the deletion of the FPN. The panel does not agree with the submitter's substantiation. The panel agrees with the action based on the substantiation provided in Comment 12-69.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-73 Log #1860 NEC-P12 **Final Action: Accept in Principle in Part (640.6(D)(1))**

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 12-94
Recommendation: Revise text to read as follows:
640.6D
(1) Cables identified for future use shall be marked with a tag ~~in accordance with the following:~~ of sufficient durability to withstand the environment.
~~640.6D (1) a Tag is impervious to the effects of temperature and dampness~~
~~640.6D(1)b Tag is resistant to the effects of gnawing rodents~~
(2) Cables shall have the following information on the tag or in a database
(a) Date cable was identified for future use
~~(b) Date of intended use~~
(c) Information relating to the intended future use of cable
Substantiation: To obtain a tag with the above requirements would be very difficult and why not use language that is already in the code" of sufficient durability to withstand the environment.
Also it is impracticable to predict when a spare cable will be used. That requirement would be very difficult to enforce and would require monitoring to see if the date has passed.
Panel Meeting Action: Accept in Principle in Part
Panel Statement: The panel accepts the recommendation to delete (D)(1)a and (D)(1)b. The panel disagrees with the deletion of the date of intended use. A cable with no expected date of future use is abandoned. The panel also disagrees with the inclusion of "or in a database" as a way to identify the information on the tag. Databases may not be readily available.
See panel action and statement on Comment 12-67.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12
Comment on Affirmative:
QUAVE, D.: See my Explanation of Affirmative Vote on Comment 12-67.

12-74 Log #1248 NEC-P12 **Final Action: Accept (640.7(A))**

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Accept" to correlate with the actions of other Code-Making Panels relative to the use of the word "bonded".
Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 12-1
Recommendation: Reject the Panel's action on 640.7(A) and keep the original proposed text.
Substantiation: The Panel's action on 640.7(A) creates redundant use of the word "bonded" in the sentence. The term "connected" is appropriate according to the Panel action on Proposal 5-2 for the definition of the term "bonded (bonding)"and is consistent with the NEC TCC Task Group on Grounding and Bonding's original initiative.
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Reject
Panel Statement: The word "bonded" is defined as a particular type of "connected." The ROP panel action reflects the intended meaning and is consistent with respect to the particular technology addressed in Article 640.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 645 — INFORMATION TECHNOLOGY EQUIPMENT

12-75 Log #2169 NEC-P12 **Final Action: Reject (645.2)**

Submitter: Ray R. Keden, Erico, Inc. / Rep. BICSI
Comment on Proposal No: 12-104
Recommendation: Accept the Proposal with stated new wording:
645.2 Definitions.
Abandoned Audio Distribution Cable. The definition in 640.2 shall apply.
Abandoned Class 2, Class 3, and PLTC Cable. The definition in 725.2 shall apply.
Abandoned Fire Alarm Cable. The definition in 760.2 shall apply.
Abandoned Optical Fiber Cable. The definition in 770.2 shall apply.
Abandoned Communications Cable. The definition in 800.2 shall apply.
Abandoned Coaxial Cable. The definition in 820.2 shall apply.
Abandoned Network-Powered Broadband Communications Cable. The definition in 830.2 shall apply.
Abandoned Type DP Cable. Installed Type DP cable that is not terminated at equipment and not identified for future use with a tag.
Substantiation: This Proposal offered definitions of the following types of cables that are referenced in 645(D)(5)c.
- Class 2, Class 3, and PLTC Cable. Types CL2 (Class 2), CL3 (Class 3), and PLTC (Article 725).
- Fire Alarm Cable Types NPLF and FPL (Article 760)
- Optical Fiber Cable Types OFC and OFN (Article 770)
- Communications Cable Type CM (Article 800)
- Coaxial Cable Type CATV (Article 820).

BICSI designers and installers place these types of cables, as well as, audio distribution cables and network powered broadband cables, in computer rooms.
Panel Meeting Action: Reject
Panel Statement: See panel action on Proposal 12-106, which established a definition of "Abandoned Supply Circuits and Interconnecting Cables." Individual definitions as recommended in the comment are not necessary.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-76 Log #83 NEC-P12 **Final Action: Accept (645.4(6))**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 12-108
Recommendation: The Technical Correlating Committee understands that this new Section follows the existing FPN to 645.4(5). The Technical Correlating Committee directs that the panel add a title to the new section.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel agrees with the direction of the TCC and clarifies that Proposal 12-108 is rejected by action on Comment 12-78. No new title is necessary.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-77 Log #1316 NEC-P12 **Final Action: Reject (645.4(6) (New))**

Submitter: Stephen McCluer, American Power Conversion Corp
Comment on Proposal No: 12-108
Recommendation: Revise proposal as follows:
645.4(6) ~~Except for lighting and its control, no~~ No electrical distribution equipment or wiring, other than that which supplies the IT equipment, ~~and~~ its associated equipment, and a dedicated heating/ventilating/air conditioning (HVAC) equipment shall be installed in the room.
Exception No. 1: Lighting and its control shall be permitted to be installed.
Exception No. 2: Communications systems and monitoring systems such as telephones, fire alarm systems, fire extinguishing systems, security systems, water detection systems, and other related protection equipment shall be permitted to be installed.
Exception No-3: Power wiring, cabling and wall-mounted receptacles installed as premises wiring within the walls in accordance with Chapters 1-4 of this Code shall be permitted to be installed.
Substantiation: As written, this requirement would prevent the use of wall outlets in an IT space.

The proponent's substantiation implies that he *might* have wanted the stipulation to apply only to power distribution under a raised floor, but the proposal does not say that. Therefore, any non-IT equipment cabling, whether run overhead
in racks and cable trays or within raceways inside of walls, would be prohibited.

Furthermore, the proponent talks about wanting to de-energize the entire room via the disconnecting means. That implies that everything in the entire IT space would have to be powered on the critical bus (usually on conditioned, UPS protected power). 645.10 already requires de-energizing "all electronic equipment" in the IT equipment room. The proponent asks us to provide a higher level of protection for normal power than is required in any other part of the Code, simply because it is an IT room with power cabling under a raised floor.

It is inconceivable to have an IT equipment room with no wall outlets.

● Contractors need to run equipment in the room during installation, maintenance, and renovation. Connecting their heat guns, drills, halogen lights, or other tools and test equipment into the conditioned power at best invites a tripped circuit breaker and nuisance alarms, and at worst causes damage to IT data or equipment.

● If there is a water emergency under the floor, wet vacuums must be plugged in somewhere. They cannot be plugged into the critical power bus.

● In the event of a cooling failure, temporary cooling systems might be rolled in to cool hot spots; they must plug into something - certainly not the critical bus!

● Long extension cords through open doors will reduce environmental control, compromise fire protection systems, compromise security, and can damage extension cord insulation.

● One assumes that any IT space created in existing buildings would require removal of all existing wall outlets in order to comply with the revised Article 645.

● Wall mounted receptacles that are installed in an IT environment that are dedicated to service equipment should be allowed and should be supplied from a non-IT dedicated distribution source. (General purpose distribution sources)

● IT spaces should be provided with the same wall-mounted receptacle spacing as required in 210.52(A)(1): no point measured horizontally along the floor line in any wall space should be more than 1.8 m (6 ft) from a receptacle outlet.

As written, the proposal also suggests that only one HVAC device would be permitted, when most of the time there are multiple dedicated air conditioners.

Taken to its extreme, the wording would even prevent the use of UPS systems in an IT room if they were listed as power systems instead of IT equipment.

Finally, as written the proposal would eliminate many other essential, non-IT equipment types, including communication systems, security systems, monitoring systems, fire alarm systems, fire extinguishing systems, water detection systems, etc. The proponent and the panel appear to have not thought through the unintended consequences of this code.

The safety record of IT spaces is extremely good. Proponent has offered no statistics to justify why more restrictions are required.

See: Marty Ahrens, Computer and Computer Peripheral Fires With a Discussion of Fires, National Fire Protection Association, August 2006. From 1999 to 2003 there were fewer than 30 fires in computer rooms and control spaces. That equates to less than 3 percent of all computer-related fires, less than 0.1 percent of all commercial fires, and less than $200,000 total property damage. That's a darned good record. If ain't broke, don't fix it.

The justification for this proposal is weak and the wording is ill-advised. The proposal should be rejected and returned to sender for rewrite in the next cycle. It is just bad code.

Panel Meeting Action: Reject

Panel Statement: The exceptions as shown in the comment are not necessary due to the action on Comment 12-78. See panel action and statement on Comment 12-78. In addition, the panel does not agree that the action taken during the proposal stage produced "bad code"; rather it reflects the benefits of an open consensus process.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-77a Log #2506 NEC-P12 **Final Action: Reject**
(645.4(6) Exception)

Submitter: Technical Committee on Electronic Computer Systems,
Comment on Proposal No: 12-108

Recommendation: Revise the exception to new 645.4(6) to read as follows :

Exception: Communications systems and monitoring systems such as telephone, fire alarm systems, fire extinguishing systems, security systems, water detection systems and other related protective equipment shall be permitted to be installed.

Substantiation: Clarify the fact that monitoring systems should be covered under the exception.

Panel Meeting Action: Reject

Panel Statement: The exception as shown in the comment is not necessary due to the action on Comment 12-78. See panel action and statement on Comment 12-78.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-78 Log #1986 NEC-P12 **Final Action: Accept in Part**
(645.4(6) Exception)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 12-108

Recommendation: This Proposal should have been Rejected or Accepted in Principle with the following revision to the Exception:

Exception to (6): Communications, signaling, and fire alarm systems wiring and equipment for control of or connection to equipment related to the information technology room equipment or for required functions shall be permitted.

Substantiation: The proposal is seriously flawed. The panel should give additional consideration to the Explanation of Negative by Mr. Johnson. This proposal creates a direct contradiction with the requirements of 645.5(D)(3), which requires smoke detection, while making an unlimited exception for communications systems (the exception does not require the communications wiring to be related in any way to the IT equipment or the use of the IT room). Also, it could be argued that communications, signaling, and fire alarm wiring is not "electrical distribution equipment or wiring," since it is not clear whether "electrical distribution" modifies just "equipment" or "equipment and wiring." A strict interpretation of the proposed wording would even prohibit interconnecting data wiring that is usually classified as Class 2 under Article 725 as well as the Class 2 wiring for temperature control for a separate HVAC system as permitted by 645.4(2). Even the wiring for and the EPO devices themselves that are required by 645.4(1) and 645.10 are prohibited since it is often not "electrical distribution equipment or wiring" whatever that means. (The panel should understand that strict, literal interpretations will be applied by some jurisdictions.) The exception should also clearly refer only to (6) in this case (especially since it's at the end of the list of requirements.)

Panel Meeting Action: Accept in Part

Reject Proposal 12-108.

Panel Statement: The panel accepts the recommendation to reject Proposal 12-108. The panel does not accept the recommendation to accept in principle the recommendation to include a new exception in the comment.

The panel chairman appointed a task group to study the issues raised in the comments. The task group concluded that the best course of action would be to reject the original proposal and revert back to the language of the 2005 NEC.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-79 Log #277 NEC-P12 **Final Action: Accept in Principle**
(645.5)

Submitter: John H. Mortimer, Inductotherm Industries, Inc.
Comment on Proposal No: 12-116

Recommendation: Revise text to read as follows:

645.5(G)(1) Supply circuits and interconnecting cables identified for future use shall be marked with a tag ~~in accordance with the following~~: of sufficient durability to withstand the environment involved.

~~(a) Tag is impervious to the effects of temperature and dampness.~~
~~(b) Tag is resistant to the effects of gnawing by rodents.~~

645.5(G)(2) Supply circuits and interconnecting cables shall have the following information on the tag: ~~or in the database.~~

Substantiation: This comment was prepared by a Task Group after further consideration of the comments expressed in the voting as directed by the Technical Correlating Committee. The revised wording of the section was developed by a Task Group consisting of: Thomas Burke, Jeffrey Holmes, Ron Janikowski, Robert Johnson, John Mortimer, and Kenneth White.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 12-80, which meets the intent of the submitter.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-80 Log #546 NEC-P12 **Final Action: Accept in Principle**
(645.5)

TCC Action: The Technical Correlating Committee directs that the Fine Print Note contained in the panel action be deleted because it contains a statement of intent. The Technical Correlating Committee notes that the rule as written in (F) is clear in that it applies to the accessible portion of the abandoned cable.

Submitter: Richard P. Owen, City of St. Paul
Comment on Proposal No: 12-116

Recommendation: Revise text to read as follows:

645.5(F) Abandoned Supply Circuits and Interconnecting Cables. The accessible portion of abandoned ~~Abandoned~~ supply circuits and interconnecting cables shall be removed unless contained in a metal raceway.

FPN : See Article 100 for a definition of accessible. It is desirable to remove as much abandoned cable as is practical but it is not the intent of this clause

to require construction or renovation specifically to facilitate the removal of abandoned cable.

645.5G (1) Supply circuits and interconnecting cables identified for future use shall be marked with a tag ~~in accordance with the following:~~ of sufficient durability to withstand the environment involved.

645.5G (1) ~~(a) Tag is impervious to the effects of temperature and dampness.~~

645.5G (1) ~~(b) Tag is resistant to the effects of gnawing by rodents.~~.....

645.5G (2) Supply circuits and interconnecting cables shall have the following information on the tag: ~~or in a database.~~

Substantiation: This comment was written by a Task Group consisting of Stan Kaufman and Randy Ivans (Panel 16), John Mortimer (Panel 12) and Ron Maassen, Paul Casparro (Panel 3) plus Task Group Chair Richard Owen (Panel 3). The Task Group was directed by the Technical Correlating Committee to examine proposals submitted to all three Panels concerning abandoned cable and other related issues covered by the Panels.

The Task Group came to consensus on the following issues and submitted comments to the Panels as appropriate:

1) On the issue of abandoned cable removal, the task group agreed that only the accessible portions of abandoned cable should be removed. To require removal of all cable could, in some cases, necessitate demolition of the building finish in order to access cables that were properly fastened to the building in accordance with the rules in the various code articles. Furthermore, the task group agreed that the requirements for abandoned cable removal should not be in Section X3 (Locations and Other Articles) but should be relocated into the general requirements of each article.

2) The task group also agreed to recommend the addition of a new Fine Print Note to further explain the removal requirement. This addition was thought to be necessary to address a common practice of cables that are "fished" inside existing walls. These cables, if abandoned, can be disconnected from their junction point in a wall and pulled out of the wall without having to harm the building finish. At present, in many cases, these cables are being cut off above the wall and left to drop into the wall space.

3) On the issue of "tagged for future use", the Task Group agreed that it was not necessary to require anything more than the cable tag being "...of sufficient durability to withstand the environment involved." This phrase is used in several other places in the NEC and leaves it up to the AHJ as to what is suitable. This language does not add requirements that are difficult, if not impossible, to enforce by adding unclear requirements for rodent-resistance, etc.

Panel Meeting Action: Accept in Principle

Revise 645.5(F) and 645.5(G) to read as follows:

(F) Abandoned Supply Circuits and Interconnecting Cables. The accessible portion of abandoned supply circuits and interconnecting cables shall be removed unless contained in a metal raceway.

FPN : See Article 100 for a definition of Accessible. It is desirable to remove as much abandoned cable as is practical, but it is not the intent of this clause to require construction or renovation specifically to facilitate the removal of abandoned cable.

(G) Installed Supply Circuits and Interconnecting Cables Identified for Future Use.

(1) Supply circuits and interconnecting cables identified for future use shall be marked with a tag of sufficient durability to withstand the environment involved.

(2) Supply circuit tags and interconnecting cable tags shall have the following information:

(a) Date identified for future use

(b) Date of intended use

(c) Information relating to the intended future use

Panel Statement: The panel accepts the recommendation of the two task groups who worked extensively on this material. The panel has revised the text to clarify the requirement, since the recommended text of Comment 12-80 is not clearly presented.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-81 Log #865 NEC-P12 **Final Action: Accept**
(645.5(C)(6))

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 12-109
Recommendation: The panel is encouraged to continue to Reject Proposal 12-109.
Substantiation: The reasons to continue to Reject the Proposal are as follows:

1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.

2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.

3. These standards are also covered by a Fine Print Note in 110.12.

4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.

5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).

6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Accept
Panel Statement: The panel agrees with the recommendation to maintain the deletion of the FPN. The panel does not agree with the submitter's substantiation. The panel reaffirms its statement on Proposal 12-109.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-82 Log #688 NEC-P12 **Final Action: Accept**
(645.5(D) (New))

Submitter: Timothy M. Croushore, Allegheny Power
Comment on Proposal No: 12-114
Recommendation: Revise the main text of 645.5(D) to read as follows:

(D) Under Raised Floors. Power cables, communications cables, connecting cables, interconnecting cables, cord-and-plug connections, and receptacles associated with the information technology equipment shall be permitted under a raised floor, provided the following conditions are met:

Add a new (3) ahead of the existing (3). Renumber existing (3) through (6) to (4) through (7). The new (3) is as follows:

(3) Supply cords of listed information technology equipment in accordance with 645.5(B).

Revise the text of existing (4) and renumber it to (5) as recommended above. The revised text and revised number are as follows:

(5) Openings in raised floors for cords and cables protect cords and cables against abrasion and minimize the entrance of debris beneath the floor.

Substantiation: These suggested revisions comply with the intent of the original submitter. These revisions are discussed in my affirmative ballot comment. Cords are manufactured differently than cables due to the requirements for flexibility of the cord. There is confusion in the industry whether cord-and-plug connections from listed information technology equipment supply cords are permitted under the raised floor. This proposal permits listed cords under a raised floor where the length of the supply cord and attachment plug cap does not exceed 15 feet in length. Should any portion of the cord be on the surface of the raised floor, the requirement for protection from physical damage would apply.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-83 Log #789 NEC-P12 **Final Action: Accept in Principle**
(645.5(D)(5)(d))

Submitter: Stephen McCluer, American Power Conversion Corp
Comment on Proposal No: 12-114
Recommendation: Revise the original proposal as follows:

(d) Power supply cords of listed information technology equipment plugged into receptacles under the raised floor when only the portion of the cord required to make the ~~vertical~~ connection occupies the ~~plenum free air space~~ area under the raised floor. Cord assemblies shall be protected from damage and shall not ~~be permitted to~~ lie on the subfloor.

Substantiation: This revision removes the panel's justification for rejecting the original proposal. Despite the chairman's observation that the NEC does not prohibit power supply cords from listed IT equipment from being plugged into receptacles under a raised floor, it is, in fact, a practice in some jurisdictions to prohibit such cord assemblies under raised floors. We request this clarification to ensure uniform enforcement of the Code.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 12-82, which meets the intent of the submitter.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-84 Log #1985 NEC-P12 **Final Action: Accept in Principle**
(645.5(D)(5)d.)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 12-103
Recommendation: This Proposal should have been Accepted.
Substantiation: The panel statement to "see the panel action and statement on proposal 12-114" is not responsive to this proposal. As stated in the Comment on Affirmative by Mr. Croushore, the NEC does not prohibit cords in raised floors. And as stated in the Explanation of Negative by Mr. Johnson, the panel has repeatedly refused to make this issue clear. In fact, the NEC specifically permits the receptacles to which the cords must attach to be in the raised floor according to 645.5(D), but the wiring methods permitted in 645.5 do not include any mention of flexible cords. If the receptacles are to be installed in

the underfloor space, it follows that the cords must also be permitted there, and cords are permitted by 645.5(B). However, without a modification here, the restrictions of 400.8(2) and (5) apply and the cord may not be run through the floor assembly into the below-floor area, even if protected as required by 645.5(D)(4). The proposal adds clarity and actually restricts the use of cords to that portion required to make the connection, but is not as restrictive and does not raise the issues to which the panel objected in Proposal 12-114. In fact, none of the issues addressed in the panel statement in Proposal 12-114 are raised by this proposal. The panel statement implies that cords may be used and objects to the increased restrictions, yet the panel refuses to make the permission clear. The first two sentences of the Comment on Affirmative by Mr. Jones are true, and enough reason to resolve this issue, however the rest of the comment is immaterial - no new information is necessary to clarify this long-standing issue.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action on Comment 12-82, which meets the intent of the submitter.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-85 Log #84 NEC-P12 **Final Action: Accept**
(645.5(F))

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 12-116

Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC. See panel action and statement on Comment 12-80.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-86 Log #1863 NEC-P12 **Final Action: Accept in Principle in Part**
(645.5(F))

Submitter: Michael Walls, American Chemistry Council

Comment on Proposal No: 12-116

Recommendation: Revise text to read as follows:

645.5G

(1) Cables identified for future use shall be marked with a tag ~~in accordance with the following:~~ of sufficient durability to withstand the environment.

~~640.6D (1) a Tag is impervious to the effects of temperature and dampness~~

~~640.6D(1)b Tag is resistant to the effects of gnawing rodents~~

(2) Cables shall have the following information on the tag or in a database

(a) Date cable was identified for future use

~~(b)Date of intended use~~

(c) Information relating to the intended future use of cable

Substantiation: To obtain a tag with the above requirements would be very difficult and why not use language that is already in the code" of sufficient durability to withstand the environment".

Also it is impracticable to predict when a spare cable will be used. That requirement would be very difficult to enforce and would require monitoring to see if the date has passed.

Panel Meeting Action: Accept in Principle in Part

Panel Statement: The panel accepts the recommendation to delete (D)(1)a and (D)(1)b. The panel disagrees with the deletion of the date of intended use. A cable with no expected date of future use is abandoned. The panel also disagrees with the inclusion of "or in a database" as a way to identify the information on the tag. Databases may not be readily available.

See panel action and statement on Comment 12-80.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-87 Log #790 NEC-P12 **Final Action: Accept**
(645.10(1))

Submitter: Stephen McCluer, American Power Conversion Corp

Comment on Proposal No: 12-120

Recommendation: Modify the original proposal as follows:

645.10 Disconnecting Means. ~~A~~ An approved means shall be provided to disconnect power to all electronic equipment in the information technology equipment room or in designated zones within the room. There shall also be a similar approved means to disconnect the power to all dedicated HVAC systems serving the room or designated zones and shall cause all required fire/smoke dampers to close. The control for these disconnecting means shall be grouped and identified and shall be readily accessible at the principal exit doors. A single means to control both the electronic equipment and HVAC systems in the room or in a zone shall be permitted. Where a pushbutton is used as a means to disconnect power, pushing the button in shall disconnect the power. Where multiple zones are created, each zone shall have an approved means to confine fire or products of combustion to within the zone.

(1) Revise 645.10 to add an exception and to number the exceptions

~~Exception No. 1: Installations qualifying under the provisions of Article 685.~~

~~Exception No. 2: Installations qualifying under the provisions of paragraph 645.10.1.~~

~~(2) Add a new paragraph 645.10.1~~

~~645.10.1 Zone disconnect means. An approved disconnect means shall be permitted to disconnect power only to an isolated portion of the information technology room when the following conditions are met:~~

~~(1) The disconnect means shall completely remove all power to the isolated portion of the room (which can be one equipment or a common group of equipment's) with a single means of disconnect~~

~~(2) Manual or automatic disconnect means shall be permitted~~

~~(3) Manual disconnect means shall be accessible in a manner acceptable to the authority having jurisdiction~~

~~FPN: The disconnect means may include an approved method to prevent accidental or unauthorized activation~~

~~(4) Manual disconnect means shall be clearly identified with signage so that emergency procedure operating points are identified~~

~~(5) Method of operation shall be well documented and staff shall be trained~~

~~(5) The location of all zoned disconnect means in the IT room shall be identified in such a manner that they are easily located by emergency responders~~

~~(6) All zones with an isolated disconnect means contain an approved method of preventing the spread of smoke and products of combustion beyond the perimeter of the zone.~~

Substantiation: This modification removes the panel's justification for rejecting the original proposal, which stated "it is too complicated and would be difficult to enforce." It eliminates the proposed exception and moves the language into the body of the main paragraph. The proposal codifies practices that are already in use, and it recognizes the technology that is available today.

The proposal does not replace the existing method. It allows an alternative construction which must be approved by the AHJ(s).

Zoned shutdown is already widely used in telecommunications facilities. It usually involves pre-review with the AHJ(s), special signs, posted instructions, and clear identification of the zones, or anything else that satisfies the AHJ that an equivalent level of safety is provided. Some facilities use special floor markings to guide fire fighters to the affected zone. The means still exists to shut down power and air to the entire room if necessary.

Technology today has the ability to control electricity and cooling with extreme precision. The existing requirement for disconnecting means has changed very little in almost 50 years, when NFPA 75 and NEC Article 645 were created for the protection of mission-critical operations. It is time for the Code to reflect reality.

This amendment will actually improve safety, because it will encourage instead of discourage the use of Article 645. Many people today choose not to build ITE rooms per Article 645 because they do not want a single point of failure capable of shutting down their entire mission-critical operation. This modified proposal gives a reasonable balance of safety and business continuity.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

JANIKOWSKI, R.: I am still under the opinion that this would be very hard to enforce. What are "zones"? Where are they defined? How would emergency personnel know where each zone starts and stops? Where would the emergency shutoff disconnect be located for each zone? The Code does not require posted floor plans to identify each zone and is there any maximum number of zones permitted?

LOTTMANN, T.: The panel action on this comment should have been reject. This comment places an excessive burden on the authority having jurisdiction, as there is no consensus National standard cited for the creation of zones in information Technology Rooms. In addition, no technical substantiation has been provided to show the revised language would improve the safety of persons and property over the existing language. Monetary losses should not be used as substantiation for change as they are outside the committee scope and purpose of this code.

ARTICLE 647 — SENSITIVE ELECTRONIC EQUIPMENT

12-88 Log #1948 NEC-P12 **Final Action: Reject**
(647.7(A)(4))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 12-127

Recommendation: Reject the proposal, or accept its implicit second option.

Substantiation: It is actually unclear what took place under this proposal because the proposal submitter offered the panel a choice and the panel action was a straight accept. This comment assumes that the last sentence was deleted.

The intent of the original drafters of this provision, however, was more in line with the proposal submitter's second option. Because NEMA has not yet produced a plug and receptacle configuration in accordance with this provision, the allowance for conventional receptacles was included as a transitional step. Since these receptacles allow any 120V load to be connected, and since any connected load that does not have a two-pole unit switch (e.g. Edison-base lampholders) will be at 60V to ground internally, the idea is that only qualified personnel should be using them. CMP 12 needs to decide whether to force these systems into disconnection by deleting the lined-out text (thereby leaving the unique configuration as the only connection method), or reinstating the transitional language, perhaps with a sunset date to try to elicit a response from the receptacle industry.
Panel Meeting Action: Reject
Panel Statement: The action taken on Proposal 12-127 is clear, and the panel rejects this comment since it fails to comply with 4.4.5(c) of the Regulations Governing Committee Projects, as the comment does not offer a clear recommended action.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ARTICLE 660 — X-RAY EQUIPMENT

12-89 Log #532 NEC-P12 **Final Action: Reject**
(660.5)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-132
Recommendation: Accept as revised:
An approved disconnecting means that simultaneously disconnects all ungrounded conductors of the circuit with an ampere rating for at least...(remainder unchanged).
Substantiation: Since the panel declined to accept a limitation to a switch or circuit breaker, simultaneous disconnection should be specified, as it may be inferred that other sections that require this are modified.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided adequate substantiation to justify the revision recommended in this comment, which would require simultaneous disconnection.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ARTICLE 665 — INDUCTION AND DIELECTRIC HEATING EQUIPMENT

12-90 Log #531 NEC-P12 **Final Action: Reject**
(665.12)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-137
Recommendation: Accept as revised:
An approved disconnecting means that simultaneously disconnects all ungrounded conductors of the circuit shall be.. (remainder unchanged).
Substantiation: Since the panel declined to accept a limitation to a switch or circuit breaker, simultaneous disconnection should be specified, as it may be inferred that other sections that require this are modified.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided adequate substantiation to justify the revision recommended in this comment, which would require simultaneous disconnection.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-91 Log #1249 NEC-P12 **Final Action: Reject**
(665.26)

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 12-1
Recommendation: Reject the Panel's action on 665.26 and keep the original proposed text.
Substantiation: The Panel's action on 665.26 creates redundant use of the word "bonding" in the sentence. The term "connecting" is appropriate according to the Panel action on Proposal 5-2 for the definition of the term "bonded (bonding)" and is consistent with the NEC TCC Task Group on Grounding and Bonding's original initiative.
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Reject
Panel Statement: The word "bonding" is defined as a particular type of "connecting." The ROP panel action reflects the intended meaning and is consistent with respect to the particular technology addressed in Article 665.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 668 — ELECTROLYTIC CELLS

12-92 Log #526 NEC-P12 **Final Action: Reject**
(668.3(C)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-141
Recommendation: Accept the addition of:
"except as specified in 668.11(B)".
Substantiation: Metal enclosures of associated equipment are not required to comply with Article 250 per 668.6(3)(C) while 668.11(B) indicates metal enclosures associated with the cell line dc power circuits shall be grounded.
Panel Meeting Action: Reject
Panel Statement: The existing wording has not caused confusion in this specialized industry. There is no substantiation that the proposed wording adds more clarity. Grounding of power supply enclosures is specifically described in 668.11(B).
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-93 Log #473 NEC-P12 **Final Action: Reject**
(668.15)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-142
Recommendation: Accept revised:
For equipment, apparatus, and structural components that are required to be grounded the provisions of Article 250 shall apply ~~except a water pipe electrode shall not be required to be used.~~ Any electrode or combinations of electrodes described in 250.52 shall be permitted.
Substantiation: Equipment that is grounded by choice (not required) should also comply with Article 250 since 250.1 (1) indicates Article 250 covers "permitted" grounding and this section may be deemed to modify that. The reference to water pipe electrodes is superfluous since "any" electrode is permitted.
Panel Meeting Action: Reject
Panel Statement: Water pipe electrodes must be an option. In some of the industry, ground leakage current of the process can destroy the water piping. In other sections of the industry, the water piping is purposely isolated from ground.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-94 Log #497 NEC-P12 **Final Action: Reject**
(668.30(D))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote voted in the affirmative.
Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 12-144
Recommendation: Accept the proposal.
Substantiation: The type of protection should be specific; the Code generally specifies whether the protection is from overcurrent or physical damage. Requirements pertaining to the same thing but differently worded may cause confusion per the Style Manual.
Panel Meeting Action: Accept
Panel Statement:
Number Eligible to Vote: 12
Ballot Results: Affirmative: 7 Negative: 5
Explanation of Negative:
CROUSHORE, T.: Upon review of the Negative Ballot statements on Comment 12-94 by Mr. Givens, Mr. Mortimer, Mr. Prichard, and Mr. White, I am changing my vote from affirmative to negative. I agree with their statements. The submitter has not provided any records or case histories of problems existing in the electrolytic cell industry from the current wording of 668.30(D). Furthermore, since the current wording in the NEC is also contained in NFPA 70E and IEEE 463, it would be preferable to keep all three standards consistent in wording and intent. The circuit protection mentioned in 668.30(D) is not just limited to overcurrent protection.
GIVENS, K.: The author of this Comment 12-94 does not provide substantiation that the existing wording is inadequate for this specialized industry. The issue cited has never been brought up by the electrolytic cell industry.
MORTIMER, J.: No technical substantiation for approval of this comment was provided.

No details with existing Code text was provided.

No details that would indicate any knowledge of the very special application of high current electrolytic cells was provided.

PRICHARD, R.: The submitter has not presented any definitive technical substantiation to focus only on overcurrent protection.

WHITE, K.: The submitter of this comment does not provide any definitive substantiation that the existing wording is inadequate for this specialized industry. The same wording is also in NFPA 70E and IEEE Standard 463 which are both used to guide the Electrolytic Industry.

ARTICLE 675 — ELECTRICALLY DRIVEN OR CONTROLLED IRRIGATION MACHINES

19-58 Log #649 NEC-P19 **Final Action: Reject**
(675.8(B))

Submitter: Linda J. Little, St. Louis, MO
Comment on Proposal No: 19-137
Recommendation: This proposal should be Accepted in Principle. A new sentence should be added before the last sentence to read as follows:

"Portable means for adding a lock to the disconnecting means shall not be permitted."

Substantiation: There should be consistency between similar rules in the NEC that call for the disconnecting means to be capable of being locked in the open position. New language accepted by Code-Making Panel 12 should also be adopted here to clarify that portable units are unacceptable. See language accepted by Code-Making Panel 12 (Proposal 12-136) for this same purpose.
Panel Meeting Action: Reject
Panel Statement: The panel contends that the language in the original proposal correlates with the language in 430.102(B), Exception and that the language in Proposal 19-137 is adequate without the additional sentence.
Number Eligible to Vote: 8
Ballot Results: Affirmative: 7 Negative: 1
Explanation of Negative:

LITTLE, L.: The panel should have accepted in principle with the revised sentence: "Portable means for adding a lock to the disconnecting means shall not be permitted as the means required to be installed at and remain with the equipment."

There are claims that some of the portable units available for snapping on to circuit breakers do remain with the switch or circuit breaker after they are installed on the breakers when the lock is not installed, but they are portable. The actions taken by Code-Making Panel 11 in the 2002 cycle in 430.102(B) Exception were fairly clear that the provisions for adding a lock should be more substantial and not portable units.

The modified wording clarifies that portable units are not acceptable as "the provision for locking or adding a lock to the disconnecting means"... that "shall remain in place with or without the lock installed" as in 430.102(B) Exception. Additionally, the language clarifies that this section does not restrict the use of portable accessory features that workers carry to provide for the attachment of multiple locks to the provision installed at the switch or circuit breaker.
Comment on Affirmative:

EWING, M.: The disconnect is required to be provided with a permanent provision to install a lock, it does not require a lock to be used. The need to install a lock comes from Federal, State, other requirements which in general refer to NFPA 70E, where it is permissible to install a portable hasp (with provisions to install multiple locks) into the disconnect's permanent provision for installing a lock.

ARTICLE 680 — SWIMMING POOLS, FOUNTAINS, AND SIMILAR INSTALLATIONS

17-59 Log #2039 NEC-P17 **Final Action: Reject**
(680 (New))

Submitter: Donald Cook, Shelby County Building Inspections
Comment on Proposal No: 17-171
Recommendation: Accept proposed text from Proposals 17-59, 17-60 and either 17-171 or 17-172 as a package to address the lack of electrical requirements for Baptisteries.
Substantiation: When the proposals above were submitted, the bulleted items were inadvertently attached to the substantiation, an obviously were not intended to apply to these proposals. While the panel action on Proposal 17-60 revises the definition of permanently installed and storable pools to include immersion pools, the scope of Article 680 does not seem to include the vessels of concern. Without a revision to the scope, it seems difficult to apply the definition to these vessels. When I look at the installations, it would also be difficult to determine which part of the current Article 680 would apply to these installations. Two options were provided in Proposals 17-171 and 17-172. While I understand the political difficulty of dealing with the various religious practices related to baptism, the proposed definition attempts to address the electrical safety concerns that are similar to those found with swimming pools, spas, hot tubs, hydromassages, and fountains and at the same time realizes that some religious practices related to baptism do not pose the same risk as others. There was no attempt to infer that one practice or the other should be used, but to provide electrical safety where persons are immersed. It was brought to my attention after I made the proposal, that some religious groups wade into a vessel and while standing in the vessel, are sprinkled rather than being immersed. It would seem the definition should be revised to include persons standing or immersed in these vessels. Pictures will be provided for reference. (Note: No pictures were received by NFPA with this Comment).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 17-63.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-60 Log #2096 NEC-P17 **Final Action: Reject**
(680 (New))

Submitter: Donald Cook, Shelby County Building Inspections
Comment on Proposal No: 17-172
Recommendation: Accept proposed text from Proposals 17-59, 17-60, and either 17-171 or 17-172 as a package to address the lack of electrical requirements for Baptisteries.
Substantiation: When the proposals above were submitted, the bulleted items were inadvertently attached to the substantiation and obviously were not intended to apply to these proposals. While the panel action on proposal 17-60 revises the definition of permanently installed and storable pools to include immersion pools, the scope of Article 680 does not seem to include the vessels of concern. Without a revision to the scope, it seems difficult to apply the definition to these vessels. When I look at the installations, it would also be difficult to determine which part of the current Article 680 would apply to these installations. Two options were provided in Proposals 17-171 and 17-172. While I understand the political difficulty of dealing with the various religious practices related to baptism, the proposed definition attempts to address the electrical safety concerns that are similar to those found with swimming pools, spas, hot tubs, hydromassages, and fountains and at the same time realizes that some religious practices related to baptism do not pose the same risk as others. There was no attempt to infer that one practice or the other should be used, but to provide electrical safety where persons are immersed. It was brought to my attention after I made the proposal, that some religious groups wade into a vessel and while standing in the vessel, are sprinkled rather than being immersed. It would seem the definition should be revised to include persons standing or immersed in these vessels. Pictures will be provided for reference. (Note: No pictures were received by NFPA with this Comment).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 17-63.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-61 Log #2037 NEC-P17 **Final Action: Reject**
(680.1)

Submitter: Donald Cook, Shelby County Building Inspections
Comment on Proposal No: 17-59
Recommendation: Accept proposed text from proposal 17-59, 17-60 and either 17-171 or 17-172 as a package to address the lack of electrical requirements for Baptisteries.
Substantiation: When the proposals above were submitted, the bulleted items were inadvertently attached to the substantiation an obviously were not intended to apply to these proposals. While the panel action on proposal 17-60 revises the definition of permanently installed and storable pools to include immersion pools, the scope of Article 680 does not seem to include the vessels of concern. Without a revision to the scope, it seems difficult to apply the definition to these vessels. When I look at the installations, it would also be difficult to determine which part of the current Article 680 would apply to these installations. Two options were provided in proposal 17-171 and 17-172. While I understand the political difficulty of dealing with the various religious practices related to baptism, the proposed definition attempts to address the electrical safety concerns that are similar to those found with swimming pools, spas, hot tubs, hydromassages, and fountains and at the same time realizes that some religious practices related to baptism do not pose the same risk as others. There was no attempt to infer that one practice or the other should be used, but to provide electrical safety where persons are immersed. It was brought to my attention after I made the proposal, that some religious groups wade into a vessel and while standing in the vessel, are sprinkled rather than being immersed. It would seem the definition should be revised to include persons standing or immersed in these vessels. Pictures will be provided for reference. (Note: No pictures were received by NFPA with this Comment).

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 17-63.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-62 Log #1949 NEC-P17 **Final Action: Reject**
(680.2)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-62
Recommendation: Accept the proposal.
Substantiation: The panel statement is not responsive. The submitter is aware that if water circulation fails, the water level can rise to the brim. This is a very unusual event. It should not be the basis for setting the rules in Article 680. Going to the actual flood level is akin to setting the datum plane in Article 682 at some height that reflected water height in a 100-yr flood. When the permitted height of the swimming pool junction box was lowered,it was done with enough vacant space in the conduit risers that an unusual water event would not compromise the box, and a reasonable result came out of the process. Now, through the adoption of this definition, those earlier results have been nullified, without substantiation. CMP 17 needs to reconsider the definition.
Panel Meeting Action: Reject
Panel Statement: The panel concludes that the current definition provides the appropriate level of safety. The maximum water level as currently defined can occur as a result of natural events such as heavy rainfall as well as failure of the recirculation system. The definition of "Maximum Water Level" was added in the 2002 edition; it did not change the level intended by the panel.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-63 Log #2038 NEC-P17 **Final Action: Reject**
(680.2)

Submitter: Donald Cook, Shelby County Building Inspections
Comment on Proposal No: 17-60
Recommendation: Accept proposed text from proposal 17-59, 17-60 and either 17-171 or 17-172 as a package to address the lack of electrical requirements for Baptisteries.
Substantiation: When the proposals above were submitted, the bulleted items were inadvertently attached to the substantiation an obviously were not intended to apply to these proposals. While the panel action on proposal 17-60 revises the definition of permanently installed and storable pools to include immersion pools, the scope of Article 680 does not seem to include the vessels of concern. Without a revision to the scope, it seems difficult to apply the definition to these vessels. When I look at the installations, it would also be difficult to determine which part of the current Article 680 would apply to these installations. Two options were provided in proposal 17-171 and 17-172. While I understand the political difficulty of dealing with the various religious practices related to baptism, the proposed definition attempts to address the electrical safety concerns that are similar to those found with swimming pools, spas, hot tubs, hydromassages, and fountains and at the same time realizes that some religious practices related to baptism do not pose the same risk as others. There was no attempt to infer that one practice or the other should be used, but to provide electrical safety where persons are immersed. It was brought to my attention after I made the proposal, that some religious groups wade into a vessel and while standing in the vessel, are sprinkled rather than being immersed. It would seem the definition should be revised to include persons standing or immersed in these vessels. Pictures will be provided for reference. (Note: No pictures were received by NFPA with this Comment).
Panel Meeting Action: Reject
Panel Statement: The panel action in Proposal 17-60 addressed the submitter's concern by modifing the definitions of Pools; Permanently Installed Swimming, Wading, Immersion, and Therapeutic Pools; and Storable Swimming, Wading or Immersion Pool in 680.2. Pools used in religious practices involving wading or immersion would fall under one of these definitions.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-64 Log #211 NEC-P17 **Final Action: Accept**
(Table 680.3)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 17-63
Recommendation: The Technical Correlating Committee directs that the Panel reconsider and correlate with the Panel Action on Proposals 8-53 and 8-78. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation of the Technical Correlating Committee to reconsider. See the panel action and statement on Comment 17-65.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-65 Log #1389 NEC-P17 **Final Action: Accept in Principle in Part**
(Table 680.3)

Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 17-63
Recommendation: This Proposal should be Accepted as originally proposed.

Topic	Section or Article
Wiring	Chapters 1 – 4
Junction box support	314.23
Rigid nonmetallic conduit	352.12, 353.12, 355.12
Audio Equipment	Article 640, Parts I and II
Adjacent to pools and fountains	640.10
Underwater speakers*	

*Underwater loudspeakers shall be installed in accordance with 680.27(A).

Substantiation: In accordance with CMP-8's actions on Proposals 8-53 and 8-78, Article 352 will now apply to "Rigid Polyvinyl Chloride Conduit: Type PVC", and Article 353 will continue to apply to "High Density Polyethylene Conduit: Type HDPE" and Article 355 will now apply to "Reinforced Thermosetting Resin Conduit: Type RTRC". Prior to the separation of these Articles for the 2005 and 2008 editions of the NEC, each of these conduit Types was included in Article 352 as "Rigid Nonmetallic Conduit: Type RNC." Therefore, it is necessary to revise the reference in Table 680.3 as noted above.
This will correlate with the TCC Action on Proposal 17-63.
Panel Meeting Action: Accept in Principle in Part
A. Modify Current Table 680.3 as follows:
1. Revise the words "Rigid nonmetallic conduit" to become "Rigid polyvinyl chloride conduit (Type PVC)"
2. Add a new line to read:
"Reinforced thermosetting resin conduit (Type RTRC)" under Topic, and "355.12" under Section or Article.
B. Replace the words "rigid nonmetallic conduit" in Article 680 in accordance with the instructions in the following table:
Table for inclusion in the committee action on Comment 17-65

Section	Replace	With
680.21(A)(1)	"rigid nonmetallic conduit"	"rigid polyvinyl chloride conduit, reinforced thermosetting resin conduit"
680.23(F)(1)	"or rigid nonmetallic conduit"	"rigid polyvinyl chloride conduit or reinforced thermosetting resin conduit"
680.25(A)	"or rigid nonmetallic conduit"	"rigid polyvinyl chloride conduit or reinforced thermosetting resin conduit"
680.27(A)(2) first sentence	"or rigid nonmetallic conduit"	"rigid polyvinyl chloride conduit or reinforced thermosetting resin conduit"
680.27(A)(2) second sentence	"rigid nonmetallic conduit"	"rigid polyvinyl chloride conduit, reinforced thermosetting resin conduit"

Panel Statement: The panel accepts in principle the addition of 355.12 and rejects the addition of 353.12. High density polyethelene conduit, addressed by Article 353, was never permitted by Article 680. The panel has incorporated the changes in Table 680.3 to account for the use of rigid polyvinyl chloride conduit and reinforced thermosetting resin conduit and has also provided correlating changes for terminology throughout Article 680. This action is based on the continued acceptance of Proposals 8-53 and 8-78. It is recommended that the Technical Correlating Co correlate accordingly if this is not the case.
It is also recommended that the TCC consider the use of "RPVCC" instead of PVC to be consistent with acronyms used for other wiring methods and to prevent confusion with the generic compound pvc.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-66 Log #346 NEC-P17 **Final Action: Accept**
(680.7)

TCC Action: The Technical Correlating Committee understands that the panel action on Proposal 17-67 deleted "an" and "(lighting fixture)", and made "luminaire" plural. The panel action on Comment 17-66 added the text "-and-plug-connection".

The final text reads as follows:

"Fixed or stationary equipment, other than underwater luminaires, for a permanently installed pool shall be permitted to be connected with a flexible cord and plug to facilitate the removal or disconnection for maintenance or repair."

Submitter: L. Keith Lofland, International Association of Electrical Inspectors
Comment on Proposal No: 17-66
Recommendation: Revise text to read as follows:

Fixed or stationary equipment other than an underwater luminaire (lighting fixture) for a permanently installed pool shall be permitted to be connected with a flexible cord-and-plug-connection to facilitate the removal or disconnection for maintenance or repair.

Substantiation: After reading this section, without looking back up and reading the title of this section (Cord-and-Plug-Connected Equipment), if you subscribe to this section, an installer or inspector could not allow an underwater wet-niche luminaire (light fixture) installed in a wet-niche forming shell with a flexible cord, which is typically provided by the luminaire manufacture. Section 680.23(B)(3) permits a flexible cord (but not a cord-and-plug-connection) to a wet-niche luminaire (light fixture). Section 680.23(B)(6) basically requires a flexible cord connection (but not a cord-and-plug-connection).

As indicated in the panel statement on Proposal 17-66, 680.7(B) states the cord shall terminate in a grounding-type attachment plug. Adding the words "-and-plug-connection" in the main statement of 680.7, would make this section much clearer that an underwater luminaire (lighting fixture) for a permanently installed pool cannot be cord-and-plug-connected, but can be connected with a flexible cord. This new wording would make this section much more user-friendly.

Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-67 Log #424 NEC-P17 **Final Action: Accept in Principle**
(680.7)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-66
Recommendation: Accept proposal.
Substantiation: The text should be consistent with the heading which includes "and plug". The literal text excludes underwater fixtures from being cord connected as it states: "other than an underwater luminaire shall be permitted to be connected with a flexible cord."
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 17-66.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-68 Log #530 NEC-P17 **Final Action: Reject**
(680.7)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-66
Recommendation: Accept the proposal as revised:

Fixed or stationary equipment ~~other than underwater luminaires (lighting fixtures)~~ shall be...(remainder unchanged).

Substantiation: Reference to underwater luminaires is unnecessary since the heading covers plug-connected equipment and (A) limits cord length to 3 ft. 680.28 does not appear to provide for plug connections.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree with the submitter's substantiation. The language suggested for deletion needs to be retained to make it clear that underwater luminaires are NOT addressed by this section.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-69 Log #902 NEC-P17 **Final Action: Reject**
(680.8 Exception (New))

Submitter: Terry L. Schneider, Pikes Peak Regional Building Department
Comment on Proposal No: 17-73
Recommendation: 680.8(A) Power. With respect...Figure 680.8.

Exception: Self-contained Spa or Hot Tub. The minimum clearances for overhead conductors shall be reduced to 3.0 m (10 ft) above the water level for self-contained spa(s) or hot tub(s).

Substantiation: In the National Electrical Safety Code, section 234(C)3d, it covers the overhead clearances of utility wires over decks and similar structures and have attached an interpretation from Committee C2. They are in agreement that the clearances are not required for the same reasons as the original submitter. There is a conflict between the NESC and the NEC and II recommend that Panel 17 reconsider this proposal to bring the 2 standards into agreement.

Note: Supporting Material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The panel continues to reject this change. Often spas and swim spas are located in close proximity to pools and the same tools used for pool maintenance are often used for spas. NESC interpretations do not pertain to NEC Article 680.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-70 Log #455 NEC-P17 **Final Action: Accept in Principle**
(680.12)

TCC Action: The Technical Correlating Committee understands that the final text of 680.12 includes both of the panel actions on Comments 17-70 and 17-71.

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-79
Recommendation: Accept proposal or revision as follows:

One or more approved means to simultaneously disconnect all ungrounded conductors of the circuit shall be provided...(remainder unchanged).

Substantiation: Since the panel declined to accept a requirement for a switch or circuit breaker, the means should be specifically required to be approved. Simultaneous disconnection should be specified since literal wording, infers that two or three individual disconnecting means may be used. Utilization equipment includes signs within fountains which require a switch or circuit breaker disconnecting means per 600.6. Since this rule is in Chapter 6, it may be construed as amending other sections requiring simultaneous disconnect.
Panel Meeting Action: Accept in Principle
Revise 680.12 to read as follows:
680.12 Maintenance Disconnecting Means. One or more means to simultaneously disconnect all ungrounded conductors shall be provided for all utilization equipment other than lighting. Each means shall be readily accessible and within sight from its equipment.
Panel Statement: The revised language more clearly presents the requirement and meets the intent of the submitter.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-71 Log #1950 NEC-P17 **Final Action: Accept in Principle**
(680.12)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-80
Recommendation: Add the following phrase at the end of the last sentence:

"unless separated from the open water by a permanently installed barrier that provides equal or better separation."

Substantiation: The reason the 5-ft requirement was removed was that this disconnect applies throughout Article 680, and frequently the best place for it might be under the skirt f a commercial hot tub, for example. Such a location might be only one foot, measured horizontally, from the body of water, but there would be no hazard to a swimmer or bather. This suggested wording might adequately bridge the prior history and the submitter's concerns.
Panel Meeting Action: Accept in Principle
Revise 680.12 to read as follows:

680.12 Maintenance Disconnecting Means. One or more means to disconnect all ungrounded conductors shall be provided for all utilization equipment other than lighting. Each means shall be readily accessible and within sight from its equipment and shall be located at least 1.5 m (5 ft) horizontally from the inside walls of a pool, spa, or hot tub unless separated from the open water by a permanently installed barrier that provides a 1.5 m (5 ft) reach path or greater. This horzontal distance is to be measured from the water's edge along the shortest path required to reach the disconnect.

Panel Statement: It is the intent of the panel to regulate the locations of disconnects as stated in the panel action text. The panel disagrees with the submitter's substantiation. The scenario suggested would still allow maintenance personnel to come in contact with the water while operating the disconnect.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-72 Log #1951 NEC-P17 **Final Action: Accept**
(680.21)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-81
Recommendation: Do not convert any existing text into an exception, nor change the order of any text. Instead, add the following sentence as action text for 680.21(A):

(A) Wiring Methods. The wiring to a pool motor shall comply with (1) unless modified for specific circumstances by (2), (3), (4), or (5).
Substantiation: The proposal submitter is correct in observing that (4) is, in effect, an exception to (1). The problem is that the other numbered paragraphs are as well. The simplest way out is to add the suggested parent text to (1), allowing the succeeding numbered paragraphs to complete the requirements.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-73 Log #2216 NEC-P17 **Final Action: Reject**
(680.21(A)(1) Exception)

Submitter: Jeff Fitzloff, State of Idaho Division of Building Safety
Comment on Proposal No: 17-81
Recommendation: Revise text to read as follows:
680.21 Motors.
(A) Wiring Methods.
(1) General. The branch circuits for pool-associated motors shall be installed in rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, or Type MC cable listed for the location. Other wiring methods and materials shall be permitted in specific locations or applications as covered in this section. Any wiring method employed shall contain an insulated copper equipment grounding conductor sized in accordance with 250.122 but not smaller than 12 AWG.
Exception: In the interior of dwelling units, or in the interior of accessory buildings associated with a dwelling unit, any of the wiring methods recognized in Chapter 3 of this Code that comply with the provisions of this section shall be permitted. Where run in a cable assembly, the copper equipment grounding conductor not smaller than 12 AWG shall be permitted to be uninsulated, but it shall be enclosed within the outer sheath of the cable assembly. [ROP 17-81]
Substantiation: Adding the text will word this section of the code similar to 680.42(C).
Panel Meeting Action: Reject
Panel Statement: The panel has reinstated item (4) of 680.21(A) in the action on Comment 17-72. In addition, the requirement for a copper equipment grounding conductor with a minimum size of 12 AWG is already contained in item (1) of 680.21(A).
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-74 Log #212 NEC-P17 **Final Action: Accept**
(680.22)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 17-85
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation of the Technical Correlating Committee to give further consideration to the comments expressed in voting. See panel action and statement on Comment 17-75.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-75 Log #1663 NEC-P17 **Final Action: Accept**
(680.22)

TCC Action: The Technical Correlating Committee understands that the panel's action to Accept Proposal 17-85 deletes the second sentence of 680.22(A)(5) in the 2005 NEC:
"Receptacles that supply pool pump motors and that are rated 15 or 20 amperes, 125 volts through 250 volts, single phase, shall be provided with GFCI protection."
Submitter: Brian Myers, IBEW Local Union 98
Comment on Proposal No: 17-85
Recommendation: This proposal should have been accepted.
Substantiation: Receptacle fed pump motors are already required to be GFCI protected. Hard wired pump motors present the same hazards due to the highly corrosive atmosphere. Pump motor seals have a limited life due to chlorines corrosive nature.
The stated purpose of the NEC is "the practical safeguarding of persons and property from hazards" it is practical to provide the same level of protection for a hard wired pump motor that is afforded to a cord and plug connected pump motor.
Panel Meeting Action: Accept
Panel Statement: As a part of the panel's consideration of this comment, the panel reviewed a "Compilation of Data from the U.S. Consumer Product Safety Commission National Injury Information Clearinghouse" that was assembled by a task group of the panel.
Note: Supporting material is available for review at NFPA Headquarters.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 2
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
HIRSCH, B.: The Panel should reject this comment and this proposal since proper substantiation was not supplied. The data presented at the meeting from the US Consumer Product Safety Commission National Injury Information Clearinghouse shows that of all the incidents on record, only one possible incident is attributable to hard wire pool pump motors and the data available on that incident is too vague to draw a positive conclusion. To implement requirements that cannot be shown to add safety value puts an unnecessary burden on the end use customer and does not meet the "practical safeguarding" purpose of the Code.
RAMIREZ, M.: The 1999 NEC did not require all motors associated with Article 608 to be GFCI protected, in other than dwelling units. Motor, whether cord and plugs connected or directly hard wired, were required to be GFCI protected.
In the 2002 code cycle, the GFCI protection for hard wired (direct connection) was eliminated because there was no substantiation to require it. In the 2005 code cycle, the proposals to reintroduce the GFCI requirement for "hard wired" motors was rejected by the panel and failed to acquire the votes at the general assembly meeting.
For the 2008 code cycle, the only documentation that CPSC had in their files was one incident dating back 20 years to back-up the theory that GFCI protection should also include hard wired motors for pools and spas.
I conclude that, yes, cord and plug connected motors should have GFCI protection due to possible mishandling of the cord and plug by a consumer. There are thousands of hard wired pool associated motors without GFCI protection without an incident including for 3 HP 30 ampere circuits or three phase motors, pool heaters, ground level central A.C. units, swamp coolers, etc. The requirements for a maintenance service disconnect on hard wire equipment meets the code requirement.
Comment on Affirmative:
BLEWITT, T.: The only incident in the "Compilation of Data from the US Consumer Product Safety Commission National Injury Information Clearinghouse" clearly attributed to a permanently connected swimming pool pump indicated the unit had bare wires in the control box ("sparking was observed"), was not grounded at all and had been repeatedly tripping its circuit breaker.
JHONSON, D.: It has come to my attention the panel action to accept Comment 17-75 that adopts Proposal 17-85 has an editorial issue which may need to be addressed by the TCC. The following underlined text is the code change resulting from the panel action. The bold italicized text seems to be redundant and confusing. the intent to protect pool pumps receptacles or outlets with GFCI protection wherever they may be located would be simply accomplished with the remaining text in 680.22(B).
17-85 (680.22)
5) GFCI Protection. all 15- and 20-ampere, single-phase, 125-volt receptacles located within 6.0 m (20 ft) of the inside walls of a pool shall be protected by a ground-fault circuit interrupter. ***Receptacles that supply pool pump motors and that are rated 15 or 20 amperes, 125 volts through 250 volts, single phase, shall be provided with GFCI protection.***
(B) GFCI Protection. Outlets supplying pool pump motors from branch circuits with short-circuit and ground-fault protection rated 15 or 20 amperes, 125 volt or 240volt, single phase, whether by receptacle or direct connection, shall be provided with ground fault circuit-interrupter protection for personnel.
ROCK, B.: NEMA supports this comment. GFCI protection of hard-wired pump motors in the 1999 NEC provides needed safety and these requirements should be reinstated in the 2008 NEC. The fatality cited in US CPSC National Injury Information Clearinghouse data (INDP 990603HCN0217) supports this position.

17-76 Log #2355 NEC-P17 **Final Action: Accept**
(680.22)

TCC Action: The Technical Correlating Committee understands that the panel's action on Comment 17-75 to Accept Proposal 17-85 deletes the second sentence of 680.22(A)(5) in the 2005 NEC:
"Receptacles that supply pool pump motors and that are rated 15 or 20 amperes, 125 volts through 250 volts, single phase, shall be provided with GFCI protection."
Submitter: Alan Manche, Square D Company
Comment on Proposal No: 17-85
Recommendation: Accept the Proposal.
Substantiation: Based on the panel statement and the panel member negatives on this topic, it is clear that protection was clearly reduced from the 1999 NEC to the 2002 NEC. The panel statement indicates that the general assembly rejected this issue on the floor. The issue on the floor had nothing to do with the reinstating GFCI protection but the wording that was being presented. The NFPA Electrical Section supported the reinstatement of GFCI protection on hard-wire pump motors. The wording has been corrected for this cycle and should be accepted. There has been no evidence or substantiation presented that would support removing this protection.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 17-75.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 2
Ballot Not Returned: 1 Gill, C.

Explanation of Negative:
HIRSCH, B.: See my Comment under Comment 17-75
RAMIREZ, M.: See my explanation of negative vote on Comment 17-75.
Comment on Affirmative:
ROCK, B.: NEMA supports this comment. GFCI protection of hard-wired pump motors in the 1999 NEC provides needed safety and these requirements should be reinstated in the 2008 NEC. The fatality cited in US CPSC National Injury Information Clearinghouse data (INDP 990603HCN0217) supports this position.

17-77 Log #900 NEC-P17 **Final Action: Accept in Principle**
(680.22(A)(5))

Submitter: James Paul, James R. Paul Jr. Electrical Contractor / Rep. Town of Rockland Inspection of Wires
Comment on Proposal No: 17-91
Recommendation: Revise as follows:
Receptacles (and branch circuits) that supply pool pump motors...15 or 20 amps, 125-250 volts shall be provided with GFCI protection.
Substantiation: The problem with pool pump motors, whether "hardwired" or connected by cord and plug to a receptacle are typically in a wet and corrosive (hostile) environment and should be afforded protection of a GFCI. Also, even hardwired motors are removed for storage or repair and may or may not be grounded or bonded to the pool grid upon installation. Are we waiting for a body count?
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 17-75.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 2
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
HIRSCH, B.: See my Comment under Comment 17-75
RAMIREZ, M.: See my explanation of negative vote on Comment 17-75.
Comment on Affirmative:
ROCK, B.: GFCI protection of hard-wired pump motors in the 1999 NEC provides needed safety and these requirements should be reinstated in the 2008 NEC. The fatality cited in US CPSC National Injury Information Clearinghouse data (INDP 990603HCN0217) supports this position.

17-78 Log #2181 NEC-P17 **Final Action: Accept**
(680.22(A)(5))

Submitter: Charles Palmieri, Inspector of Wires Town of Norwell
Comment on Proposal No: 17-91
Recommendation: This Proposal should be reconsidered as Accept in Principle.
Substantiation: Mr. Paul's substantiation (certainly for northern latitude locations) is valid. GFCI protection of permanently wired pumps is currently not required. Internal failure of such equipment is no less a shock hazard when hard wired then a cord connected installation. Possibly, the CMP regards permanently connected pumps as a stable installation which is not subject to periodic movement and relocation such as a cord connected pump may be. In residential applications pump installations may be best served if only cord connected this is especially true for dwellings where there is a heightened likelihood that the homeowner will provide annual maintenance such as assembly and disassembly of the filtration equipment for winter storage. It is very common that during follow up inspections to notice degraded conditions of the wiring, which supply permanently, connected pool pumps. While such conditions are a cause for alarm to professionals in the electrical industry such concern does not always have the same impact or sense of urgency (to repair) that we who install, service, and inspect realize. The deteriorated conditions that my fellow inspectors and I have noted regarding permanently connected pump motors are an accident waiting to happen and, frankly, I am puzzled why the language of the 1999 NEC has not been readopted as mentioned by Mr. Curry in Proposal 17-92.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 17-75.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 2
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
HIRSCH, B.: See my Comment under Comment 17-75
RAMIREZ, M.: See my explanation of negative vote on Comment 17-75.
Comment on Affirmative:
ROCK, B.: GFCI protection of hard-wired pump motors in the 1999 NEC provides needed safety and these requirements should be reinstated in the 2008 NEC. The fatality cited in US CPSC National Injury Information Clearinghouse data (INDP 990603HCN0217) supports this position.

17-79 Log #2184 NEC-P17 **Final Action: Accept**
(680.22(A)(5))

Submitter: William F. Laidler, Inspector of Wires Town of Hanover
Comment on Proposal No: 17-91
Recommendation: This Proposal should have been Accepted in Principle. The submitter is correct that by not requiring "hardwired" pool pump motors to be GFCI protected is a hazardous situation.
Substantiation: As an inspector of wires, I am often called to make an inspection at a residence where I had previously done an inspection on a swimming pool. In some cases, I have an opportunity to take a look at the wiring of the existing pool and notice that the liquidtight is usually pulled out of the connector exposing the conductors to the elements of the weather and to the possibility of physical damage. In one particular case, I was called out to investigate why people were getting a sensation of "electrical shock" while in the area of the pool equipment. It was noted that the liquidtight had pulled out of the connector and the ungrounded wire was nicked and making intermittent contact with the metallic frame of the pool pump motor. The frame was connected to the equipment grounding connector, but the breaker did not trip due to high resistance. Had the pump motor been GFCI protected, it would have cleared the circuit due to ground current leakage. The installation was repaired and a GFCI breaker was installed and the situation was corrected.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 17-75.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 8 Negative: 2
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
HIRSCH, B.: See my Comment under Comment 17-75
RAMIREZ, M.: See my explanation of negative vote on Comment 17-75.
Comment on Affirmative:
ROCK, B.: GFCI protection of hard-wired pump motors in the 1999 NEC provides needed safety and these requirements should be reinstated in the 2008 NEC. The fatality cited in US CPSC National Injury Information Clearinghouse data (INDP 990603HCN0217) supports this position.

17-80 Log #1952 NEC-P17 **Final Action: Accept**
(680.22(C))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-93
Recommendation: Continue to reject the proposal.
Substantiation: The only substantiation for the proposal had to do with the visibility of the requirement. In my code book, 680.22(C) is extremely visible in its bold print with the subsection title prominently displayed. Subsection title fonts are the same as section titles (compare, for example, 680.23 immediately below it.) The proposal is unnecessary.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-81 Log #394 NEC-P17 **Final Action: Accept**
(680.22(D))

Submitter: Bryan P. Holland, City of North Port
Comment on Proposal No: 17-96
Recommendation: I continue to support this proposal and the revision made by the Panel.
Substantiation: The 30 volt stipulation in the original proposal was based on the limited shock potential of circuits under 30 volts, however, the panel revision adds an additional level of safety and assured shock prevention from these system types.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-82 Log #1798 NEC-P17 **Final Action: Reject**
(680.22(D))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 17-96
Recommendation: This proposal should have been rejected.
Substantiation: The term "outlet" as used in this proposal is only partially correct, and this proposal does not enhance safety for the types of equipment specifically mentioned. "Outlet" is a defined term; "The point on the wiring system at which current is taken to supply utilization equipment." Thus, for

example, a thermostat or a push-button on a Class 2 circuit is not an outlet and would not be subject to this rule, nor would any junction box. It could be argued that a telephone qualifies as "utilization equipment" as defined and fire alarm "appliances" such as horns or strobes are a form of utilization equipment (which is why they are called appliances). However, "devices" such as switches and smoke detectors that are part of a fire alarm system (not residential smoke alarms) are not utilization equipment, so the locations where such devices are installed are not outlets - by definition. Switching devices (including thermostats, push-buttons and fire alarm pull stations) are already covered under (C), luminaires under (B), and receptacles under (A) so "other outlets" in the proposed (D) dopes not include, in this case, receptacles, lighting outlets, or switching devices. The proposed FPN would then mislead the user to believe that many points on a signaling, fire alarm, remote control, or communications system are outlets. Also, though the 10 ft rule works well for equipment that has a standard cord length, telephones commonly have cords longer than 10 ft so the proposal will not eliminate or reduce the hazard it claims to address. The proposal probably won't hurt much, other than fostering a slew of misinterpretations and creating conflicts with 680.27 where "outlets" are permitted as close as 5 ft or closer for underwater audio, but it won't resolve much easier.

Panel Meeting Action: Reject

Panel Statement: The panel does not agree with the submitter's substantiation. Fire alarm appliances and telephones would be considered as utiliziation equipment since they use electric energy and connect to outlets that supply them. Refer to the definitions of "outlet" and "utilization equipment" in Article 100.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10

Ballot Not Returned: 1 Gill, C.

17-83 Log #1450 NEC-P17 **Final Action: Reject**
(680.23)

Submitter: Donald W. Zipse, Electrical Forensics, LLC

Comment on Proposal No: 17-99

Recommendation: New text:

Underwater Luminaries shall be NOT be installed in swimming pools, unless the material interfacing with the water is non-conductive.

Substantiation: Electrical safety should be a major concern of this panel. Shocking persons in swimming pools must be stopped and your acceptance of this proposal / comment will be a step in the correct direction and in compliance with NEC 90.1 "**Purpose. The purpose of this Code is the practical safeguarding of PERSONS... from the hazards arising from the use of electricity."**

Since the pole mounted or pad mounted or underground utility transformer has the primary neutral connected directly to the secondary neutral which is brought into the service panel, where the combination messenger / neutral / ground conductor is attached to the neutral bus bar. The equipment grounding conductor is connected to the neutral bus bar and is connected to the metal enclosure of the underwater (light fixture) luminaries. The high voltage electric current can and does now flow directly from the primary high voltage utility neutral directly by way of a copper conductor into the swimming pool water from the conductive surface of the luminaries and from the swimming pool water the high voltage current **MUST** flow through the pool, into the re-bar and into the earth and back to the utility substation completing the high voltage distribution circuit.

Electric current flow through the swimming pool subjects the swimmers to electric shocks.

The electric utilities brain trust is called the Electric Power Research Institute, (EPRI) and they admit that 60 percent of the high voltage electric current flows back to the substation over the earth, ground. The utility's neutral conductor only carries approximately 40 percent of the primary current back on the neutral conductor. (See attached EPRI document.)

The panel replied, "The Code provides for the establishment of an equipotential bonding grid to limit voltage gradients within the pool area." Tests conducted over the past two years have shown that the panel statement is a **figment of the imagination.** Anyone familiar with and knowledgeable about OHMS LAW would realize that current flowing through the swimming pool will generate a voltage and that this voltage due to continuous flow of electric current will generate a voltage. This level of voltage has and is continuing to shock persons in swimming pools.

See the peer reviewed technical paper presented at an IEEE technical conference titled: "Equipotential Planes, A Figment of the Imagination". Although the testing was done on Equipotential Plane found in dairies, the same principle applied to swimming pools.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The panel agrees with the submitter's concerns with electrical safety of underwater luminaires but does not agree with the submitter's substantiation. The existing requirements in the Code already address the hazards of underwater luminaires provided with metallic enclosures and forming shells.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 9 Negative: 1

Ballot Not Returned: 1 Gill, C.

Explanation of Negative:

CRIVELL, P.: 1. This proposal addresses a valid concern. There is a real potential for underwater light fixtures to act as part of the return path for unbalanced utility current.

2. Underwater luminaries should be required to be manufactured or installed in such a way as to eliminate the potential for underwater light fixtures to act as part of the return path for unbalanced utility current (e.g., double insulation or isolation through an isolation transformer).

17-84 Log #406 NEC-P17 **Final Action: Reject**
(680.23(F)(1))

Submitter: Daniel Leaf, Seneca, SC

Comment on Proposal No: 17-104

Recommendation: Revise as follows:

Accept proposal revised:

Branch circuit wiring on the supply side of enclosures and junction boxes connected to conduits run to wet niche and/or niche luminaires (fixtures) shall be installed using rigid metal conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, liquidtight flexible metal conduit ~~or~~ rigid nonmetallic conduit, or Type MI cable. Where installed on buildings electrical metallic tubing shall be permitted. For a one-family dwelling the provisions of 680.21(A)(4) shall be permitted.

Exception: Where ~~connecting to~~ liquidtight flexible metal conduit liquidtight flexible nonmetallic conduit, is used for connecting to transformers for pool or fountain lights ~~liquidtight flexible metal conduit or liquidtight flexible nonmetallic conduit shall be permitted~~. Remainder unchanged.

Substantiation: LFMC should be included since 350.10(1) and 350.12(1) permit use where flexibility and protection from liquids or vapors is required and where not subject to physical damage. Panel statement that is subject to physical damage is arbitrary and be judged by the AHJ. Why would LFNC in the same location not automatically be subject to damage? Type MI cable is resistant to physical damage and provides corrosion protection for conductors. Where conditions corrosive to the sheath are present stainless steel or protection (332.12(2)) can be utilized. To automatically conclude the copper sheath will be corroded doesn't correlate with copper bonding jumpers for rebar and pool equipment which are specified and which may be bare. The reference to 680.21(A) is for correlation as this section doesn't exempt single-family dwellings.

Panel Meeting Action: Reject

Panel Statement: The use of MI cable is not suitable for pool use; see 332.12.

The panel agrees with the submitter that the panel statement on Proposal 17-104 regarding physical damage is incorrect. However, LFMC is not suitable for pool locations due to the corrosive environment.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10

Ballot Not Returned: 1 Gill, C.

Comment on Affirmative:

BLEWITT, T.: LFMC is Listed for installations permitted in Article 350. The jackets are suitable for outdoor wet environments and can be obtained marked as suitable for direct burial in earth or concrete. Note that LFMC is permitted on the supply side of a swimming pool transformer per the exception to 680.23(F)(1).

17-85 Log #1130 NEC-P17 **Final Action: Accept in Principle**
(680.23(F)(1))

Submitter: Andre R. Cartal, Princeton Borough Building Dept.

Comment on Proposal No: 17-105

Recommendation: Please review.

Substantiation: I don't understand the Panel comment. The proposal specifically stated that the armored cable would contain an insulated equipment grounding conductor. If the AC cable does not contain an insulated grounding conductor, it can't be used.

Panel Meeting Action: Accept in Principle

Revise the last sentence of 680.23(F)(1) to read as follows:

Where installed on buildings, electrical metallic tubing shall be permitted, and where installed within buildings, electrical nonmetallic tubing, Type MC cable, ~~or~~ electrical metallic tubing, or Type AC cable shall be permitted. In all cases an insulated equipment grounding conductor sized in accordance with Table 250.122 but not less than #12 AWG shall be required.

Panel Statement: The revised text more clearly presents the requirements and meets the intent of the submitter.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10

Ballot Not Returned: 1 Gill, C.

17-86 Log #2046 NEC-P17 **Final Action: Reject**
(680.23(F)(1))

Submitter: Phil Simmons, National Armored Cable Manufacturers Assn.
Comment on Proposal No: 17-106
Recommendation: Revise existing 680.23(F)(1) as follows:
(F) Branch-Circuit Wiring.
(1) Wiring Methods. Branch-circuit wiring on the supply side of enclosures and junction boxes connected to conduits run to wet-niche and no-niche luminaires (fixtures), and the field wiring compartments of dry-niche luminaires (fixtures), shall be installed using rigid metal conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, ~~or~~ rigid nonmetallic conduit or listed Type MC cable having an impervious outer nonmetallic jacket. Where installed on buildings, electrical metallic tubing shall be permitted, and where installed within buildings, electrical nonmetallic tubing or electrical metallic tubing shall be permitted.
Exception: Where connecting to transformers for pool lights, liquidtight flexible metal conduit, ~~or~~ liquidtight flexible nonmetallic conduit or listed Type MC cable having an impervious outer nonmetallic jacket shall be permitted. The length shall not exceed 1.8 m (6 ft) for any one length or exceed 3.0 m (10 ft) in total length used. Liquidtight flexible nonmetallic conduit, Type B (LFNC-B), or listed Type MC cable having an impervious outer nonmetallic jacket shall be permitted in lengths longer than 1.8 m (6 ft).
Substantiation: Type MC cable with an impervious nonmetallic outer jacket offers identical protection for these branch circuits as provided by liquidtight flexible metal conduit and should be permitted for use in these applications. The installer should have a choice of installing a proven, safe, listed, cable product or a conduit wiring method.
As Panel member Mr. Blewitt stated in his ballot, "Type MC cable is available with constructions designed to resist the chemical vapors likely in these installations. They are jacketed versions and are marked "Suitable for use in swimming pool motor circuits."
These are safe and proven products and should not be unfairly restricted by the NEC rules.
Panel Meeting Action: Reject
Panel Statement: Type MC cable is not listed for swimming pool luminaires.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-87 Log #456 NEC-P17 **Final Action: Reject**
(680.24(F))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-112
Recommendation: Accept proposal revised:
..."shall be ~~grounded~~ connected to the equipment grounding terminal of the panelboard or the metal enclosure of an individual switch or circuit breaker where the circuit originates."
Substantiation: This requirement should also specifically apply where the branch circuit does not originate from a panelboard.
Panel Meeting Action: Reject
Panel Statement: It is the intent of the panel that the connection be made via a continuous equipment grounding conductor in accordance with 680.23(F)(2) terminating at the equipment grounding terminal of the panelboard.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-88 Log #403 NEC-P17 **Final Action: Reject**
(680.25(A))

Submitter: Daniel Leaf, Seneca, SC
Comment on Proposal No: 17-113
Recommendation: Accept proposal inclusion of liquidtight flexible metal conduit.
Substantiation: The panel statement that liquidtight flexible metal conduit is subject to physical damage is arbitrary and should be determined by the AHJ. LFNMC is permitted; why is it not arbitrarily considered subject to physical damage? LFMC is permitted for flexibility and protection from liquids and (nonspecific) vapors. 350.12 does not prohibit use in corrosive environments. 680.42(A)(1) permits LFMC.
Panel Meeting Action: Reject
Panel Statement: The subject conduit is not listed for corrosive environments.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

Comment on Affirmative:
BLEWITT, T.: LFMC is Listed for installations permitted in Article 350. The jackets are suitable for outdoor wet environments and can be obtained marked as suitable for direct burial in earth or concrete. Note that LFMC is permitted on the supply side of a swimming pool transformer per the exception to 680.23(F)(1).

17-89 Log #2047 NEC-P17 **Final Action: Reject**
(680.25(A))

Submitter: Phil Simmons, National Armored Cable Manufacturers Assn.
Comment on Proposal No: 17-114
Recommendation: Accept the proposal.
Substantiation: Type MC cable having an impervious nonmetallic sheath is manufactured with a polyvinychloride outer jacket that makes the cable suitable for direct earth burial, encasement in concrete and is inherently resistant to chlorine-enriched atmospheres. As with all wiring methods in an chlorine-enriched atmosphere, the manufacturer should be consulted to determine the suitability for a particular atmosphere.
Type MC cable of the interlocked metal armor type is manufactured with either a galvanized steel or aluminum armor. For the galvanized steel product, the steel strip is galvanized before being spiraled around the conductors being protected. This galvanizing ensures the satisfactory performance of the cable and is similar, if not identical in protection, to that provided on electrical metallic tubing that is allowed as a wiring method for feeders.
Panel Meeting Action: Reject
Panel Statement: The subject wiring method is not universally listed for pool environments.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-90 Log #1661 NEC-P17 **Final Action: Accept**
(680.25(A) Exception No. 2)

Submitter: Brian Myers, IBEW Local Union 98
Comment on Proposal No: 17-113
Recommendation: Continue to accept in part. Add Exception No. 2 to the positive text to read as follows:
(A) wiring Methods. Feeders shall be installed in rigid metal conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, or rigid nonmetallic conduit. Electrical metallic tubing shall be permitted where installed on or within a building, and electrical nonmetallic tubing shall be permitted where installed within a building. Aluminum conduits shall not be permitted in the pool area where subject to corrosion.
Change existing exception to be Exception ~~No. 1.~~
~~Add Exception No. 2 as follows:~~
~~Exception No. 2 Aluminum conduits shall not be permitted in the pool area where subject to corrosion.~~
Substantiation: According to the NEC Style Manual sections 3.1.4, 3.1.4.1, and Annex A "Editorial Guidance on Exceptions" "Exceptions should be written into positive language, if positive language achieves clarity."
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-91 Log #213 NEC-P17 **Final Action: Accept**
(68.26)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 17-114a
Recommendation: The Technical Correlating Committee directs that the panel reconsider the proposal and rewrite the text to comply with the NEC Style Manual to correct items such as the mandatory text in Fine Print Notes No. 1 and No. 2, incomplete sentences, and correcting other NEC Style issues. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation of the TCC to reconsider. Refer to the panel action and statement on Comment 17-92.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-92 Log #950 NEC-P17 **Final Action: Accept in Principle (680.26)**

Submitter: Gary L. Siggins, Underwriters Laboratories Inc.
Comment on Proposal No: 17-114a
Recommendation: Revise as follows:

680.26 Equipotential Bonding.

(A) Performance. The equipotential bonding required by this section shall be installed to reduce voltage gradients in the pool area.

(B) Bonded Parts. The parts specified in 680.26(B)(1) through (B)(7) shall be bonded together using solid copper conductors, insulated covered, or bare, not smaller than 8 AWG or with rigid metal conduit of brass or other identified corrosion-resistant metal. Connections to bonded parts shall be made in accordance with 250.8. An 8 AWG or larger solid copper bonding conductor provided to reduce voltage gradients in the pool area shall not be required to be extended or attached to any remote panelboard, to service equipment, or electrodes.

(1) Conductive Pool Shells. Bonding to conductive pool shells shall be provided as specified in 680.26(B)(1)(a) or 680.26(B)(1)(b). Poured concrete, pneumatically applied or sprayed concrete, and concrete block with painted or plastered coatings ~~are~~ shall all be considered conductive materials due to water permeability and porosity. Vinyl liners and fiberglass composite shells ~~are~~ shall be considered to be non-conductive materials.

a. Structural Reinforcing Steel. Unencapsulated structural reinforcing steel (rebar) shall be bonded together by steel tie wires or the equivalent.

FPN: For structural reinforcing steel encapsulated in a nonconductive compound, see 680.26(B)(1)(b).

b. Copper Conductor Grid. A copper conductor grid shall be provided and shall comply with the following conditions:

(1)Be constructed of minimum 8 AWG bare solid copper conductors bonded to each other at all points of crossing.

(2) Conform to the contour of the pool and the pool deck.

(3)Be arranged in a 300 mm (12 in.) by 300 mm (12 in.) network of conductors in a uniformly spaced perpendicular grid pattern with tolerance of 100 mm (4 in.).

(4)Be secured within or under the pool no more than 150 mm (6 in.) from the outer contour of the pool shell.

(2) Perimeter Surfaces. The perimeter surface shall extend~~s~~ for 1 m (3 ft) horizontally beyond the inside walls of the pool. ~~This~~ and shall include~~s~~ unpaved surfaces as well as poured concrete and other types of paving. Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a) or 680.26(B)(2)(b), and shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four (4) points uniformly spaced around the perimeter of the pool. For non-conductive pool shells, bonding at four points shall not be required.

(a) Structural Reinforcing Steel. Structural reinforcing steel shall be bonded In accordance with 680.26 (B)(1)(a).

(b) Alternate Means. Where structural reinforcing steel is not available or is encapsulated in a nonconductive compound, copper conductors shall be utilized where the following conditions are met:

(1)At least one minimum 8 AWG bare solid copper conductor ~~is~~ shall be provided.

(2)The conductors shall follow the contour of the perimeter surface.

(3) Approved splices shall be permitted.

(4)If only a single conductor is provided it shall be 450 to 600 mm (18 to 24 inches) from the inside walls of the pool.

(5)Shall be secured within or under the perimeter surface 100 to 150 mm (4 to 6 inches) below the subgrade.

(3) Metallic Components. All metallic parts of the pool structure, including reinforcing metal not addressed in 680.26(1)(a), shall be bonded. Where reinforcing steel is encapsulated with a nonconductive compound, ~~it~~ the reinforcing steel shall not be required to be bonded.

(4) Underwater Lighting. All metal forming shells and mounting brackets of no-niche luminaires (fixtures) shall be bonded.

Exception: Listed low-voltage lighting systems with nonmetallic forming shells shall not require i~~ng~~ bonding.

(5) Metal Fittings. All metal fittings within or attached to the pool structure shall be bonded. Isolated parts, that are not over 100 mm (4 in.) in any dimension and do not penetrate into the pool structure more than 25 mm (1 in.), shall not require bonding.

(6) Electrical Equipment. Metal parts of electrical equipment associated with the pool water circulating system, including pump motors and metal parts of equipment associated with pool covers, including electric motors shall be bonded.

Exception: Metal parts of listed equipment incorporating an approved system of double insulation shall not be bonded.

(a) Double-Insulated Water Pump Motors. Where a double-insulated water-pump motor is installed under the provisions of this rule, a solid 8 AWG copper conductor ~~that is~~ of sufficient length to make a bonding connection to a replacement motor shall be extended from the bonding grid to an accessible point in the ~~motor~~ vicinity of the pool motor. Where there is no connection between the swimming pool bonding grid and the equipment grounding system for the premises, this bonding conductor shall be connected to the equipment grounding conductor of the motor circuit.

(b) Pool Water Heaters. For pool water heaters rated at more than 50 amperes and having specific instructions regarding bonding and grounding, only those parts designated to be bonded shall be bonded and only those parts designated to be grounded shall be grounded.

(7) Metal Wiring Methods and Equipment. Metal-sheathed cables and raceways, metal piping, and all fixed metal parts shall be bonded.

Exception No. 1: Those separated from the pool by a permanent barrier shall not be required to be bonded.

Exception No. 2: Those greater than 1.5 m (5 ft) horizontally of the inside walls of the pool shall not be required to be bonded.

Exception No. 3: Those greater than 3.7 m (12 ft) measured vertically above the maximum water level of the pool, or as measured vertically above any observation stands, towers, or platforms, or any diving structures shall not be required to be bonded.

Substantiation: Per the request of the Technical Correlating Committee in the Report on Proposals, I reviewed the proposal to correct violations to the NEC Style Manual. Detailed below is a summary of the changes.

FPN Nos. 1 and 2 were moved to the end of 680.26(B) as requirements.

Deleted unnecessary words from B(1)(a). No need to mention concrete pools. B(1) already defines conductive pool shells.

New FPN added as an explanatory reference to help quickly locate the requirements for pools with encapsulated rebar.

B(1)(b) was a fragment. It was revised as a complete sentence followed by a List.

B(2)(b) was originally formatted as a fourth level subdivision. Only three are allowed. It was reformatted as a List under Level 3.

B(7)(a) and (b) were fragments. These two items and part of the text of (7) were reformatted as a set of three Exceptions.

Some editorial revisions were made to bring text into compliance with the formatting requirements for mandatory rules (shall, shall be etc.).

Panel Meeting Action: Accept in Principle

Revise as follows:

680.26 Equipotential Bonding.

(A) Performance. The equipotential bonding required by this section shall be installed to reduce voltage gradients in the pool area ~~as prescribed~~.

(B) Bonded Parts. The parts specified in 680.26(B)(1) through (B)(7) shall be bonded together using solid copper conductors, insulated covered, or bare, not smaller than 8 AWG or with rigid metal conduit of brass or other identified corrosion-resistant metal. Connections to bonded parts shall be made in accordance with 250.8. An 8 AWG or larger solid copper bonding conductor provided to reduce voltage gradients in the pool area shall not be required to be extended or attached to any remote panelboard, to service equipment, or electrodes.

(1) Conductive Pool Shells. Bonding to conductive pool shells shall be provided as specified in 680.26(B)(1)(a) or 680.26(B)(1)(b). Poured concrete, pneumatically applied or sprayed concrete, and concrete block with painted or plastered coatings ~~are~~ shall all be considered conductive materials due to water permeability and porosity. Vinyl liners and fiberglass composite shells ~~are~~ shall be considered to be non-conductive materials.

a. Structural Reinforcing Steel. Unencapsulated structural reinforcing steel ~~(rebar)~~ shall be bonded together by steel tie wires or the equivalent. Where ~~For~~ structural reinforcing steel is encapsulated in a nonconductive compound, a copper conductor grid shall be installed in accordance with~~, see~~ 680.26(B)(1)(b).

b. Copper Conductor Grid. A copper conductor grid shall be provided and shall comply with the following conditions:

(1) Be constructed of minimum 8 AWG bare solid copper conductors bonded to each other at all points of crossing.

(2) Conform to the contour of the pool and the pool deck.

(3) Be arranged in a 300 mm (12 in.) by 300 mm (12 in.) network of conductors in a uniformly spaced perpendicular grid pattern with a tolerance of 100 mm (4 in.).

(4) Be secured within or under the pool no more than 150 mm (6 in.) from the outer contour of the pool shell.

(2) Perimeter Surfaces. The perimeter surface shall extend~~s~~ for 1 m (3 ft) horizontally beyond the inside walls of the pool. ~~This~~ and shall include~~s~~ unpaved surfaces as well as poured concrete and other types of paving. Bonding to perimeter surfaces shall be provided as specified in 680.26(B)(2)(a) or 680.26(B)(2)(b), and shall be attached to the pool reinforcing steel or copper conductor grid at a minimum of four (4) points uniformly spaced around the perimeter of the pool. For non-conductive pool shells, bonding at four points shall not be required.

(a) Structural Reinforcing Steel. Structural reinforcing steel shall be bonded In accordance with 680.26 (B)(1)(a).

(b) Alternate Means. Where structural reinforcing steel is not available or is encapsulated in a nonconductive compound, copper conductor(s) shall be utilized where the following conditions are met:

(1) At least one minimum 8 AWG bare solid copper conductor ~~is~~ shall be provided.

(2) The conductor(s) shall follow the contour of the perimeter surface.

(3) Only listed ~~approved~~ splices shall be permitted.
(4) The required ~~If only a single~~ conductor ~~is provided it~~ shall be 450 to 600 mm (18 to 24 in.) from the inside walls of the pool.
(5) The required conductor shall be secured within or under the perimeter surface 100 to 150 mm (4 to 6 in.) below the subgrade.
(3) Metallic Components. All metallic parts of the pool structure, including reinforcing metal not addressed in 680.26(1)(a), shall be bonded. Where reinforcing steel is encapsulated with a nonconductive compound, ~~it~~ the reinforcing steel shall not be required to be bonded.
(4) Underwater Lighting. All metal forming shells and mounting brackets of no-niche luminaires shall be bonded.
Exception: Listed low-voltage lighting systems with nonmetallic forming shells shall not require i~~ng~~ bonding.
(5) Metal Fittings. All metal fittings within or attached to the pool structure shall be bonded. Isolated parts that are not over 100 mm (4 in.) in any dimension and do not penetrate into the pool structure more than 25 mm (1 in.) shall not require bonding.
(6) Electrical Equipment. Metal parts of electrical equipment associated with the pool water circulating system, including pump motors and metal parts of equipment associated with pool covers, including electric motors, shall be bonded.
Exception: Metal parts of listed equipment incorporating an approved system of double insulation shall not be bonded.
(a) Double-Insulated Water Pump Motors. Where a double-insulated water-pump motor is installed under the provisions of this rule, a solid 8 AWG copper conductor ~~that is~~ of sufficient length to make a bonding connection to a replacement motor shall be extended from the bonding grid to an accessible point in the ~~motor~~ vicinity of the pool pump motor. Where there is no connection between the swimming pool bonding grid and the equipment grounding system for the premises, this bonding conductor shall be connected to the equipment grounding conductor of the motor circuit.
(b) Pool Water Heaters. For pool water heaters rated at more than 50 amperes and having specific instructions regarding bonding and grounding, only those parts designated to be bonded shall be bonded and only those parts designated to be grounded shall be grounded.
(7) Metal Wiring Methods and Equipment. Metal-sheathed cables and raceways, metal piping, and all fixed metal parts shall be bonded.
Exception No. 1: Those separated from the pool by a permanent barrier shall not be required to be bonded.
Exception No. 2: Those greater than 1.5 m (5 ft) horizontally of the inside walls of the pool shall not be required to be bonded.
Exception No. 3: Those greater than 3.7 m (12 ft) measured vertically above the maximum water level of the pool, or as measured vertically above any observation stands, towers, or platforms, or any diving structures shall not be required to be bonded.
Panel Statement: The revised text more clearly presents the requirements and meets the intent of the submitter.
The panel has removed the word "(rebar)" from 680.26(B)(1)a to clarify that welded wire mesh can be included in the term "structural reinforcing steel" where acceptable to the authority having jurisdiction.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-93 Log #1662 NEC-P17 **Final Action: Accept in Principle (680.26)**

Submitter: Brian Myers, IBEW Local Union 98
Comment on Proposal No: 17-114a
Recommendation: The proposal should be accepted in principle as follows:
Relocate existing Fine Print Notes as positive text, editorially revised to comply with the NEC Manual of Style.
~~FPN No. 1~~: Poured concrete, pneumatically applied or sprayed concrete, and Concrete block with painted or plastered coatings ~~are all~~ shall be considered conductive materials due to water permeability and porosity.
~~FPN No. 2~~: Vinyl liners and fiberglass composite shells ~~are~~ shall be considered to be nonconductive materials.
Substantiation: It is noted that the action of CMP 17 on Proposal 17-114a is in essence the "panel action" for Proposal 17-115.
Panel Meeting Action: Accept in Principle
Panel Statement: Refer to the panel action and statement on Comment 17-92.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-94 Log #1685 NEC-P17 **Final Action: Reject (680.26)**

Submitter: Donald W. Zipse, Electrical Forensics, LLC
Comment on Proposal No: 17-114a
Recommendation: Remove 680.26 ~~Equipotential~~ Bonding.
~~(A) Performance. The equipotential bonding required by this section shall be installed to reduce voltage gradients in the pool area.~~
Substantiation: See technical paper attached to comment on 17-99 titled: "Equipotential Planes, A Figment of the Imagination"
The Code Making Panel is to be commended on taking steps to make swimming pools safer. However, there needs to be MORE accomplished.
The Panel statement made on Proposal # 17-116 states, "The Code provides for the establishment of an equipotential bonding grid to limit voltage gradients within the pool area. It is not the intent of the equipotential bonding grid to limit voltage gradients to 0 V but to reduce them."
This gives the pool owner a false sense of security. What if the so-called Equipotential Plane still allows a swimmer to receive electric shock? Should there be a voltage level set? I think NOT. The term Equipotential Plane needs to be eliminated.
Cows have approximately the same internal resistance as humans. Wet skin, hand-to-hand 500 ohms or cow's feet to mouth the same 500 ohms. We are measuring sufficient electric current to disrupt milk production when cows are standing on an Equipotential Plane that is suppose to reduce the potential. Ha, Ha!
What justification is there for using the so-called term Equipotential Plane? What testing has been done? Mr. Lawrence C. Neubauer and Donald W. Zipse have tested many dairies – same electrical setup as swimming pools – and have found that Equipotential Plane should be eliminated as the Wisconsin dairymen have done – remove Equipotential Planes from the NEC.
You need to re-think the underwater fixtures, luminaries since if they have a conductive frame and thus are required to be connected to the equipment grounding conductor, the isolation of the Equipotential Plane is thus voided.
Substation can be found in the peer reviewed technical paper referenced above.
Panel Meeting Action: Reject
Panel Statement: The panel does not agree with the submitter's substantiation based on the testing data provided as a part of the substantiation of Comment 17-98.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.
Comment on Affirmative:
CRIVELL, P.: Eliminating voltage gradients by bonding is not technically possible. If there is any current flow across the bonding grid or mat, some voltage gradient will exist.

17-95 Log #1668 NEC-P17 **Final Action: Reject (680.26, FPN 2)**

Submitter: Joseph Mendonca, Rochester, NH
Comment on Proposal No: 17-114a
Recommendation: Revise as follows:
FPN No. 2: Vinyl liners and fiberglass composite shells (which are manufactured with only noncondutive materials)\
~~are considered to be nonconductive materials~~.
Substantiation: Fiberglass composite shells can be made of conductive material as well as nonconductive material.
Panel Meeting Action: Reject
Panel Statement: The current manufactured material is not identified as conductive or nonconductive. The submitter has not provided substantiation as to the existence of conductive material used in the manufacture of vinyl liner or composite shell swimming pools.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-96 Log #214 NEC-P17 **Final Action: Accept (680.26(A))**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 17-115a
Recommendation: It was the action of the Technical Correlating Committee that this action be reconsidered and correlated with the action taken on Proposal 17-114a. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction to provide correlation. See panel action on Comment 17-92.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-97 Log #2217 NEC-P17 **Final Action: Reject**
(680.26(B)(2))

Submitter: Jeff Fitzloff, State of Idaho Division of Building Safety
Comment on Proposal No: 17-114a
Recommendation: Revise text to read as follows:
(2) Perimeter Surfaces. Extends for 1 m (3 ft) horizontally beyond the inside walls of the pool. Includes ~~unpaved surfaces as well as~~ poured concrete and other types of paving. Bonding for perimeter surfaces shall be provided as specified in 680.26(B)(2)(a) or 680.26(B)(2)(b), and attached to the pool reinforcing steel on copper conductor grid. No perimeter areas will require equipotential bonding if the surface of the area is non conductive or encapsulated in epoxy. ~~at a minimum of four (4) points uniformly spaced around the perimeter of the pool. For nonconductive pool shells, bonding at four points shall not be required.~~ [ROP 17-114a]
Substantiation: The wording in the proposal would require that surfaces that would not be conductive have equipotential bonding. The comment that I have supplied would recognize that surfaces can be coated to insulate them and would be similar to double insulated appliances.
Panel Meeting Action: Reject
Panel Statement: The conductivity of a perimeter surface is not dependent entirely on the material. Weather and other conditions can impact the conductivity.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-98 Log #802 NEC-P17 **Final Action: Accept**
(680.26(C) (New))

Submitter: Frank C. Lambert, Georgia Tech/NEETRAC
Comment on Proposal No: 17-122
Recommendation: Proposal 17-122 should have been adopted in its entirety.
Substantiation: Extensive testing clearly substantiates that the potential for voltage gradient is present in pools where the pool water is not bonded via metal parts in the pool. With this knowledge and confirmation of a voltage gradient hazard, the CMP must address the issue. Test results, handed out at the Proposal Meeting, show that the presence of a touch potential exists in all areas of the pool and that the proposed solution for bonding pool water will essentially reduce that potential to zero. While the proposed solution may not be the only solution, it meets the NEC criteria of providing minimum protection for the public. The test report in its entirety has been submitted to this Comment for further review by the Panel Members.
Typically, pool water is considered electrically conductive due to dissolved chemicals. Although the conductivity will vary with the temperature, the change in conductivity for all practical purposes is not a factor in the application of a proposed solution. Again, the proposed solution meets the NEC criteria of providing minimum protection for the public and should be viewed as a protection measure compared to having no protection.
In the proposed solution, the size of bonding conductor is not specified. This is in line with several Bonded Parts described in 680.26(B). In 680.26(B)(1), (B)(2), (B)(3), and (B)(5), use of a minimum of #8 AWG size wire is implied as specified in 680.26(B)(4) and 680.26(C).
In the stray voltage field, ground currents are rarely determined due to measurement difficulties and inaccuracies. On the other hand, resulting voltage gradients (stray voltages), however, are very easy to measure and can be directly used to analyze stray voltage problems and their mitigation. As evidenced by the test report, the proposed solution is based on such stray voltage measurements around a swimming pool.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 9 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:
CRIVELL, P.: Optimum solution is to eliminate stray currents causing the voltage gradient. Code Panel 17 should address the cause and methods for elimination of stray currents. Conductive metallic objects in chlorinated water will result in electrolytic coupling issues.

17-99 Log #1190 NEC-P17 **Final Action: Accept**
(680.26(C) (New))

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 17-122
Recommendation: Accept Proposal 17-122.
Substantiation: Testing done by a National Laboratory (NEETRAC) clearly substantiates that the potential for shock hazard is present in pools where the pool water is not bonded via metal parts in the pool. With this knowledge and confirmation of a potential shock hazard, CMP-17 must address the issue. NEETRAC, in its proposal, recommended a solution for bonding pool water. The proposed solution was tested and worked successfully. While the proposed solution may not be the only solution, it meets the NEC criteria of providing minimum protection for the public.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-100 Log #1766 NEC-P17 **Final Action: Reject**
(680.26(C) Exception and 680.26(C)(1) Exception)

Submitter: Michael Cole, MRC Electric
Comment on Proposal No: 17-126
Recommendation: Delete this Exception:
~~Exception: The equipotential bonding grid shall not be required to be installed under the bottom of or vertically along the walls of vinyl lined polymer wall, fiberglass composite, or other pools constructed of nonconductive materials.~~
Substantiation: a. ALL insulators, even a perfect insulator, will pass some amount of alternating current because of capacitance and capacitive reactance. In the event of a utility company primary ground fault in the vicinity of a nonmetallic in ground swimming pool, lack of an equipotential grounding and bonding grid around the walls and floor would allow the ground fault to force some amount of alternating current to flow through the capacitive reactance of the swimming pool wall.
If you have to ask how much current, you might as well be asking how much a yellow jacket sting hurts.
A capacitor consists of 2 electrical conductors separated by an insulator. The water inside a nonmetallic pool, the allegedly insulating wall, and the slurry backfill forms such a device. A linear capacitor stores charge in proportion to applied voltage, what is known as capacitance. Since alternating current constantly reverses the voltage charge (current) also flows in constantly reversing direction.
b. Water will increase the capacitance of waterproof insulation to the point that a variable frequency drive will not work. A case in point was a variable frequency drive circuit with THWN wire in PVC conduit for about 30 ft in the ceiling of a food plant. The motor would work fine if the drive was bypassed which proved that the 60 Hertz and direct current insulation resistance was OK. However, at the carrier frequency (such as 2,000 or 4,000 Hertz) the wiring capacitance created a poor excuse for a 480 volt short circuit.
c. I also have first hand experience with the kind of havoc that occurs when a 30 or 40 ft long 120 volt underground electrical line is leaking 7 amperes during a DROUGHT! The result is a nasty tingle voltage of 40 to 80 volts to correctly grounded objects because the current flow partially energized concrete floors and metal drainpipes. Knowing what their electric bills were during wet months, they did not need to install an electric driveway deicing system.
As our electrical infrastructure ages, these kinds of problems will occur more frequently.
d. In his book, Old Electrical Systems, David Eli Shapiro relates how a shower with a nonmetallic drain pipe had electricity flowing through the slime on the inside of the pipe. He never did locate the source of current but there are a number of possible ways for current to enter. One of them is through the joints of clay tile pipe. I also am familiar with a mobile home park that has tree and grass root penetration of the o-ring joints of gasketed 3034 PVC sewer pipe. This means that even with a modern sewer system electricity can enter the drain pipes and that sanitary engineers and districts need to require copper foil around the joints of PVC sewer pipe.
If something CANNOT go wrong, it will go wrong anyways.
e. If this ill advised exception continues into the 2008 National Electrical Code, I will just simply swear off swimming pools.
Panel Meeting Action: Reject
Panel Statement: The panel's intent is not to require an equipotential bonding grid to be installed under the bottom of, or vertically along the walls of vinyl lined polymer walls, fiberglass composite or other pools constructed of nonconductive material. However, the change made by the panel action on Comment 17-98 addresses the submitter's concerns.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-101 Log #1191 NEC-P17 **Final Action: Reject**
(680.32)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 17-135
Recommendation: Reject Proposal 17-135.
Substantiation: The submitter of the proposal did not provide adequate substantiation for this change. Technical or statistical data was not provided to document the existence of a problem. The current Code wording in 680.22(A)(5) amply covers the GFCI requirements. The change does not offer any additional protection for the public and in the case of pool pumps will require duplicate GFCI protection. In addition, requirements for pool pump

cords should be covered in the appliance standards and not in the NEC.
It is the Edison Electric Institute's (EEI/EL&P) position that the requirements for end-use electrical devices that are not installed as part of the permanent premises wiring system are best covered by appropriate product standards. It is not the National Electrical Code's intent or scope to set requirements for end-use electrical devices that would typically be purchased by the after market consumer. EEI/EL&P supports the entire electrical safety system that integrates product standards, installation standards, product testing and evaluation, electrical inspection, manufacturer's products, qualified electrical installation and maintenance, electric supply system characteristics, and the owner's use and operation. Covering product standards in the National Electrical Code installation standard could negate the responsibility of the appropriate product standard and adversely impact the entire process.

The integrity of the electrical safety system is anchored in the systematic integration of the National Electrical Code, installation inspection, product safety standards and product testing. If non-premises end-use product safety issues are usurped by the National Electrical Code, the product safety standard process will be weakened resulting in the entire process being weakened. In addition, since non-premises end-use products are not normally in place during the inspection process, enforcement of such a requirement under the NEC would be impossible.

Panel Meeting Action: Reject
Panel Statement: The panel intends to protect against shock hazards due to damaged cords in this environment. Since this is for a storable pool pump, there is no guarantee that GFCI protection will be available.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 9 Negative: 1
Ballot Not Returned: 1 Gill, C.
Explanation of Negative:

HIRSCH, B.: The EEI/EL&P Companies believe the current Code wording amply covers the GFCI requirements. The change does not offer any additional protection for the public and in the case of cord and plug connected pool pumps will require the use of duplicate GFCI protection both at the receptacle and in the cord.. The proposal submitter did not provide substantiation for the change but simply that the proposal was placed on hold by the TCC during the 2005 Comment cycle due to being new material. In addition, requirements for pool pump cords should be covered in the appliance standards and not in the NEC.
It is the Edison Electric Institute's position that the requirements for end-use electrical devices that are **not** installed as part of the permanent premises wiring system are best covered by appropriate product standards. It is not the National Electrical Code's intent or scope to set requirements for en
d-use electrical devices that would typically be purchased by the after market consumer.
The Edison Electric Institute supports the entire electrical safety system that integrates product standards, installation standards, product testing and evaluation, electrical inspection, manufacturer's products, qualified electrical installation and maintenance, electric supply system characteristics, and the owner's use and operation. Covering product standards in the National Electrical Code could negate the responsibility of the appropriate product standard and adversely impact the entire process.
The integrity of the electrical safety system is anchored in the systematic integration of the National Electrical Code, installation inspection, product safety standards and product testing. If non-premises end-use product safety issues are usurped by the National Electrical Code, the product safety standard process will be weakened resulting in the entire process being weakened. In addition, since non-premises end-use products are not normally in place during the inspection process, enforcement of such a requirement under the NEC would be impossible.

17-102 Log #607 NEC-P17 **Final Action: Reject**
(680.43(E))

Submitter: Jim Schmer, Boise City Electrical Department
Comment on Proposal No: 17-150
Recommendation: (E) Methods of Bonding.
(3) The provisions of copper bonding jumper, insulated, covered, or bare, not smaller than 8 AWG solid or #6 AWG stranded insulated green in color.
Substantiation: With the amount of vibration from the control panel and motor's and such that goes on, the solid doesn't always have a solid connection and with stranded Insulated conductor the amount of vibration whether small or large would not come loose. Also in the confines of the area of a self-contained Hot tub or Spa there is not enough room to store chlorine under the skirting of the Hot tub. What Chlorine that is in the Hot tub, the fumes would disipate before they got any where anyhow. Besides Chlorine is lighter than air.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its original reason for rejection. The submitter's substantiation has not resolved this concern.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-103 Log #404 NEC-P17 **Final Action: Reject**
(680.43(F)(1) and (2))

Submitter: Daniel Leaf, Seneca, SC
Comment on Proposal No: 17-151
Recommendation: Accept proposal.
Substantiation: The proposal would correlate with 680.55(B) which uses the phrase "exposed noncurrent-carrying metal."
Panel Meeting Action: Reject
Panel Statement: There is no need to correlate with 680.55(B), as 680.43(F)(1) and (F)(2) identify types of equipment to be grounded and 680.55(B) identifies the methods of grounding.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-104 Log #539 NEC-P17 **Final Action: Accept in Principle**
(680.52(B)(2)(b))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-157
Recommendation: Accept the proposal as revised:
~~Where the junction box is supported only by the conduit~~ A junction box shall be permitted to be supported in accordance with 314.23(E) and (F). The conduit**s** shall be of...(remainder unchanged).
Substantiation: The word "conduit" is singular and infers enclosures may be supported by one conduit, and since Chapter 6 may modify Chapters 1 through 4 it is unclear whether the requirements of 314.23(E) and (F) are intended to apply.
Panel Meeting Action: Accept in Principle
Revise 680.52(B)(2)(b) to read as follows:
(b) Underwater enclosures shall be firmly attached to the supports or directly to the fountain surface and bonded as required. Where the junction box is supported only by ~~the~~ conduit**s in accordance with 314.23(E) and 314.23(F),** the conduit**s** shall be of copper, brass, stainless steel, or other approved corrosion-resistant metal. Where the box is fed by nonmetallic conduit, it shall have additional supports and fasteners of copper, brass, or other approved corrosion-resistant material.
~~FPN: See 314.23 for support of enclosures.~~
Panel Statement: The revised text more clearly presents the requirement and meets the intent of the submitter. The FPN has been deleted, since the reference in the requirement is more specific.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-105 Log #524 NEC-P17 **Final Action: Reject**
(680.56(D))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-161
Recommendation: Accept as revised:
Where permanently connected to supply conductors connections with flexible cords shall be ~~permanent~~ in accordance with 110.14. ~~except that~~ Grounding type attachment plugs and receptacles...(remainder unchanged).
Substantiation: 110.14 is specific. "Permanent connection" is not defined; many permanent installations are cord-and-plug connected.
Panel Meeting Action: Reject
Panel Statement: The submitter's comment and original proposal misses the clear purpose of 680.56(D), as indicated by its title "Terminations" and by its context of precluding disconnection of the conductors of flexible cord from terminals of fixed or stationary cord-and-plug-connected equipment except at the interface subject to frequent handling and potential damage to the grounding path: the attachment plug and receptacle.

The submitter's proposed redirection to 110.14 includes general requirements addressing the coordination and integrity of electrical connections, but not to the capacity to render that connection incapable of separation. Per 110.1, 110.14 general requirements are already inherently applicable; 110.14 applicability is reiterated by 680.3.

Relative to the submitter's perception that "permanent connection" is not defined, the submitter is directed to the Scope of Article 100 regarding commonly defined general terms or commonly defined technical terms. Various terms expressing permanent connection (also including "conductors connected permanently", permanently joined", "connected by a permanent wiring method", "permanent, reliable electrical bond", "permanently attached leads", "permanently wired", etc.) are used throughout the National Electrical Code®.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-106 Log #1660 NEC-P17 **Final Action: Accept (680.71)**

TCC Action: The Technical Correlating Committee understands that the changes made in Comment 17-106 do not alter the changes made by the panel action on Proposal 17-85a with respect to the distance.
Submitter: Brian Myers, IBEW Local Union 98
Comment on Proposal No: 17-165
Recommendation: Continue to accept in principle, revised as follows:
Change 680.71 to read as follows:
Hydromassage bathtubs and their associated electrical components shall be on a ~~dedicated circuit~~ individual branch circuit(s) and protected by a readily accessible ground-fault circuit interrupter. All 125-volt, single-phase receptacles not exceeding 30 amperes and located within 1.5 m (5 ft) measured horizontally of the inside walls of a hydromassage tub shall be protected by a ground-fault circuit interrupter.
Substantiation: The term "dedicated circuit" is not defined in the NEC. However, the term "individual branch circuit" is defined. For example, an installer may interpret "dedicated" as primarily serving the hydromassage bathtub while also providing limited lighting in the area.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-107 Log #1800 NEC-P17 **Final Action: Accept in Principle (680.71)**

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 17-165
Recommendation: This proposal should have been accepted in principal and reworded as follows:
"...shall be on a ~~dedicated~~ branch circuit that has no other outlets and shall be protected by a readily accessible ground-fault circuit interrupter."
Substantiation: The term "dedicated circuit" is not defined, and actually means different things to different people - in varying contexts. In other locations in the NEC, such as in 210.11(C) where circuits are intended to be "dedicated" to specific types of equipment, rooms, or areas, the language used is "shall have no other outlets," which is the language upon which the language proposed in this comment is modeled." Article 620 uses the term "separate branch circuit," which is perhaps better than "dedicated branch circuit," but is also not defined. The defined term "individual branch circuit" does not work here unless the tub is completely self-contained and requires only one connection.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 17-106.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-108 Log #1882 NEC-P17 **Final Action: Reject (680.71)**

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 17-186
Recommendation: This proposal should be rejected.
Substantiation: The substantiation for this major change is "contractors are tapping in on hallway, living room and/or bedroom circuits without a violation." Well...so what? Is it unsafe? Requirements for circuiting an appliance should be driven by the load of the appliance in accordance with Article 220. Also, what is a dedicated circuit? Does the proponent mean "individual branch circuit"? And, why does the GFCI have to be readily accessible? Are people going to get injured if the GFCI is beneath the tub in an accessible, but not readily accessible, location? If the GFCI trips and the occupant is forced to leave the tub to reset it, isn't that a good thing?
Panel Meeting Action: Reject
Panel Statement: There is no Proposal 17-186, and the panel could not determine the intended proposal.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-109 Log #1953 NEC-P17 **Final Action: Reject (680.71)**

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-165
Recommendation: 1. Revise the first sentence as follows:
Hydromassage bathtubs and their associated electrical components shall be on a dedicated circuit and protected by a ground-fault circuit-interrupter.
2. Add the following sentence to 680.73 at the end:
Where the hydromassage bathtub is cord- and plug-connected, the receptacle shall be installed so that its face is within direct view and not more than 300 mm (1 ft) of a service access opening.
Substantiation: The proposed requirement for "readily accessible" is excessive, since this device will not need to be reached in an emergency. On the other hand we routinely see devices so well concealed that two flashlights and a mirror are needed to find them, and a contortionist is required to disconnect the tub. This language refers to a receptacle and not a GFCI device because the issue is the disconnect ability regardless of the type of device. Many tubs are protected by a GFCI circuit breaker, for example.
Panel Meeting Action: Reject
Panel Statement: With regard to the first item, GFCIs are required to be tested on a monthly basis and therefore must be accessible to be tested.
With regard to the second item, the recommendation is not specific as to whether the outlet is located internal or external to the access compartment.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-110 Log #215 NEC-P17 **Final Action: Accept (680.74)**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 17-166
Recommendation: The Technical Correlating Committee directs that the panel reconsider and clarify the panel action on this proposal by using mandatory language in accordance with the NEC Style Manual. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise 680.74 to read as follows:
680.74 Bonding. All metal piping systems and all grounded metal parts in contact with the circulating water shall be bonded together using a copper bonding jumper, insulated, covered, or bare, not smaller than 8 AWG solid. The bonding jumper shall be connected to the terminal on the circulating pump motor that is intended for this purpose. The bonding jumper shall not be required to be connected to a double insulated circulating pump motor. The 8 AWG or larger solid copper bonding jumper shall be required for equipotential bonding in the area of the hydromasage bathtub and shall not be required to be extended or attached to any remote panelboard, service equipment, or any electrode.
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action and has made the needed changes.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

ARTICLE 682 — NATURAL AND ARTIFICALLY MADE BODIES OF WATER

17-111 Log #1954 NEC-P17 **Final Action: Hold (682.14)**

TCC Action: The Technical Correlating Committee directs that this comment and Proposal 17-176 be reported as "Hold " consistent with Section 4.4.6.2.2 of the NFPA Regulations Governing Committee Projects. This comment introduces a conflict with 682.13 that attempts to be resolved through a new Exception that has not had adequate public review.
Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-176
Recommendation: Accept the proposal in principle. Accept the text as proposed, but insert the phrase "or other outlet" after "marked to designate which receptacle" in proposed (A), and insert an exception ahead of (A) as follows:
Exception: Equipment listed for direct connection and equipment anchored in place and incapable of routine movement caused by water currents or wind shall be permitted to be connected using wiring methods covered in 682.13.
Substantiation: This comment addresses equipment that might not be connected by flexible cord, as was pointed out in the panel statement. It also puts the live parts issue back on the table, as identified in the comment in the voting. The substantiation for the proposal as originally submitted remains valid.
Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-112 Log #435 NEC-P17 **Final Action: Accept in Principle (682.14(A))**

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-177
Recommendation: Accept revised.
The disconnecting means shall ~~be permitted to~~ consist of a circuit breaker, switch, or both, or other approved means, that simultaneously disconnects all ungrounded conductors of the circuit it supplies, and shall be ~~properly~~ suitably identified as to which structure or equipment it controls.

Substantiation: Since the panel rejected the proposal to specify a switch or circuit breaker, the proposed "or other approved means" will permit other types if acceptable to the AHJ. Simultaneous disconnection of ungrounded conductors should be specified so that no inference is made that such requirements elsewhere in the code are modified in this article. The phrase "shall be permitted" doesn't impose any requirement. It is noted that signs and outline lighting in fountains require a switch or circuit breaker disconnect per 600.6.
Panel Meeting Action: Accept in Principle
Revise 682.14(A) to read as follows:
(A) Type. The disconnecting means shall be permitted to consist of a circuit breaker, switch, or both that simultaneously opens all ungrounded circuit conductors, and shall be properly identified as to which structure or equipment it controls.
Panel Statement: The revised text more clearly presents the requirements and meets the intent of the submitter.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-113 Log #538 NEC-P17 **Final Action: Accept in Principle (682.14(A))**

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 17-177
Recommendation: Accept the proposal as revised:
The disconnecting means shall ~~be permitted to~~ consist of a circuit breaker(s), switch(es), or both, or other approved means, that simultaneously disconnects all ungrounded conductors of the circuit it supplies and shall be properly identified as to which structure or equipment it controls.
Substantiation: Since the panel did not want to limit disconnecting means to switches or circuit breakers, other types should be specifically required to be approved. Since Chapter 6 may modify other Code rules for simultaneous disconnection, it should be clearly required in this section.
Panel Meeting Action: Accept in Principle
Panel Statement: Refer to the panel action and statement on Comment 17-112.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

17-114 Log #1955 NEC-P17 **Final Action: Reject (682.30)**

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 17-178
Recommendation: Accept the proposal as submitted.
Substantiation: The proposal wording brings the relevant requirements forward so the reader does not need to query Part III of Article 553, and then 555.15, in order to know the requirements.
Panel Meeting Action: Reject
Panel Statement: The NEC Manual of Style does not prohibit the revisions made by the panel action on Proposal 17-178.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 10
Ballot Not Returned: 1 Gill, C.

ARTICLE 690 — SOLAR PHOTOVOLTAIC SYSTEMS

13-22 Log #682 NEC-P13 **Final Action: Accept (690)**

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 13-17
Recommendation: I agree with the Panel Action except the word "multi-conductor" should be changed to "multiconductor" in 690.35(D).
Substantiation: This is an editorial correction for consistency. Multiconductor is not hyphenated. In the 2005 NEC, the word "multi-conductor" is only used in Articles 690 and 810 and Annex D. The word "multiconductor" is used in 31 Articles, Chapter 9, and Annex B. In the 2008 preprint, "multi-conductor" only appears 7 times whereas "multiconductor" appears 142 times.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-23 Log #686 NEC-P13 **Final Action: Reject (690)**

TCC Action: The Technical Correlating Committee understands that the panel action to Reject this comment also results in the rejection of Proposal 13-17 as stated in the panel statement in this comment.
Submitter: Timothy M. Croushore, Allegheny Power
Comment on Proposal No: 13-17
Recommendation: These recommended corrections to Article 690 as recommended in the original proposal are intended to comply with the current NEC organization are as follows:
1. Please accept the original proposed modifications to 690.1 Scope as published in the ROP.
2. Please accept the original proposed modified Figure 690.1(N) as published in the ROP.
3. Please delete the definition of Interactive System, as it will now appear in Article 100. Please do not delete the definition of Hybrid System and Electrical Production and Distribution Network as proposed. The last two definitions are needed to explain Figure 690.1(B).
4. Please accept the modifications made in the original proposal to the definitions of Inverter Input Circuit as published in the ROP. The definition of this circuit should apply to Interactive, Hybrid and Stand-alone systems and not just interactive systems. The original definition of Inverter Output Circuit should remain as published in the 2005 NEC.
5. Please accept the modifications made in the original proposal to 690.3 Other Articles to correspond with the rewrite of Article 705. The proposed modifications are published in the ROP.
6. Please accept the modification made in the original proposal to the title of 690.5 DC Ground Fault Protection. Overcurrent Protection. This proposed change is to clarify that the requirement of 690.5 is for DC and not AC Ground Fault protection.
7. Please delete the complete title and text of (D) Utility-Interactive Inverters Mounted in Not-Readily-Accessible Locations of 690.13. All Conductors as recommended in the original proposal to correspond with the rewrite of Article 705.
8. Please delete the complete title and text of 690.54 Interactive System Point of Interconnection as recommended in the original proposal to correspond with the rewrite of Article 705. This information is included in Article 705.
9. Please do not delete the title and text of (B) Facilities with Utility Service and PV Systems of 690.56 Identification of Power Sources as recommended in the original proposal. These requirements should probably remain in Article 690.
10. Please delete all of Part VII. Connection to Other Sources and renumbering Part VIII, Storage Batteries accordingly as recommended in the original proposal to correspond with the rewrite of Article 705. The information on connection to other sources is now included in Article 705.
Substantiation: Code Making Panel 13 is to be commended for the fine job on the work on the rewrite of Article 705 and revision to Article 690 and Article 692 as it appears in the NEC 2008 Draft.
This comment is a companion comment to the comment on Proposal 13-184 dealing with the rewrite of Article 705. There is also a companion comment to the comment on Proposal 13-71 dealing with comment on Article 692. It may be best to review the comment on Article 705, Proposal 13-184 before reviewing this comment and the one on 13-71.
It is recognized that the Solar Photovoltaic community has done great work in promoting and advancing the utility-interactive inverter technology both for photovoltaic installations. However, this technology can also be used for interconnection for other distributed generation sources. While there may be reluctance to remove the utility-interconnection requirements from Article 690 and 692, it is the best organization for the NEC to keep the nonspecific interconnection requirements in Article 705 scoped specifically for the interconnnection of electric power sources and any specific technology installation requirements such as photovoltaic and fuel cells in their separate Articles.
The main purpose of the original proposal is to consolidate nonphotovoltaic utility interconnection issues with distributed generation in Article 705 and photovoltaic-specific technical issues in Article 690. Having non-photovoltaic utility interconnection issues duplicated within Article 690 causes confusion with Article 705 that is intended to deal with utility interconnection issues with all distributed generation sources.
The intent of this comment on the original proposal is to clarify and correct the issues in Article 690 based on the rewrite of Article 705 and on the affirmative comments as published in the Report on Proposals suggested by the members of CMP-13. The original proposal as published in the ROP was used to identify the changes as originally proposed.
Panel Meeting Action: Reject
Panel Statement: The panel rejects the proposal in order to satisfy the intent of the original panel action on the proposal by keeping Article 690 intact while transferring selected language related to interconnection to Article 705.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-24 Log #1178 NEC-P13 **Final Action: Reject**
(690)

TCC Action: The Technical Correlating Committee understands that the panel action to Reject this comment also results in the rejection of Proposal 13-17 as stated in the panel statement in this comment.
Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 13-17
Recommendation: Accept Proposal 13-17.
Substantiation: Proposal 13-184 establishes a location in Article 705 to locate the common interconnection requirements that apply to all electric power production sources operating in parallel with a primary source of electricity. These requirements are not unique to photovoltaic systems and should be relocated to Article 705 and removed from Article 690. This action is a necessary step towards standardization of interconnection requirements and improves the usability of the NEC.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-23.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:
HORNBERGER, B.: I agree with the panel action, however the panel discussed recommending that a Task Group be formed to review the redundant "Point of Connection" requirements for PV in 690, Fuel Cells 692 and Interconnected Electric Power Sources 705. There is no mention of this in the panel statements. The panel harmonized most of these requirements through their actions on comments 13-77, 13-97, and 13-262. Photovoltaic and Fuel Cell systems are "Interconnected Electric Power Sources", when they operate in parallel with another supply source. Article 705 should apply. Point of connection requirements in Articles 690 and 692 should only contain "special" considerations that pertain to the specific power source technology.

13-25 Log #1704 NEC-P13 **Final Action: Accept**
(690)

TCC Action: The Technical Correlating Committee understands that the panel action to Accept this comment also results in the rejection of Proposal 13-17.
Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-17
Recommendation: The PV Industry Forum agrees with the Panel Action to reject the proposal as it applies to Article 690 and also agrees with the Comments by Bower, Kranstins, and Zgonena.
Substantiation: Neither the PV Industry, the electrical installer industry, the inspector community, nor the user community have had time to fully digest and analyze the impacts of this far-reaching proposal. A working group drawn from these groups should be convened to prepare a complete proposal for the 2011 code cycle.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 13-23.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-26 Log #2198 NEC-P13 **Final Action: Reject**
(690)

TCC Action: The Technical Correlating Committee understands that the panel action to Reject this comment also results in the rejection of Proposal 13-17 as stated in the panel statement in this comment.
Submitter: Kenneth Krastins, Plug Power, Inc. / Rep. US Fuel Cell Council
Comment on Proposal No: 13-17
Recommendation: Reject the proposed change.
Substantiation: The panel acknowledged the value of such a proposal and accepted this proposal in principle to permit public comment of the proposal. Comments have been received and will be reviewed further at the CMP-13 ROC meeting in November. But, feedback to this point indicates that to adequately address the concerns of a change of this magnitude and craft language that will neither omit nor introduce wording that will compromise safety for the affected industries that a working group will need to convene to provide a comprehensive proposal for the 2011 NEC. The proposal should be rejected by the panel to ensure that the changes indicated in the 2008 NEC ROP are not inadvertently included in the final publication.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 13-23.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-27 Log #86 NEC-P13 **Final Action: Accept in Principle**
(690 and 690.50 (New))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-18
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal since 250.120(C) deals with equipment grounding conductors, not equipment bonding jumpers. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-70.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:
BOWER, W.: I refer to my ballot comment on Comment 13-70 to clarify the title of the new 690.46 to read "Array Equipment Grounding Conductors Installation" to agree with the intent and structure of 250.120 titles.

13-28 Log #1706 NEC-P13 **Final Action: Hold**
(690.5)

TCC Action: The Technical Correlating Committee understands that in the panel Statement, Proposal 13-22 was not held.
Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-22
Recommendation: The original Proposal should be accepted as the Panel Action indicates. A revision is made to EX 2 as follows and a FPN is added for clarity:
Exception 2: PV arrays mounted on other than dwelling units shall be permitted without ground-fault protection if each equipment-grounding conductor, the grounded circuit conductor, and the dc grounded conductor-to-ground bonding conductor has an ampacity of at least 2.8 times the module rated short-circuit current. The ampacity in the equipment-grounding conductors shall be adjusted for the conditions of use including temperature and conduit fill where applicable. No increase in size is required if circuit conductors are oversized.
FPN to EX 2. Where the system and equipment does not employ a ground fault detection device that interrupts the fault current, the equipment-grounding conductors, grounded circuit conductors and the dc grounded conductor-to-ground bonding conductor can carry ground-fault currents continuously, and these currents can be insufficient to cause operation of any overcurrent devices. The equipment-grounding conductors should have conditions-of-use adjustment factors applied.
Substantiation: Many systems will employ equipment that meets the basic requirements of 690.5. See attached explanatory materials.
The revision to EX 2 clarifies the exact ampacity requirement of the equipment grounding conductors, grounded circuit conductors, and the dc system ground-bonding conductor as 2.8 times the module rated short-circuit current and points out that the ampacity should be adjusted for conditions of use, since, under fault conditions, they may have to carry the fault currents continuously where the fault currents are insufficient to operate any overcurrent devices. All conductors that may be subject to these higher ground fault currents are required to be oversized. Note this is not an issue of voltage drop or conductor size limiting the operation of overcurrent devices, it is a problem of insufficient, although somewhat larger than normal, over currents. The FPN is added for clarity.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Hold
Panel Statement: This comment was held because it would introduce a concept that has not had public review by being included in a related proposal as published in the Report on Proposals. Proposal 13-22 was not held.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:
BOWER, W.: I agree with the proposed changes and new language from CMP 5 as shown in comment 13-29, however the language in (B) still needs minor improvement to avoid ambiguity. See My Affirmative with Comment on 13-29.

13-29 Log #287 NEC-P13 **Final Action: Accept**
(690.5 Exception No. 2, 690.45)

TCC Action: The Technical Correlating Committee understands that the portion of the comment recommendation on 690.45 is a comment on Proposal 13-49.
Submitter: Code-Making Panel 5,
Comment on Proposal No: 13-22
Recommendation: CMP-5 recommends revising Exception No. 2 to reference 690.45 for equipment grounding conductor sizing requirements.

Revise Exception No. 2 to 690.5 as follows:

"Exception No. 2: PV arrays installed at other than dwelling units shall be permitted without ground-fault protection where the equipment grounding conductors are sized in accordance with 690.45."

Revise 690.45 into a list format as follows:

"690.45 Size of Equipment-Grounding Conductor. Equipment grounding conductors for photovoltaic source and photovoltaic output circuits shall be sized in accordance with (A) or (B).

(A) Equipment-grounding conductors in photovoltaic source and photovoltaic output circuits shall be sized in accordance with Table 250.122. When no overcurrent protective device is used in the circuit, an assumed overcurrent device rated at the photovoltaic rated short-circuit current shall be used in Table 250.122. Increases in equipment-grounding conductor size to address voltage drop considerations shall not be required. ~~If equipment grounding conductors sized per 690.5(A) Exception 2 are used, the above sizing requirements are not to be used.~~ The equipment-grounding conductors shall be no smaller than 14 AWG.

(B) For other than dwelling units where ground-fault protection is not provided in accordance with 690.5(A) through (C), each equipment grounding conductor shall have an ampacity of at least two (2) times the temperature and conduit fill corrected circuit conductor ampacity."

Add a new FPN following the revision to this section (B) as follows:
"FPN: The short circuit current of photovoltaic modules and photovoltaic sources is just slightly above the full load normal output rating. In ground fault conditions, these sources are not able to supply the high levels of short-circuit or ground-fault currents necessary to quickly activate overcurrent devices as in typical AC systems. Protection for equipment grounding conductors in photovoltaic systems that are not provided with ground-fault protection is related to size and withstand capability of the equipment grounding conductor, rather than overcurrent device operation."
Substantiation: 690.45 already provides the minimum sizing requirements for equipment grounding conductors. From an NEC usability standpoint, all such sizing requirements should be provided in this section. The proposed Exception No. 2 to 690.5 as adjusted, would provide the necessary correlation with 690.45 that would now include under this revision a sizing requirement that is in excess of current EGC sizing requirements contained in 690.45 and 250.122 for specific reasons related to the performance of this special equipment.
The proposed revisions to 690.45 are also needed for proper correlation.
Substantiation provided indicated that the amount of short-circuit current produced from solar photovoltaic equipment is slightly higher than the normal output current levels. In ground fault conditions, solar photovoltaic equipment is not able to supply the high levels of short-circuit or ground-fault currents necessary to quickly activate overcurrent devices as in typical AC systems. Protection for equipment grounding conductors in photovoltaic systems that are not provided with ground-fault protection is related to size and withstand capability of the equipment grounding conductor, rather than overcurrent device operation. This information is provided in a new FPN following the new equipment grounding conductor sizing provisions. The FPN will provide useful information for users describing the unique conditions that warrant increased equipment grounding conductor sizes where ground-fault protection is not provided.

This comment has been balloted through CMP-5 with the following ballot results:

15 Eligible to Vote
13 Affirmative
1 Negative
1 Not Returned (W. Helfrich)

Mr. D. Mohla voted negatively stating: "Comment on these proposals should be separated as they pertain to different sections of the code and proposals.

I agree with the revised Exception No. 2 proposed by CMP-5 which refers equipment grounding conductor sizes to 690.45, where sizing belongs.

I do not agree with all the revisions to 690.45 proposed by CMP-5.

There is no basis or justification for inclusion of 690.45(B) or a FPN requiring an exception from ground fault protection when equipment grounding conductor size is twice the phase conductors. Please see the objection of the Technical Correlating Committee on Proposal 13-22 (690.5) which reinforced basic requirements contained in 250.122 that EGC sizing is based on overcurrent corrective devices.

See the negative vote by Mr. Swayne on Proposal 13-.22."

Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:

BOWER, W.: I agree with the proposed changes and the new language from CMP 5 however the new language is ambiguous. "For other than dwelling units where ground-fault protection is not provided in accordance with 690.5(A) through (C)." It should be changed to read "For other than dwelling units with rooftop installations where ground-fault protection is not provided in accordance with 690.5(A) through (C)". Without the clarification, the sentence could be interpreted as dwelling units that do not have ground-fault protection. Dwelling units with rooftop installations are required to have GFP.
Also, in Exception 2, change the term "PV" to "Photovoltaic" to be consistent with the rest of the code. Other editorial changes on 690.31(C), 690.56(B) and 690.72(B)(3), the only other places where the term PV is used would remove the undefined term from the code.

ZGONENA, T.: The word "or" needs to be inserted as follows to clarify the intent of Exception (B) as follows:
"For other than dwelling units "or" where ground-fault protection is not provided in accordance with 690.5(A) through (C)." As written this appears to be an "and" function which does not convey the intent. This does not only apply to dwellings without GFDI protection.

13-30 Log #1707 NEC-P13 **Final Action: Accept**
(690.5(A))

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-23
Recommendation: The original proposal should be accepted as submitted. The warning is already required by 690.5(C). Here is the original submission:

690.5(A) Ground-Fault Detection and Interruption. The ground-fault protection device or system shall be capable of detecting a ground-fault current, interrupting the flow of fault current, and providing an indication of the fault. Automatically opening the grounded conductor of the faulted circuit to interrupt the ground-fault current path shall be permitted. If a grounded conductor is opened to interrupt the ground-fault current path, all conductors of the faulted ~~source~~ circuit shall be automatically and simultaneously opened. Manual operation of the main PV dc disconnect shall not activate the ground-fault protection device or result in grounded conductors becoming ungrounded.
Substantiation: The Panel Actions and wording have created a conflict with UL Standard 1741 requirements and created a safety hazard as pointed out by Zgonena. The necessary safety warning is already required by 690.5(C). The original submission should be adopted.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-31 Log #1709 NEC-P13 **Final Action: Accept**
(690.7(A))

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-27
Recommendation: The PV Industry Forum agrees with and supports the Panel Action.
Substantiation: For Swayne: None of the basic PV module data is in the code. It is found on the module labels. Much of the information required to size the ac circuits connected to an inverter is found only in the inverter instruction manuals, not in the code. Inspectors throughout the country are starting to require all necessary information and calculations for code compliance on PV systems to be furnished with the permit applications. Also note that new PV module technologies such as thin films (three currently and more coming) will require that manufacturer's instructions be used to make code-required calculations. These technologies are addressed in the requirement, already in this section, to use the manufacturer's data.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-32 Log #1967 NEC-P13 **Final Action: Reject**
(690.7(A))

Submitter: Elliot Rappaport, Electro Technology Consultants
Comment on Proposal No: 13-27
Recommendation: Reject the proposal.
Substantiation: The proposed wording does not provide information to all who may have a need for it. The AHJ does not have access to instructions and must rely on code. If a module is replaced with one having a different coefficient, the maximum circuit voltage may change.
Panel Meeting Action: Reject
Panel Statement: The NEC recognizes labeling instructions as an enforceable Code requirement.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-34 Log #1711 NEC-P13 **Final Action: Accept in Principle (690.8(A)(1))**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-28
Recommendation: The PV Industry Forum agrees with and supports the Panel Action.
Substantiation: For Swayne:
Two multiplication factors of 1.25 (125%) are required on the module short-circuit current. The first 690.8(A)(1) deals with the fact that the module short circuit current may exceed the rated value (marked on the back of the PV module) for a period of three hours or more on clear sunny days. The second 125% required by 690.8(B)(1) is required to ensure that this higher current (the value from 690.8(A)(1)) does not result in conductors or overcurrent devices operating at more than 80% of rating.
Panel Meeting Action: Accept in Principle
Add a new FPN following 690.8(A) to read as follows:
FPN: Where the requirements of 690.8(A)(1) and 690.8(B)(1) are both applied, the resulting multiplication factor is 156 percent.
Panel Statement: The double-derating requirement is now clarified and addresses the affirmative comment expressed in the voting.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-33 Log #327 NEC-P13 **Final Action: Reject (690.10(A))**

Submitter: Albert Parry, City of Aspen/Pitkin County
Comment on Proposal No: 13-29
Recommendation: Leave section as originally written.
Substantiation: The code change proposer is stating that the pv alternate stand alone system should not be subject to the requirements of the code as to load capability.
When the system is used in a residential application it should be capable of powering all life safety systems concurrently and the largest piece of equipment as a minimum.
His change would treat off grid 5,000' duplex dwellings the same as a 200' cabin.
There is no sense in allowing the installation of a 13KW double oven on a 7KW system.
Panel Meeting Action: Reject
Panel Statement: The original proposal and the panel action produced identical language except for removal of "that may be." The proposal is to allow the original. The removal of "that may be" removes the future reference. This is not a life-safety issue.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-35 Log #1968 NEC-P13 **Final Action: Accept (690.10(A))**

Submitter: Elliot Rappaport, Electro Technology Consultants
Comment on Proposal No: 13-29
Recommendation: Delete "service" in the first sentence.
Substantiation: Not all buildings or structures are supplied by a "service" as defined in this code, but will have a disconnecting means.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-36 Log #87 NEC-P13 **Final Action: Accept (690.13)**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-32
Recommendation: The Technical Correlating Committee understands that the Panel Action on Proposal 13-31a modifies the Panel Action on this Proposal. The Technical Correlating Committee directs the panel to reconsider the use of the term "may" to be consistent with the NEC Style Manual. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Delete the first "may" and change the second "may" to "shall be permitted to." The text now reads: "…if operation of that switch, circuit breaker, or other device ~~may~~ leaves the marked, grounded conductor in an ungrounded and energized state.
Exception: A switch or circuit breaker that is part of a ground-fault detection system required by 690.5 ~~may~~ shall be permitted to open the grounded conductor when that switch or circuit breaker is automatically opened and indicated only as a normal function of the device in responding to ground faults."
Panel Statement: This action is now consistent with the NEC Style Manual.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-37 Log #1712 NEC-P13 **Final Action: Accept (690.13)**

TCC Action: The Technical Correlating Committee understands that the comment addresses a Code-Making Panel 13 proposal, not a Technical Correlating Committee proposal.
Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-31a
Recommendation: The PV Industry Forum proposes that this TCC proposal be rejected in favor of an acceptance of 13-32 (Log #2087).
Substantiation: All current-carrying conductors in a system should have disconnects or it would not be possible to connect or disconnect equipment for additions, repairs, or replacements. Disconnects can be bolted connections or terminals and do not necessarily have to be switches or circuit breakers. User-accessible switched disconnects should not be placed in grounded source circuit conductors.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-38 Log #1714 NEC-P13 **Final Action: Hold (690.13)**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-32
Recommendation: The PV Industry Forum agrees with and supports the Panel Action without the change suggested by the TCC in 13-31a Log CP 1301. An additional Exception #2 is proposed as follows:
Exception 2: A disconnecting switch shall be permitted in a grounded conductor if it is:
a. used only for PV array maintenance, and
b. accessible only by qualified persons.
Substantiation: The location and correction of ground faults in PV arrays may require that the ungrounded conductor be disconnected from the system and from ground during maintenance operations. This permissive allowance provides that a maintenance-only switch can be added to the system to facilitate such operations.
Panel Meeting Action: Hold
Panel Statement: The commenter has met the intent of Comment 13-37 with this change, but the material is new. The TCC request has been addressed in the panel action of Comment 13-36. This comment was held because it would introduce a concept that has not had public review by being included in a related proposal as published in the Report on Proposals. Only the comment is being held.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-39 Log #1716 NEC-P13 **Final Action: Reject (690.13)**

TCC Action: The Technical Correlating Committee understands the rejection of this comment is based on the substantiation in Comment 13-41 since rejection based on the acceptance of Comment 13-41 is a violation of Section 4.4.6.3 of the NFPA Regulations Governing Committee Projects.
Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-33
Recommendation: The PV Industry Forum agrees with and supports the Panel Action.
Substantiation: None given.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 13-41.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-40 Log #1956 NEC-P13 **Final Action: Accept in Principle (690.13)**

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 13-33
Recommendation: Accept the proposal in principle by using the text from the comment on affirmative vote: Add at the end, "The switch or circuit breaker shall indicate the presence of a ground-fault."
Substantiation: The submitter appreciates the panel statement because he was unaware the sentence was intended to be so applied. This comment implements the affirmative comment in the voting.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-41.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-41 Log #2291 NEC-P13 **Final Action: Accept (690.13)**

TCC Action: The Technical Correlating Committee understands that the comment addresses a Code-Making Panel 13 proposal, not a Technical Correlating Committee proposal.
Submitter: Todd Stafford, IBEW-NJATC / Rep. IBEW
Comment on Proposal No: 13-33
Recommendation: Revise text to read as follows:
690.13 All Conductors. Means shall be provided …and that switch or circuit breaker is automatically opened ~~and indicated~~ as a normal function of the device in responding to ground faults. The switch or circuit breaker shall indicate the presence of a ground fault.
Substantiation: The above revised text would perform the actual function and intent as noted by the panel statement. This action would clearly define that the ground fault would be indicated by the switch or circuit breaker.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-42 Log #1717 NEC-P13 **Final Action: Accept (690.14)**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-34
Recommendation: After careful review, the PV Industry Forum agrees with the Panel Action to reject the proposal, but for different reasons.
Substantiation: The requirements of 690.14 should apply to any main PV disconnect (either ac or dc) where the PV circuits (either ac or dc) penetrate the structure for the first time. The Code allows PV systems that are entirely outside the structure to penetrate the structure with ac output circuits such as the 690.14(D) systems (remotely mounted inverters) and future groups of AC modules (690.10). It appears that the provisions of 690.14 should, in general, apply to either the main dc PV disconnect or the main ac PV disconnect. Consider the PV system where all dc wiring and the inverter are outside the house, but the backfed load center is inside. This is a common configuration. There is no dc penetration of the house so 690.14 cannot apply to a main PV dc disconnect. However, we do have an ac penetration and 690.14 would apply to the ac disconnect at the point of penetration. The approval of the exact location of the disconnect (inside or outside) is left to the AHJ based on local jurisdictional preferences and usually follows the location of the utility service disconnect.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-43 Log #2435 NEC-P13 **Final Action: Accept (690.14(C))**

TCC Action: The Technical Correlating Committee understands that the comment addresses a Code-Making Panel 13 proposal, not a Technical Correlating Committee proposal.
Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-35a
Recommendation: The PV Industry, after careful study, suggests that this proposal from the TCC be rejected. The original language is correct.
Substantiation: All conductors in a system should have disconnects or it would not be possible to connect or disconnect equipment for additions, repairs, or replacements. Disconnects can be bolted connections or terminals and do not necessarily have to be switches or circuit breakers. User-accessible switched disconnects should not be placed in grounded source-circuit conductors.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-44 Log #2127 NEC-P13 **Final Action: Hold (690.19 (New))**

TCC Action: The Technical Correlating Committee understands that the panel action to "Hold" Comment 13-44 only applies to the Comment and not the Proposal.
Submitter: Robert H. Wills, Intergrid, LLC
Comment on Proposal No: 13-31a
Recommendation: As the submitter of panel actions 13-31a and 13-35a, I request that CMP-13 Reject both actions as they now stand, and also consider modifying 690.13 as follows:
690.13 All Conductors. Means shall be provided to disconnect all current-carrying conductors of a photovoltaic power source from all other conductors in a building or other structure. A switch or circuit breaker shall not be installed in a grounded conductor unless:
(1) ~~that~~ the switch or circuit breaker is part of a ground-fault detection system required by 690.5 and ~~that~~ the switch or circuit breaker is automatically opened and indicated as a normal function of the device in responding to ground faults, or,
(2) an optional switch or circuit breaker is provided in a grounded conductor for maintenance and troubleshooting, and only operable by qualified personnel.
FPN: The grounded conductor may have a bolted or terminal disconnecting means to allow maintenance or troubleshooting by qualified personnel.
Substantiation: I brought up the inconsistency in 690.13 and 690.14(C) that requires means for disconnecting all current-carrying conductors, then go on to say that grounded conductors should not be disconnected.
This resulted in panel actions 13-31a and 13-35a.
Further research has shown that the inconsistency stems from the addition of the second sentence of 690.13 in the 1990s when GFI language was added.
The Fine Print Note: "The grounded conductor may have a bolted or terminal disconnecting means to allow maintenance of troubleshooting by qualified personnel." was added at the same time.
The original version of Article 690 was written for the 1984 code cycle. One of the authors, Tom Key of Sandia Labs (now at EPRIPEAC) wrote in a paper included in the 1985 IEEE PV Specialists Conference Proceedings ("Grounding Considerations for Non-Isolated Photovoltaic Systems"): *Another frequently overlooked requirement is 690.13 which states that "means shall be provided to disconnect all current carrying conductors". This applies to the "grounded" conductor of the PV array whether it be the neutral or negative lead. The disconnecting means, if properly rated, can provide a very effective way to extinguish a line-to-ground fault in the array.*
The paper's Figure 2 showed a 2 pole disconnect opening both current-carrying conductors to the array, with the ground bond being on the inverter side of the switch.
Photovoltaic arrays typically contain many photovoltaic modules and interconnection wiring that can be subject to ground faults.
The requirement has changed over the years form opening all current-carrying conductors to ground fault interruption (which typically opens the grounded conductor) plus a FPN provision for bolted or terminal disconnect.
It is reasonable to consider the GFI equipment as now fulfilling the requirement that grounded conductors be disconnected (if there is a ground fault).
The FPN provision is, however, not a safe or sufficient substitute for a switched disconnect in large-scale photovoltaic systems. If multiple ground faults were to occur on different strings, the grounded conductors of the faulted strings would have to be disconnected in order to find the fault locations.
In doing so, the service person would have to open a bolted connection under load - a potentially hazardous activity.
An optional switched disconnect or circuit breaker in grounded conductors for service use only, and only operable by qualified personnel, satisfies the original intent of this section of the code and allows for the removal of a service hazard in large-scale systems.
Panel Meeting Action: Hold
Panel Statement: This comment was held because it would introduce a concept that has not had public review by being included in a related proposal as published in the Report on Proposals.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-45 Log #290 NEC-P13 **Final Action: Accept**
(690.31(A))

Submitter: Code-Making Panel 3,
Comment on Proposal No: 13-37
Recommendation: CMP-3 recommends accepting the panel action.
Substantiation: Note 4 in Table 11(B) does not require Class 2 circuits installed in a wet location to be in a metallic raceway, but can use any wiring method suitable for a Class 3 circuit in accordance with 725.52(A) or (B). Metallic raceways would provide added physical protection for the Class 2 circuit, as would nonmetallic wiring methods and Class 3 cables insulated at 300 volts in accordance with 725.82(G).

This comment has been balloted through CMP-3 with the following ballot results:

13 Eligible to Vote
10 Affirmative
2 Negative
1 Not Returned (J. Sleights)

Mr. L. Easter voted negatively stating: "This application should not be restricted to metallic raceways only. Nonmetallic raceways are an acceptable wiring method for this use when installed in accordance with their individual articles."

Mr. D. Pace voted negatively stating: "Installation of the cables should be driven by the requirements of the articles in the NEC covering conductors or cables, not by the fact that it is related to equipment under the scope of Article 690. The way the change is worded it would require that all conductors or cables associated with photovoltaic systems to be in a raceway. This would eliminate the use of cable tray, or other methods of installation that are not raceways. There are other circuits operating at similar voltages that do not require raceways. This is an overly restrictive requirement."

Mr. T. Guida voted affirmatively stating: "The actual proposed panel action in the proposal has changed the voltage from "greater than 50 volts" to "greater than 30 volts" and changed the requirement for the "circuit conductors to be installed in a raceway" to "be installed in a metallic raceway." CMP-3 recommends accepting the panel action of CMP-13 since installing circuits that are rated at greater than 30 volts into a metallic raceway is an acceptable method of providing separation and isolation of these circuits in a readily accessible location.

If these circuits were Class 2 (power limited) circuits used for control circuitry or similar uses and located in a wet location, then Note 4 would require the Class 2 circuit to be limited to not more than 30 volts continuous dc or wired with Class 3 wiring methods. Where the dc source is a pulsating dc of 10 to 200 Hz, then the voltage is limited to not more than 12.4 volts peak.

The proposed panel action is specifically stating the voltage is greater than 30 volts dc so installing a metallic raceway would be an acceptable wiring method for these circuits, even where the circuits exceed the values given in Table 11(B). Where the voltage and amperage values of Table 11(B) are exceeded, Class 1 wiring methods, such as metallic raceways, could and often would be an acceptable wiring method."

Mr. M. Sanders voted affirmatively stating: "The affirmative comment by Mr. Bowers should be taken into account, that with the unsubstantiated addition of the term "metallic" to the proposal, it makes the desired interconnections impossible, or at the least very impractical. In addition, the inclusion of the term "metallic" by the CMP-3 Task Group also lacks any technical substantiation, because the comment makes reference to 725.82(G), which contains no requirement in the present section that only metallic raceways to be used. In addition, 725.52,.54,.55,.56,.57, and.58 do not require metallic raceway either which is in accordance with Chapter 9 Table 11(B) asterisk and Note 4 and as stated in the CMP-3 Task Group comment."

Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-46 Log #1721 NEC-P13 **Final Action: Accept in Principle**
(690.31(A))

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-37
Recommendation: The PV Industry Forum disagrees with the Panel Action. The first two sentences of the section should not be combined as was accomplished by the panel action. They represent two separate requirements and when combined, an improper requirement is created. The new requirement to use metallic raceways in wiring PV modules will create safety issues. The comments by Bower address the issues. PV modules that have conduit-ready junction boxes have those boxes glued to the Tedlar back sheet of the modules. Installing a metallic raceway to such a box would very likely result is a detachment of the box from the module creating exposed conductors and a shock hazard. The module junction box has no equipment-grounding terminals, so it would be very difficult to maintain equipment-grounding for the metallic raceways, creating yet another safety hazard.

The added wording is as follows in its entirety:

Where photovoltaic source and output circuits operating at system voltages greater than 30 volts are installed in readily accessible locations, circuit conductors shall be installed in a ~~metallic~~ raceway.

Substantiation: For safety reasons, when using any photovoltaic module, it is critical that metallic raceways not be required.
Panel Meeting Action: Accept in Principle

In the ROP Draft, revise the second paragraph of 690.31(A) to read as follows: "Where photovoltaic source and output circuits operating at maximum system voltages greater than 30 volts are installed in readily accessible locations, circuit conductors shall be installed in a ~~metallic~~ raceway."

Panel Statement: Added the word "maximum" to clarify the requirement.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 15 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

STAFFORD, T.: My panel notes indicated that we talked abut removing the word "metallic" from the sentence, but there was no panel action in the ROC to show the removal of that word or panel statement to show why we should remove that word.

I still think by removing the word "metallic", you rely on an AHJ to interpret what type of raceway can be used in this situation. I think this is an excellent addition to the code, and what makes it important is that it focuses on "readily-accessible areas." These are areas that should have protection. These are areas that will be seen on a continual basis, either by the public, future customers, or installers and to allow a substandard installation does not help grow this industry. One interpretation of the term "readily-accessible" to many AHJs is an installation installed less than 8 ft. This would make the wiring method touchable and visible. This is a great opportunity to allow the installer/integrator/site selection person to make the correct decision;

(1) I can install the panels in a readily accessible location and adequately protect the public from exposure to potential shock, or

(2) I can install the panels in an accessible location out of reach from the public.

The comments about it being impossible to in
stall metallic conduit between panels is false.

There are a number of ways to approach the concern of not being able to ground those short sections of metallic conduit. I, as well as a number of installers that I know, have the ability to perform this task. It is not impossible.

If you do not include the world "metallic", what nonmetallic raceway with an acceptable temperature rating could be installed? This leads to ambiguity in the NEC, not clear concise code. Review comments on ROC 13-45 from CMP-3. ROC 13-45 was accepted at the meeting.

13-47 Log #1281 NEC-P13 **Final Action: Reject**
(690.31(E))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 13-39
Recommendation: The panel action should be to Accept in Principle in Part.

Add "Type MC cable" to the panel action so the sentence reads:

"...they shall be contained in metallic raceways, metallic enclosures, or Type MC cable, from the point..."

Substantiation: I agree with the Affirmative comment by W. Bower.

Type MC cable is permitted as a wiring method indoors or outdoors [330.10(A)(3)] and exposed or concealed [330.10(A)(4)].

330.118 states "Where Type MC cable is used for equipment grounding, it shall comply with 250.118(10) and 250.122.

Panel Meeting Action: Reject
Panel Statement: Metallic cable assemblies are limited in their rating associated with grounding.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 15 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

BOWER, W.: The types of equipment grounding conductors for "Type MC Cable" are sufficiently covered as described in the substantiation of this comment. The panel statement that metallic cable assemblies (that are not part of the comment or the proposed language) are limited in their rating associated with grounding does not appear to be relevant to the proposal.

13-48 Log #1722 NEC-P13 **Final Action: Reject**
(690.31(E))

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-39
Recommendation: The PV Industry Forum supports returning the allowance for **metallic cable assemblies** as originally submitted.
Substantiation: Type MC cable assemblies have uses permitted and not permitted that are less restrictive than those applied to the allowed Type FMC flexible metal conduit (metallic raceway). All the positive benefits of metallic raceways needed for PV source and output circuits are found in metallic cable

assemblies. Each type of raceway has differing installation requirements and limitations, which must be followed. And any raceway used in a particular installation will have to be suited to the environmental factors. Grounding is not an issue since an equipment-grounding conductor is usually used in these circuits and the available ground-fault currents are rarely more than the circuit currents and in systems with ground-fault protection will be limited to 10 amps or less.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-47.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 15 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
BOWER, W.: See My Explanation of Negative on 13-47.

13-49 Log #1724 NEC-P13 **Final Action: Accept**
(690.31(F))

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-40
Recommendation: The PV Industry agrees with and supports the Panel Action.
Substantiation: With respect to the comment by Nasby: The use of fine-stranded, flexible cables is not required in any commonly used PV system where normal *NEC*-compliant, listed electrical equipment is used. When such cables have been used, they have been improperly terminated because the requirement for proper termination is buried deep in a narrowly-distributed UL Standard. The proper ferrules and crimping tools, while readily available from multiple sources in Europe, are not commonly or readily available in the U.S. Neither the typical electrical supply house nor big-box building centers carry them or the required crimping tools.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-50 Log #1725 NEC-P13 **Final Action: Accept**
(690.33)

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-42
Recommendation: The PV Industry Forum agrees with and supports the Panel Action. The "c C" typo in the first line should be corrected.
Substantiation: None given.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-51 Log #2505 NEC-P13 **Final Action: Accept in Principle**
(690.33(C))

Submitter: Robert H. Wills, Intergrid, LLC
Comment on Proposal No: 13-41
Recommendation: The language proposed for 690.33(C) could be improved:
Existing Proposal:
~~Connectors that are readily accessible in circuits operating at over 50 volts (maximum system voltage for dc circuits or nominal voltage for ac circuits) shall require a tool to open.~~
Revised language:
Connectors that are readily accessible and that are used in circuits operating at over 50 volts nominal maximum system voltage for dc circuits, or 50 volts for ac circuits, shall require a tool for opening.
Substantiation: Revised language is clearer and more readable.
Panel Meeting Action: Accept in Principle
Change 50 volts to 30 volts in both places.
Panel Statement: The action is in accordance with the original panel action on Proposal 13-41.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 15 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
GALLO, E.: The panel action is technically incorrect. With respect to shock hazard, 30 volt dc is not equivalent to 30 volts nominal for ac circuits. The correct reference for accepted NEC threshold values in wet locations is Note 4 to Table 11(B) for dc voltages and Note 2 to Table 11(A) for ac voltages. The language should be: Connectors that are readily accessible and that are used in circuits operation at over 30 volts nominal maximums system voltage for continuous dc circuits, or 15 volts for sinusoidal ac and 21.2 volts peak for nonsinusoidal ac for ac circuits shall require a tool for openings.
Comment on Affirmative:
ZGONENA, T.: As written the proposed text is an improvement over the previously allowed 50V DC and AC, although the generally accepted limits for accessible circuits in wet location arc 30V DC and 15V AC. We will propose this revision in the 2011 code.

13-52 Log #2130 NEC-P13 **Final Action: Accept in Principle**
(690.33(C))

TCC Action: The Technical Correlating Committee understands that the panel action on the comment modifies the panel action on Comment 13-69.
Submitter: Robert H. Wills, Intergrid, LLC
Comment on Proposal No: 13-53
Recommendation: Change the proposed text for 690.47(D) as follows:
690.47(D) ~~Grounding~~ Additional Electrodes for Array Grounding. Grounding electrodes ~~for equipment grounding~~ shall be installed in accordance with 250.52 at the location of all ground and pole-mounted photovoltaic arrays and as close as possible to the location of roof-mounted photovoltaic arrays. The electrodes shall be connected directly to the array frame(s) or structure and shall be sized according to 250.166. Additional electrodes are not permitted to be used as a substitute for equipment bonding or equipment grounding conductor requirements. The structure of a ground or pole-mounted photovoltaic array can be considered a grounding electrode if it meets the requirements of 250.52. Roof mounted photovoltaic arrays may use the metal frame of a building or structure if the requirements of 250.52~~(3)~~(2) are met.
Exception No. 1: Where the load served by the array is integral with the array.
Exception No. 2: Where the grounding electrode would be adjacent to the main grounding electrode for the building or structure.
Substantiation: ● The title was changed to eliminate redundancy.
● The text "for equipment grounding" was removed per comments from R. Swayne.
● The reference to 250.50 was changed to 250.52 per comments from R. Swayne.
● The word "directly" was added to the second sentence to more clearly state the intent.
● The size of the conductor from electrode to array frame was specified per the requirements for dc grounding electrode conductors (rather than the possible interpretation that equipment grounding conductor sizing could be used).
● The third sentence was added to emphasize R. Swayne's comment that additional electrodes may not be used as a substitute for equipment bonding.
● "for the building or structure" was added to Exception No. 2 to clarify the meaning of "main grounding electrode".
Panel Meeting Action: Accept in Principle
Change "The electrodes shall be connected directly to the array frame(s) or structure and shall be sized according to 250.166" to "The electrodes shall be connected directly to the array frame(s) or structure. The dc grounding electrode conductor shall be sized according to 250.166."
Panel Statement: The text is revised to clarify that sizing referred to the grounding electrode conductor. See panel action and statement on Comment 13-69.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-53 Log #1729 NEC-P13 **Final Action: Accept**
(690.35(C)(3))

TCC Action: The Technical Correlating Committee understands that the panel action to Accept Comment 13-53 applies to 690.35(C)(3) and the remainder of 690.35(C) is not modified.
Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-43
Recommendation: Revise 690.35(C) as follows:
690.35(C). Automatically disconnects all conductors or causes the inverter or charge controller connected to the faulted circuit to automatically cease supplying power to output circuits.
Substantiation: The original proposal followed the NFPA submission guidelines with strikeouts and underlines. Here is the same proposal submitted in a totally rewritten format. The substantiation has not changed: Aligns the text for these ungrounded systems with the text in 690.5 dealing with grounded PV systems. Establishes that the faulted circuit may be isolated by disconnecting the conductors (typically done on low-voltage systems (12, 24, and 48V)) or by causing the connected inverter or charge controller to cease supplying power (typically done on higher voltage systems). Either of these methods serves the purpose of ceasing power production and providing an additional indication that something has happened that needs attention.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-54 Log #683 NEC-P13 **Final Action: Accept in Principle (690.35(D))**

TCC Action: The Technical Correlating Committee understands the panel action Accepts the text in Comment 13-54. The panel action on Comment 13-55 to delete the words "and output" modifies the panel action on this comment.
Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 13-44
Recommendation: The Proposal should have been Accepted in Principle in Part. I agree with the part the Panel did not Accept.
The remainder of the Proposal should have been Accepted in Principle by revising the section to read as follows:
"The photovoltaic source and output conductors shall consist of:
(1) ~~sheathed (jacketed) multi-conductor~~ nonmetallic jacketed multiconductor cables
(2) conductors installed in raceways, or
(3) conductors listed and identified as Photovoltaic (PV) Wire installed as exposed, single conductors ~~single conductor cable~~."
Substantiation: The change to multiconductor is an editorial correction for consistency. Multiconductor is not hyphenated. In the 2005 NEC, the word "multi-conductor" is only used in Articles 690 and 810 and Annex D. The word "multiconductor" is used in 31 Articles, Chapter 9, and Annex B. In the 2008 preprint, "multi-conductor" only appears 7 times whereas "multiconductor" appears 142 times.
The word "sheathed" is normally associated with a metallic sheath whereas a jacket implies a nonmetallic covering over the assembly.
A single conductor is not normally considered a cable. A cable, except for MC and MI cables which have additional layers over the insulated conductor, normally consists of two or more single conductors under a common overall metallic sheath or nonmetallic jacket.
Panel Meeting Action: Accept in Principle
Panel Statement: The term "and output" is removed because the requirement for output conductors does not apply. Also see Comment 13-55. This is in accordance with W. Bower's affirmative comment to Proposal 13-44.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-55 Log #1730 NEC-P13 **Final Action: Accept in Principle (690.35(D))**

TCC Action: The Technical Correlating Committee understands that the panel action to delete the words "and output" modifies Comment 13-54.
Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-44
Recommendation: The original submittal is resubmitted:
690.35(D) The photovoltaic source ~~and output~~ conductors shall consist of (1) sheathed (jacketed) multi-conductor cables, (2) conductors installed in raceways, or (3) conductors listed and identified as Photovoltaic (PV) Wire installed as exposed, single-conductor cable.
Substantiation: The proposal was correct as stated. The intent is to provide additional safety in the PV source-circuit wiring on *ungrounded* PV systems between modules and between the modules and any combining points located in the PV array. These circuits can operate up to 600 volts with exposed, single-conductor wiring in grounded PV systems. PV output circuits (in wording retained by the Panel Action) are typically already made using one of the code-approved wiring methods in Chapter 3, which do not include exposed, single conductor wiring. See accepted revised wording for 690.31(B) (13-38 Log 2070). This proposal parallels the accepted wiring allowance and should be also restricted to PV source circuits. The words "and output" should be deleted.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-54.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-56 Log #1731 NEC-P13 **Final Action: Accept in Principle (690.42 Exception)**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-46
Recommendation: The proposal is resubmitted with a slight revision to increase clarity:
690.42 Point of System Grounding Connection.
Exception: Systems with a 690.5 ground-fault protection device usually have the required grounded conductor-to-ground bond made by the ground-fault protection device. This bond, if internal to the ground-fault equipment, shall not be duplicated with an external connection.
Substantiation: Section 690.5 ground-fault protection devices typically have a grounded conductor-to-ground bond. It is critical, that this bond not be duplicated by installing a second bond. The revised text addresses the TCC Direction concerning the use of the word "may" (it has been eliminated for clarification) and follows the Panel Action or eliminating any unnecessary words. The exact bonding connection has also been clarified. Although using the grounded conductor-to ground bond in the ground-fault device is the most common method, the code does allow other methods to be used, so the words "usually" and "if" are required to address the very rare unconventional system that does not use the bond in the ground-fault protection.
Panel Meeting Action: Accept in Principle
Change the word "usually" to "shall be permitted to." Change "if" to "where."The revised text will read as follows:
Exception: Systems with a 690.5 ground-fault protection device shall be permitted to have the required grounded conductor-to-conductor bond made by the ground-fault protection device. This bond, where internal to the ground-fault equipment, shall not be duplicated with an external connection.
Panel Statement: The changes were made to comply with the NEC Style Manual.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:
RAPPAPORT, E.: The original proposal should have been rejected because the existing text already requires only one point for grounding. Addition of wording, such as, "The single point shall be permitted to be internal to a ground fault protection device", in the main text wold be sufficient. I am voting affirmative because the proposed text is better than the original proposal.
STAFFORD, T.: My panel notes indicate that the wording in the exception as published in the ROC does not correspond with what happened at the meeting. The text should read:
Exception: Systems with 690.5 ground-fault protection device shall be permitted to have the required grounded conductor-to-ground bond made by the ground-fault protection device. This bond, where internal to the ground-fault equipment, shall not be duplicated with an external connection.
In the published ROC it says grounded conductor-to-conductor bond...I think that this is an editorial change that has been overlooked.

13-57 Log #88 NEC-P13 **Final Action: Accept (690.43)**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-47
Recommendation: The Technical Correlating Committee directs that the panel reconsider the Action on this Proposal to comply with the NEC Style Manual by changing "are permitted" to "shall be permitted" in both sentences of the new second paragraph and changing
the proposed text from "when required" to "where installed" in the second paragraph of the Proposal which becomes the new third paragraph in the section.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-58 Log #89 NEC-P13 **Final Action: Accept (690.43)**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-48
Recommendation: It was the action of the Technical Correlating Committee that the panel reconsider the Panel Action and correct the wording by replacing "is required" with "shall be required" to comply with the NEC Style Manual. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-59 Log #1732 NEC-P13 **Final Action: Accept in Principle (690.43)**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-47
Recommendation: The text of the proposal is revised per TCC direction:
Devices listed and identified for grounding the metallic frames of PV modules shall be permitted to ground the exposed metallic frames of PV modules to grounded mounting structures. Devices identified and listed for bonding the metallic frames of PV modules shall be permitted to bond the exposed metallic frames of PV modules to the metallic frames of adjacent PV modules.

Equipment-grounding conductors for the PV array and structure (where installed) shall be contained within the same raceway or cable, or otherwise run with the PV array circuit conductors when those circuit conductors leave the vicinity of the PV array.

Substantiation: Changes directed by the TCC have been made in the original proposal, which was Accepted in Principle. The PV Industry Forum agrees with and supports these changes.

Panel Meeting Action: Accept in Principle

Revise the term "ground" to "bond" in the first sentence.

Panel Statement: This change is made because "ground" is not the appropriate verb. Metallic parts are bonded together.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16

Ballot Not Returned: 1 Gustafson, R.

13-60 Log #1733 NEC-P13 **Final Action: Accept (690.43)**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum

Comment on Proposal No: 13-48

Recommendation: The PV Industry Forum agrees with and supports the Panel Action and the TCC direction.

Substantiation: This repeated reference to the requirement is necessary to show a firm need to always install equipment-grounding conductors throughout the system. This is particularly important in PV systems where the ground-fault protection devices require these conductors, and to avoid confusion where multiple grounding-electrodes are installed.

Panel Meeting Action: Accept

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16

Ballot Not Returned: 1 Gustafson, R.

13-61 Log #90 NEC-P13 **Final Action: Accept (690.45)**

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 13-49

Recommendation: It was the action of the Technical Correlating Committee that the Panel Action be clarified by writing the exception in a complete sentence to comply with the NEC Style Manual.

This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See Comment 13-62 to satisfy and comply with the NEC style manual.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16

Ballot Not Returned: 1 Gustafson, R.

13-62 Log #1734 NEC-P13 **Final Action: Accept in Principle (690.45)**

TCC Action: The Technical Correlating Committee directs that the Exception to 690.45 be deleted to correlate with the panel action on Comment 13-29 to remove the circular reference.

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum

Comment on Proposal No: 13-49

Recommendation: The PV industry Forum agrees with the Panel Action and has reworded the Exception as a full sentence as directed by the TCC. The wording of the original proposal has been retained as shown and substantiated for clarity.

690.45 Size of Equipment-Grounding Conductor. Equipment-grounding conductors in photovoltaic source and photovoltaic output circuits shall be sized in accordance with Table 250.122. When no overcurrent protective device is used in the circuit, an assumed overcurrent device rated at the photovoltaic rated short-circuit current shall be used in Table 250.122. Increases in equipment-grounding conductor size to address voltage drop considerations shall not be required.

Exception: Where equipment-grounding conductors sized per 690.5(A) Exception 2 are used, the above sizing requirements are not to be used.

Substantiation: This proposal assumes that all PV systems will have a ground fault detection interruption device that interrupts the ground-fault current. In this case, the equipment-grounding conductors will be required to carry very small currents, typically 0.5 amps up to a few tens of amps before the ground fault equipment interrupts the fault current. Sizing at the values of Table 250.122 based on the overcurrent device will give a conductor of more than sufficient size. Where no overcurrent device is used, assuming an overcurrent device equal to short-circuit current and then using Table 250.122 will also give an equipment-grounding conductor that is more than adequate for the low currents being handled. Reference to Table 250.122 a second time is required for clarity. The 125% of the short-circuit current is not needed, short-circuit current alone will suffice.

Panel Meeting Action: Accept in Principle

Change "When" to "Where" in the second sentence to be consistent with the original proposal.

Panel Statement: The text was revised to be consistent with the original proposal.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16

Ballot Not Returned: 1 Gustafson, R.

Comment on Affirmative:

STAFFORD, T.: Note to the TCC: ROC Comments 13-29 and 13-62 need to be correlated to ensure that the sentence about the minimum size of the 14 AWG conductor is not lost in the correlation. Both comments have the same section 690.45, but one comment has the language and the other doesn't. My panel notes indicate that the sentence was to be included.

13-63 Log #91 NEC-P13 **Final Action: Accept (690.47(C))**

TCC Action: The Technical Correlating Committee understands that the panel action on Comment 13-66 addresses this comment.

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 13-51

Recommendation: The Technical Correlating Committee directs that the Action on this Proposal be rewritten to comply with the NEC Style Manual by replacing "may…" with "shall be permitted to…" in (5) and (6).

The Technical Correlating Committee understands that (3) should read "for equipment bonding jumpers (250.102)" to correlate with the title of 250.102.

These actions will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16

Ballot Not Returned: 1 Gustafson, R.

13-64 Log #1736 NEC-P13 **Final Action: Accept in Principle (690.47(C))**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University

Comment on Proposal No: 13-50

Recommendation: I believe that this proposal should be accepted as written. The Panel actions in accepting 13-51 Log 3585 do not address the issues clarified by this proposal. This proposal establishes the requirement (currently missing in the 2005 NEC) for a dc grounding system. It establishes the fact that the ac grounding system will provide grounding for the ac portion of the PV system. It also indicates that these requirements do not apply to ac PV modules. Proposal 13-51 does none of these. This language matches the requirements in UL Standard 1741 for a terminal for a dc grounding electrode conductor in these types of inverters. The proposed language merges well with the remainder of 690. 47. See additional comments on 13-51 Log 3585.

Substantiation: None given.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 13-66.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16

Ballot Not Returned: 1 Gustafson, R.

13-65 Log #1737 NEC-P13 **Final Action: Reject (690.47(C))**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum

Comment on Proposal No: 13-51

Recommendation: I believe that this proposal should be considerably modified due to the following reasons: 1. The resulting language does not address any of the items that the original proposal 13-50 Log 2094 addressed and clarified. There is no clarification as to when a system will require dc grounding requirements. There is no clarification that utility-interactive systems will have the ac grounding system provided by the existing ac premises grounding system. 2. There is no definition of what "bonding conductor" is being referred to in (2). The text appears to be saying that all equipment-grounding conductors in both the dc and ac systems shall be sized as the larger requirement (ac or dc). On a large system, the ac equipment-grounding conductor may be 2-4 AWG as determined by 250.122 where as the dc equipment –grounding conductors between the modules on the same system may be a small as 14 AWG from 690.45. It would be nearly impossible to attach 2-4 AWG equipment-grounding conductors to modules and the cost would be prohibitive. 3. Currently available inverters with Ground-Fault Protection circuits make the bond between the grounded conductor and the grounding system internally. With transformer isolation, between the dc grounded conductor and the ac grounded conductor, the dc system must have

a dc grounding electrode conductor that meets minimum code requirements (typically depending on the type of grounding electrode) for such a conductor. Using equipment-grounding conductors that may have numerous splices and may be as small as 14 AWG does not meet these minimum requirements. 4. Aside from current panel actions on 13-53, the adoption of this proposal would endorse grounding PV array frames on small (1-3 kW) residential systems by a conductor as small as 14 AWG routed from the roof, through the dc disconnect, the inverter, the ac disconnect, the ac house panel, and finally to the ac grounding electrode. This path is neither direct, nor free of splices that could deteriorate over time, nor is the small conductor size related to a low-impedance surge path to ground. These systems will be producing hazardous amounts of voltage and current for 40-50 years or more and proper and very reliable grounding will be the last line of defense against fires and shock hazards.
Substantiation: None given.
Panel Meeting Action: Reject
Panel Statement: The submitter does not provide an action to the NEC text or any substantiation.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R

13-66 Log #2129 NEC-P13 **Final Action: Accept in Principle (690.47(C))**

TCC Action: The Technical Correlating Committee understands that the panel action on Comment 13-66 to Accept in Principle included the word "overcurrent" in 690.47(C)(2) as included in the comment and in the panel action on Proposal 13-51.

The Technical Correlating Committee also understands that the addition of the phrase "and the system bonding requirements of 250.28." in 690.47(C)(2) also includes replacing the comma with "or" before "the ac requirements…" and deleting the comma after (...250.122)".

The Technical Correlating Committee has corrected the text in (2) and (3) in the panel action text in the proposal to comply with the NEC Style Manual as follows:

"(2) A bonding conductor between these systems shall be sized as the larger of the dc requirement in accordance with 690.45, (according to 690.45) and the ac requirements, based on the inverter alternating current overcurrent device rating and 250.122, and the system bonding requirements of 250.28.

(3) A conductor that serves as both an equipment grounding conductor and as part of the bond between ac and dc systems for an inverter incorporating dc ground-fault protection shall meet the requirements of equipment grounding bonding jumpers in accordance with 250.102 (250.102) but shall not be subject to the requirements for bonding jumpers in accordance with 250.28 (250.28)."

Submitter: Robert H. Wills, Intergrid, LLC
Comment on Proposal No: 13-51
Recommendation: The new proposed text for 690.47(C) was Accepted in Principle by CMP-13. Input from members of the PV industry has resulted in a request for the following changes. The proposed text for 690.47(C) should be revised as follows:

(C) Systems with Alternating-Current and Direct-Current Grounding Requirements. Systems with alternating-current and direct-current grounding requirements shall comply with items (1) through (7) below:

(1) Where photovoltaic power systems have both alternating-current (ac) and direct-current (dc) grounding requirements, the dc grounding system shall be bonded to the ac grounding system. A grounding system (ac or dc) consists of the various components needed to meet (ac or dc) grounding requirements.

(2) A bonding conductor between these systems ~~and equipment grounding conductors in these systems~~ shall be sized as the larger of the dc requirement (according to 690.45) and the ac requirements (based on the inverter alternating current overcurrent device rating and 250.122).

(3) A conductor that serves as both an equipment grounding conductor and as part of the bond between ac and dc systems for an inverter incorporating dc ground-fault protection shall meet the requirements of equipment ~~grounding~~ bonding jumpers (250.102) but shall not be subject to the requirements for bonding jumpers (250.28). A single conductor shall be permitted to be used to perform the multiple functions of dc grounding, ac grounding and bonding between ac and dc systems.

(4) A bonding conductor or equipment grounding conductor that serves multiple inverters shall be sized based on the sum of applicable maximum currents used in (2).

(5) A common ground bus may be used for both systems.

(6) A common grounding electrode may be used for both systems in which case the grounding electrode conductor shall be connected to the ac ground system bonding point.

(7) Grounding electrode conductor(s) shall be sized to meet the requirements of both 250.66 (ac system) and 250.166 (dc system).

(8) For systems with utility-interactive inverters, the premises grounding system serves as the ac grounding system.

Substantiation: ● The addition to (1) was in response to a comment from a PV manufacturer that pointed out that while ac and dc grounding requirements are defined, the terms "dc grounding system" and "ac grounding system" are not. While somewhat self-evident, some form of definition is warranted. The term "grounding system" is used already elsewhere in the code but is not explicitly defined.

● The deletion in (2) was in response to a response that pointed out that the Equipment Grounding Conductor (EGC) sizing is already covered in 690.45 and that the inclusion of EGC sizing in 690.47(C)(2) would change these requirements.

● The deletion in (3) was in response to the request of the TCC: "The Technical Correlating Committee understands that (3) should read "for equipment bonding jumpers (250.102)" to correlate with the title of 250.102.

● The addition to (3) regarding the use of a single conductor for multiple grounding and bonding functions was in response to a request for clarification from an inverter manufacturer. They were being instructed by inspectors and others to install redundant parallel EGCs in order to meet the various grounding requirements of Article 690.

● (5) and (6) were changed in accordance with the TCC Actions: "The Technical Correlating Committee directs the action on this proposal to be rewritten to comply with the NEC Style Manual by replacing "may..." with "shall be permitted to..." in (5) and (6).

● (8) was added in response to comments from the author of Proposal 13-50 that this point was missing from the final combined/revised text. He also requested that clarification be provided as to when a dc grounding system is required. This has been addressed in (1) by defining a grounding system as the components needed to meet grounding requirements - if there are grounding requirements, a grounding system is needed.

Panel Meeting Action: Accept in Principle

1. In (C)(1), remove the sentence "A grounding system (ac or dc) consists of the various components needed to meet (ac or dc) grounding requirements."
2. Change (2) to read: "A bonding conductor between these systems shall be sized as the larger of the dc requirement (according to 690.45), the ac requirements (based on the inverter alternating current device rating and 250.122), and the system bonding requirements of 250.28.

Panel Statement: The second sentence of (C)(1) was removed because it was obvious and unnecessary. The reference to 250.28 in (C)(2) was added in response to Comment 13-65 and to meet the intent of the original proposal. The 2005 language required that the system bond be sized as a grounding electrode conductor, which was incorrect. The first "and" was removed to correct the grammar.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:

BOWER, W.: The term "current" in 690.47(C)(2) should read "overcurrent" under the panel action statement. Additionally, the term "and" after device rating should be removed as stated in the panel statement.

13-67 Log #1738 NEC-P13 **Final Action: Reject (690.47(C)(3))**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-52
Recommendation: I suggest that the Panel reconsider its vote to reject this proposal. The proposal is technically correct and is not covered by Panel Actions on any other proposal. Here is the proposal:

690.47(C)(3) DC Grounding-Electrode Conductors for Multiple Inverter Installations A single, direct-current common grounding electrode conductor shall be permitted with tap conductors to each separate inverter in grounded, multi-inverter systems. The tap conductors for each inverter and the common-grounding electrode conductor shall each be sized in accordance with 250.166. The taps shall be made with a listed irreversible connector or exothermic welding.

Also: Add the number (3) to the end of 690.47(C) to include this proposal in that list.
Substantiation: Utility interactive PV systems using multiple smaller inverters (i.e. 1000-6000 watts) are frequently installed to provide additive power at much higher levels. Systems with multiple small inverters up to nearly 100 kW have been installed in the US, and larger systems are being planned. Each inverter normally has an internal transformer and, therefore, the dc side of the system must be grounded. Since each PV inverter represents a separate PV system for the building or structure, faults in the dc PV array for one inverter do not affect any of the other inverter systems. For this reason, the size of the common equipment-grounding conductor should be no larger than that required for a single inverter and should be based on 250.166. There is no technical or safety reason to have the common, dc grounding-electrode conductor any larger than the sizes required by 250.166. The larger grounding electrode conductors required for ac multiple separately derived systems in 250.30(A)(4)(a) should not be required for these dc grounding electrode conductors.
Panel Meeting Action: Reject
Panel Statement: The conductors from the grounding system to multiple inverters serve the function of equipment grounding conductors and system bonding conductors. They are not grounding electrode conductors. Additionally, UL 1741 is likely to be revised to clarify grounding requirements and terminology.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-68 Log #92 NEC-P13 **Final Action: Accept**
(690.47(D) (New))

TCC Action: The Technical Correlating Committee understands the panel action on Comment 13-69 addressed this comment.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-53
Recommendation: The Technical Correlating Committee directs that the Panel reconsider the proposal and clarify the language and the placement of the text. In addition, the text needs to be rewritten to be in compliance with the NEC Style Manual.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-69 Log #1739 NEC-P13 **Final Action: Accept in Principle in Part**
(690.47(D))

TCC Action: The Technical Correlating Committee understands that the panel action on Comment 13-52 modifies the action on this comment.
Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-53
Recommendation: The PV Industry Forum agrees with and supports the Panel Action and the TCC directions. It is noted that 250.54 should be referenced instead of 250.50 since these supplementary grounding electrodes are not required to be bonded to any other grounding electrodes. Also, it is noted that the reference to building steel should be 250,52(A)(2) rather than 250.52(A)(3).
It is proposed that the following sentence be added at the end of the changes made by the Panel Action:
The conductor from the grounding electrode to the array frame or structure shall be sized according to 250.166.
Substantiation: The added sentence clarifies the size of the required conductor and indicates that it is a grounding electrode conductor and not an equipment-grounding conductor.
Panel Meeting Action: Accept in Principle in Part
In the first sentence, change the words "close as possible" to "close as practicable."
In the first sentence of the second paragraph, change "can" to "shall be permitted to..." In the last sentence change "may" to "shall be permitted to..." The reference to 250.52(3) should be changed to 250.52(A)(2).
Change the two exceptions to read as follows:
"Exception No.1: Array grounding electrode(s) shall not be required where the load served by the array is integral with the array.
Exception No. 2: Additional array grounding electrode(s) shall not be required if located within 6 feet of the premises wiring electrode."
Panel Statement: The words "can" and "may" were changed to "shall be permitted to" in accordance with the style manual.
The reference to 250.52 was corrected.
The exceptions were revised to be complete sentences.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-70 Log #1705 NEC-P13 **Final Action: Accept in Principle**
(690.50)

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-18
Recommendation: The PV Industry Forum believes that this proposal should be renumbered and modified to better agree with existing code requirements. The grounding conductors attached to the exposed metal frames of PV modules are most properly referred to as equipment-grounding conductors and the electrical size requirements are given in 690.45. Any change in that requirement should properly be placed in 690.45. As a compromise and to meet the intent of the original submission, the following is suggested as a second paragraph in 690.45:
Equipment grounding conductors shall comply with 250.120(C).
Substantiation: As noted by Panel Comments, many PV modules are furnished as a listed product with provisions for connecting equipment-grounding conductors that can be no larger than 12 AWG. The modules are tested for ground-fault currents at no more than 125% of the short-circuit current which is typically less than 10 amps. In many PV installations, the PV module equipment grounding conductors can be routed along module frames and mounting racks to afford the needed physical protection. Where larger conductors are required for physical protection, lay-in lugs can be attached to the module frames.
Panel Meeting Action: Accept in Principle
Create a new Section 690.46 to read as follows:
690.46 Array Equipment Grounding Conductors. Equipment grounding conductors for photovoltaic modules smaller than 6 AWG shall comply with 250.120(C).
Panel Statement: The language in Proposal 13-18 was moved to 690.46, because 690.50 falls in Part VI, Marking. The term "equipment bonding jumpers" was changed to "equipment grounding conductors" per the request of the TCC. Section 250.120(C) refers to conductors smaller than 6 AWG. Without this clarification, Section 690.46 could imply that equipment grounding conductors should be no larger than 6 AWG.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:
BOWER, W.: I agree with the Panel Meeting Action to accept 690.46 and place the language in an appropriate section of Article 690. However, the title, "690.46 Array Equipment Grounding Conductors" would be much less ambiguous if it were to read 690.46 "Installation of Array Equipment Grounding Conductors" since this follows 690.45 that reads "Size of Equipment Grounding Conductor" and it would then better match 250.120 that is entitled "Equipment Grounding Conductor Installation".

13-71 Log #93 NEC-P13 **Final Action: Accept**
(690.53)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-54
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal so that the text is in accordance with the NEC Style Manual. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise the section as follows:
690.53 Direct-Current Photovoltaic Power Source. A ~~marking~~ permanent label for the direct-current photovoltaic power source indicating items (1) through ~~(4)~~ (5) shall be provided by the installer at the photovoltaic disconnecting means ~~for this power source~~:
(1) ~~Operating current~~. Rated maximum power-point current
(2) ~~Operating voltage.~~ Rated maximum power-point voltage
(3) Maximum system voltage.
FPN to (3) See 690.7(A) for maximum photovoltaic system voltage.
(4) Short-circuit current.
FPN to (4): See 690.8(A) for calculation of maximum circuit current.
(5) Maximum rated output current of the charge controller (if installed)
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action. The revised text conforms to 4.1.2 of the NEC Style Manual.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-72 Log #94 NEC-P13 **Final Action: Accept**
(690.57)

TCC Action: The Technical Correlating Committee directs that the new 690.57 be located as the first section in Part VII.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-56
Recommendation: The Technical Correlating Committee directs that the panel reconsider this proposal and clarify where the text is to be placed since 690.57 is in Part VI, dealing with marking.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 14 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
BOWER, W.: As group leader of the Task Group that reviewed all Article 690 comments, I find that the task group recommendation for this proposal was to accept and to change the section number form 690.57 to 690.19 but was based on acceptable language for 690.19. However, it appears that the action is invalid since comment 13-73 was rejected and the earlier panel action to accept in principle the proposal 13-56 introduces technically incorrect requirements. The new proposed language was:
"690.19. Multiple Source Disconnect: Where a circuit or load can receive power from multiple sources and there is no clear indication of the energized status of the circuit or load a single disconnect shall be used to disconnect that circuit or load from all sources of power."
FPN: The required disconnect ensures that the energized condition of the load or circuit is clearly determined where an automatic transfer switch inside or external to other equipment does not indicate the status of its output.
I CAN FIND NO APPARENT AGREED UPON, TECHNICALLY CORRECT, LANGUAGE FOR THE NEW 690.19. THE PANEL ACTION FOR 13-73 SHOULD BE CHANGED FROM REJECT TO ACCEPT. See also comments on 13.73.

A trace of the actions for this proposal shows that the TCC direction (13-72) was for a public comment that was placed on hold in 2004 for the 2005 NEC. THERE ARE NO PANEL CONSENSUS OR PANEL ACTIONS FOR THE 2008 NEC THAT REFLECTS RECONSIDERATION OF THE ORIGINAL PROPOSAL, THE ORIGINAL PUBLIC COMMENT, OR THE TCC DIRECTIVE.

Note that the original proposal was technically incorrect in the inverters are not bypassed when the switch from utility-interactive to stand-alone operation. The panel proposed language was:

"690.57 Load Disconnect. A load disconnect that has multiple sources of power shall disconnect all sources when in the off position."

I believe the public comment 13-73 addresses the intent of the original proposal and is, in my opinion, the same subject matter, does recommend a course of action when there are no external indications and then provides a FPN to explain the possibility of internal disconnects and transfer devices. The Public Comment 13-73 does deviate slightly in that it uses generic terms such as "multiple sources" instead of specific references to inverters, but it does cover the disconnecting means material proposed. It also suggests the move to 690.19. I SEE NO TECHNICAL ISSUES WITH THE PUBLIC COMMENT AT THIS TIME, AND THE LANGUAGE PROVIDES A NECESSARY DEGREE OF SAFETY WHEN MULTIPLE SOURCES OF POWER ARE INSTALLED.

For convenience the original proposal for the 2005 NEC was:
"690.57. Interactive System Point of Interconnection. All interactive system(s) points of interconnection with other sources shall be marked at an accessible location at the disconnecting means as a power source with the maximum ac output operating current and the operating voltage. Where interactive systems may operate as a Stand-Alone System through bypassing the inverter, disconnecting means shall indicate normal and bypass positions."

In commenting on this it is recommended that the reject for Comment 13-73 be changed to ACCEPT. The new language does address the disconnect requirement intent of the original proposal, the language accepted is not new material and inclusion into the NEC will provide the needed installation requirements for safety of personnel.

ZGONENA, T.: There appears to have been an oversight with the panel action to accept in principle, proposal 13-56 that contains technically incorrect requirements. Multiple mode inverters do not bypass the inverter when they switch from utility-interactive to stand-alone operation. The intent of the panel can be addressed and this problem can be corrected by accepting the text in 13-73 Log #1740 NEC-P13 (690.57) that was rejected. In contradiction to the panel statement, the 13-73 proposal text is relevant and it is correct to address this situation.

13-73 Log #1740 NEC-P13 **Final Action: Reject**
(690.57)

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-56
Recommendation: The PV Industry Forum Agrees with the intent of the Panel Action, but suggests that the proposal be renumbered as 690.19, which will place it in Part III where it belongs and addresses the TCC direction and the intent of the original submission.
690.19. Multiple Source Disconnect. Where a circuit or load can receive power from multiple sources and there is no clear indication of the energized status of the circuit or load, a single disconnect shall be used to disconnect that circuit or load from all sources of power.
FPN: The required disconnect ensures that the energized condition of the load or circuit is clearly determined where an automatic transfer switch inside or external to other equipment does not indicate the status of its output.
Substantiation: This proposal meets the requirements of the original submitter to ensure that any load or circuit that can be powered alternatively by more than one source will have single disconnect that cuts off power from any of these sources. This is easily achieved by adding a single disconnect at the origination point for the circuit or as a main disconnect for the load. Circuits or loads supplied by a device providing a clear indication of the load or circuit status would not require any additional device. It places the requirement in the Part III of Article 690 with the other disconnect requirements.
Panel Meeting Action: Reject
Panel Statement: The proposed language is not the same subject matter as Proposal 13-56.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 14 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
BOWER, W.: The Public Comment should be Accepted in Principle. See my extensive comments on 13-72.
ZGONENA, T.: See My Explanation of Negative on 13-72.

13-74 Log #95 NEC-P13 **Final Action: Accept**
(690.62)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-58
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal so that the text is in accordance with the NEC Style Manual. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise Proposal 13-58 panel action to read as follows: A conductor ~~connection to a single-phase or 3-phase utility-interactive inverter~~ used solely for instrumentation, ~~or~~ voltage detection, or phase detection, and connected to a single phase or 3-phase utility-interactive inverter ~~purposes and not for power transmission~~ shall be permitted to be sized at less than the ampacity of the other current-carrying conductors and shall be sized equal to or larger than the equipment grounding conductor.
Panel Statement: The panel accepts the direction of the TCC to clarify the text to conform to the NEC Style Manual. The last part of the sentence was changed to clarify that smaller conductors are permitted in certain cases.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 15 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: The original word "neutral" needs to be retained. Without that word, the remaining text could imply that all instrumentation wiring could be smaller than the overcurrent protection would permit.

13-75 Log #1745 NEC-P13 **Final Action: Accept in Part**
(690.64(A))

TCC Action: The Technical Correlating Committee directs that the sentence added to 690.64(A)(2) in the accepted text in Comment 13-77 from Comment 13-75 read as follows:
"In systems with ~~series-connected~~ panelboards connected in series, ~~panel-boards or sub-panels~~ the rating of the first overcurrent device directly connected to the output of a utility-interactive inverter(s) shall be used in the calculations for all busbars and conductors."
Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-59
Recommendation: The PV Industry Forum withdraws this proposal in favor of the CMP 9 rewrite of the entire Section 690.64. Two deviations from the CMP-9 submittal are underlined and explained below. This is the entire Section as submitted with the two revisions shown underlined. ALL TEXT IS NEW and REPLACES THE EXISTING 690.64:
690.64 Point of Connection. The output of a utility-interactive inverter shall be connected as specified in either 690.64(A) or 690.64(B).
(A) Supply Side. The output of a utility-interactive inverter shall be permitted to be connected to the supply side of the service disconnecting means as permitted in 230.82(6).
(B) Load Side. The output of a utility interactive inverter shall be permitted to be connected to the load side of the service disconnecting means of the other source(s) at any distribution equipment on the premises, provided that all of the conditions in (C) are met.
(C) Interconnection Limitations for Distribution Equipment. Where distribution equipment, including switchboards and panel boards, is fed simultaneously by a primary source(s) of electricity and one or more utility-interactive inverters, and where this distribution equipment is capable of supplying multiple branch circuits or feeders or both, the interconnection provisions for the utility-interactive inverter(s) shall comply with (1) through (7).
(1) Dedicated Overcurrent and Disconnect. Each source interconnection shall be made at a dedicated circuit breaker or fusible disconnecting means.
(2) Bus or Conductor Rating. The sum of the ampere ratings of overcurrent devices in circuits supplying power to a busbar or conductor shall not exceed 120 percent of the rating of the busbar or conductor. In systems with series-connected panel boards or subpanels, the rating of the first overcurrent device directly connected to the output of a utility-interactive inverter(s) shall be used in the calculations for all busbars and conductors.
(3) Ground-Fault Protection. The interconnection point shall be on the line side of all ground-fault protection equipment.
Exception: Connections shall be permitted to be made to the load side of ground-fault protection equipment, provided that there is ground fault protection for equipment from all ground-fault current sources. Ground-fault protection devices used with supplies connected to the load-side terminals shall be identified and listed as suitable for backfeeding.
(4) Marking. Equipment containing overcurrent devices in circuits supplying power to a busbar or conductor supplied from multiple sources shall be marked to indicate the presence of all sources.
(5) Suitable for Back Feed. Circuit breakers, if backfed, shall be suitable for such operation.
FPN: Circuit breakers that are marked "Line" and "Load" have been evaluated only in the direction marked. Circuit breakers without "Line" and "Load " markings are evaluated in both directions.

(6) Fastening. Listed, plug-in type circuit breakers backfed from utility-interactive inverters complying with 690.60 shall be permitted to omit the additional fastener required by 408.36(F) for such applications.

(7) Opposite-End Connections. Where the bus or conductor rating is less than sum of the ampere ratings of all overcurrent devices supplying it, then connection(s) from the output of utility-interactive inverter(s) shall be positioned at the opposite (load) end from the feeder location or main circuit location. Where such opposite-end connections are required, a permanent warning label shall be applied to the distribution equipment with the following or equivalent wording:

WARNING
PHOTOVOLTAIC SYSTEM SOURCE OUTPUT
DO NOT RELOCATE THIS OVERCURRENT DEVICE

Substantiation: The revisions to the CMP-9 submittal are as follows:
1) In 690.64(C)(2), a second sentence was added to address the frequent situation where there are multiple series-connected panel boards in a system. For example, a 15-amp backfed breaker in a 100-amp panel might allow the connection of a utility-interactive inverter on the 10th floor of a building. That 100-amp panel is fed by a 100-amp breaker in a 400-amp panel in the middle of the building which, in turn, is fed by a 400-amp breaker in a 1000- amp service entrance panel. At the 1000-amp service panel, the existing wording of 690.64 (as interpreted by inspectors and previous CMPs) requires that the 400-amps be counted as the backfed breaker in this 1000-amp panel, not the 15-amp breaker attached to and limiting the backfed current from the inverter. The added sentence clarifies that the first breaker (15-amps) attached to the inverter output is to be used in the calculation. Explanatory diagrams are attached.
2). The title on 690.64(C)(7) was changed to "Opposite-End Connections" to avoid duplicating the title on 690.64(C)(2).

The PV Industry Forum requests clarification and confirmation of the CMP 9 calculation of a 4% possible added heating due a potential 120% increase in load currents. Other calculations indicate that the potential heating may be as high as 44%. Other panel board manufacturers have indicated that the overheating is not an issue as long as the panel is fed at opposite ends..

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Part

Add the following sentence to 690.64(B)(2) in the action for Comment 13-77: "In systems with series-connected panel boards or subpanels, the rating of the first overcurrent device directly connected to the output of a utility-interactive inverter(s) shall be used in the calculations for all busbars and conductors."

Panel Statement: This information provides clarification for determining bus or conductor ratings.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 15 Negative: 1

Ballot Not Returned: 1 Gustafson, R.

Explanation of Negative:

STAFFORD, T.: Even though the added sentence would be good to have in the 2008 NEC, it is material that has not had public review, and is considered new material and should be held for the public comment IAW Section 4-4.6.2.2 of NFPA Regulations Governing Committee Projects. NEMA manufacturers of panelboards, switchboards, overcurrent devices, (both fuses and circuit breakers) would probably be interested in the additional requirements that this new wording places into effect.

13-76 Log #1746 NEC-P13 **Final Action: Accept in Principle (690.64(A))**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum

Comment on Proposal No: 13-60

Recommendation: The PV Industry Forum withdraws this proposal in favor of the CMP-9 submittal of a revision to the entire 690.64. See 13-59 Log 2100.

The PV Industry Forum requests clarification and confirmation of the CMP 9 calculation of a 4% possible added heating due a potential 120% increase in load currents. Other calculations indicate that the potential heating may be as high as 44%. Other panel board manufacturers have indicated that the overheating is not an issue as long as the panel is fed at opposite ends.

Substantiation: None given.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action on Comment 13-77.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16

Ballot Not Returned: 1 Gustafson, R.

13-77 Log #311 NEC-P13 **Final Action: Accept in Principle (690.64(B))**

TCC Action: The Technical Correlating Committee directs that the phrase "shall have been sized" be changed to "shall be sized" to comply with the NEC Style Manual.

Submitter: Code-Making Panel 9,

Comment on Proposal No: 13-61

Recommendation: Revise the panel action on this proposal as modified by the action on Proposal 13-69 to read as follows (legislative formatting in this comment applies to differences from the CMP-13 action text, and not in respect to the 2005 NEC):

690.64 Point of Connection. The output of a utility-interactive inverter shall be connected as specified in 690.64(A) or 690.64(B).

(A) Supply Side. The output of a utility-interactive inverter shall be permitted to be connected to the supply side of the service disconnecting means as permitted in 230.82(6).

(B) Load Side. The output of a utility-interactive inverter shall be permitted to be connected to the load side of the service disconnecting means of the other source(s) at any distribution equipment on the premises, provided that ~~either condition (1) or~~ all of the conditions ~~(2) through (6)~~ in (C) are met.

(C) Interconnection Limitations for Distribution Equipment. Where distribution equipment, including switchboards, and panelboards, is fed simultaneously by a primary source(s) of electricity and one or more utility-interactive inverters, and where this distribution equipment is capable of supplying multiple branch circuits or feeders or both, the interconnecting provisions for the utility-interactive inverter(s) shall comply with (1) through (7).

~~(1) The PV supply overcorrect/disconnect device shall be installed in a panelboard and positioned farthest from the feeder or service connection.~~

~~(2) Each source interconnection shall be made at a dedicated circuit breaker or fusible disconnecting means.~~

~~(3) the interconnection point shall be on the line side of all ground-fault protection equipment.~~

~~Exception: connection shall be permitted to be made to the load side of ground-fault protection, provided that there is ground-fault protection for equipment from all ground-fault current sources. Ground-fault protection devices used with supplies connected to the load side terminals shall be identified and listed as suitable for backfeeding.~~

~~(4) Equipment containing more than one circuit supplying power to a busbar or conductor shall be marked at the overcorrect device for each supply.~~

~~(5) Circuit Breakers, if backfed, shall be identified for such operation. Dedicated circuit breakers backfed from listed utility-interactive inverters complying with 690.60 shall not be required to be individually clamped to the panelboard busbars. A front panel shall clamp all circuit breakers to the panelboard busbars. Main circuit breakers connecte d directly to energized feeders shall also be individually clamped.~~

~~FPN: Circuit breakers that are marked "Line" and "Load" are not identified as suitable for backfeeding.~~

~~(6) The rating of the bus or conductor to which the utility interactive inverter breaker or fusible disconnect is connected shall meet all of the conditions in 690.65(B)(6)(a) or 690.65(B)(6)(b).~~

~~(a) Where connected at other than the opposite (farthest) end of the busbar from the feeder or service, the sum of all overcorrect devices supplying the busbar or conductor shall not exceed the rating of the busbar or conductor, except in dwelling unit installations where the sum of all overcorrect devices supplying the busbar or conductor shall not exceed 120 percent of the busbar or conductor rating.~~

~~(b) Where connected at the opposite (farthest) end of the busbar from the feeder or service, the sum of ampere rating of the backfed PV supply overcorrect/disconnect device(s) shall not exceed the rating of the busbar or conductor. The following permanent plaque shall be installed at the PV supply connection or circuit breaker location:~~

~~WARNING: THIS PV SUPPLY CONNECTION MUST REMAIN CONNECTED OR INSTALLED AT THIS LOCATION, WHICH IS FARTHEST FROM THE FEEDER OR SERVICE CONNECTION.~~

(1) Dedicated Overcurrent and Disconnect. Each source interconnection shall be made at a dedicated circuit breaker or fusible disconnecting means.

(2) Bus or Conductor Rating. The sum of the ampere ratings of overcurrent devices in circuits supplying power to a busbar or conductor shall not exceed 120 percent of the rating of the busbar or conductor.

(3) Ground Fault Protection. The interconnection point shall be on the line side of all ground-fault protection equipment.

Exception: Connection shall be permitted to be made to the load side of ground-fault protection, provided that there is ground-fault protection for equipment from all ground-fault current sources. Ground-fault protection devices used with supplies connected to the load-side terminals shall be identified and listed as suitable for backfeeding.

(4) Marking. Equipment containing overcorrect devices in circuits supplying power to a busbar or conductor supplied from multiple sources shall be marked to indicate the presence of all sources.

(5) Suitable for Back Feed. Circuit breakers, if backfed, shall be suitable for such operation.

FPN: Circuit breakers that are marked "Line" and "Load" have been evaluated only in the direction marked. Circuit breakers without "Line" and "Load" have been evaluated in both directions.

(6) Fastening. Listed plug-in type circuit breakers backfed from utility-interactive inverters complying with 690.60 shall be permitted to omit the additional fastener normally required by 408.36(F) for such applications.
(7) Bus or Conductor Rating. Unless the panelboard is rated not less than the sum of the ampere ratings of all overcurrent devices supplying it, a connection in a panelboard shall be positioned at the opposite (load) end from the input feeder location or main circuit location. A permanent warning label shall be applied to the distribution equipment with the following or equivalent wording:
WARNING
PHOTOVOLTAIC SYSTEM SOURCE OUTPUT
DO NOT RELOCATE THIS OVERCURRENT DEVICE

Substantiation: Although the Technical Correlating Committee requested that CMP-9 comment on Proposal 13-61, and by this comment the panel has done so, the technical issues raised in that and in the associated proposals apply to all systems capable of interconnection and parallel operation using multiple sources. Ror this reason, CMP-9 believes that the CMP-13 actions in Articles 690, 692, and 705 must be correlated in this respect, and is providing comments to the comparable proposals and panel actions in all of these articles. In addition, the layout and content of this comment reflect a consistency of approach that assures correlation with the corresponding language in Articles 692 and 705.

CMP-9 agrees that it is possible to assure that the busbars of panelboards receiving supply current from two sources can be arranged so the busbars will not exceed their ampacity (the "opposite end" scenario accepted under this proposal), however, CMP-9 points out that such an arrangement allows for up to double the amount of load to be taken from the panel for indefinite periods of time. Current product standards do not anticipate the effect of I2R heating losses under these conditions, which could severely impact the performance of essential components within the distribution equipment. Before the NEC recognizes this type of connection, it is essential that careful testing be carried out to determine the acceptable parameters that should be applied in these cases.

For example, if a large PV system provides 100 amperes of power to a panel in an interactive system rated 100 amperes, and this panel is supplied by a normal utility supply of 100 amperes, the branch circuit and feeder loads supplied by this panel could total 200 amperes. Although such a load should not exist due to required sizing rules relative to Article 220 calculations, the requirement for individual protection for panelboards (now set to apply to all panelboards by virtue of CMP-9 action in this cycle) anticipates that these load calculations are easily circumvented given the relative ease of circuit modifications.

CMP-9 is suggesting revisions to the backfeed allowance that more closely track the actual provision in Article 408 that is intended to be varied in this Chapter 6 article. Our wording also omits the deadfront clamping language in the proposal because such construction is clearly required by the product standard and pointless here; furthermore, the deadfront does not actually "clamp all circuit breakers to the panelboard busbars." In addition, we are offering a different version of the fine print note to address concerns raised in the voting. CMP-9 understands that CMP-13 was using the term (identified) in its Article 100 sense and not in the sense of a marking, however, this wording avoids any confusion. Other changes are editorial and in the interest of correlation, where technically appropriate, with other interactive articles.

CMP-9 expresses its willingness to assign a task group to work with CMP-13 and other industry parties to provide a carefully substantiated global approach to double-fed distribution equipment applied in interactive settings for the 2011 NEC. This might include specially targeted allowances for equipment listings that would cover such interconnections. In the mean time, this comment does broaden the 120 percent allowance from dwellings to all occupancies. Because of the I2R relationship, an allowance for an an additional 20% loading (one fifth) would only increase the heating losses by 4% (one twenty fifth), which should be tolerated by existing equipment designs even if the interconnection does not occur at the opposite end of the bus from the normal supply. This comment incorporates the opposite-end rule from the CMP-13 action on this proposal as a trade-off for the occupancy expansion, thereby ensuring that an overloaded busbar does not exacerbate the heating problem.

This comment has been balloted through CMP-9 with the following balloting results:
11 Eligible to Vote
10 Affirmative
1 Not Returned (H. deVega)

Panel Meeting Action: Accept in Principle
Revise CMP-9's 690.64(B) and (C) as follows:
690.64 Point of Connection. The output of a utility-interactive inverter shall be connected as specified in 690.64(A) or 690.64(B).
(A) Supply Side. The output of a utility-interactive inverter shall be permitted to be connected to the supply side of the service disconnecting means as permitted in 230.82(6).
(B) Load Side. The output of a utility-interactive inverter shall be permitted to be connected to the load side of the service disconnecting means of the other source(s) at any distribution equipment on the premises. Where distribution equipment, including switchboards and panelboards, is fed simultaneously by a primary source(s) of electricity and one or more utility-interactive inverters, and where this distribution equipment is capable of supplying multiple branch circuits or feeders or both, the interconnecting provisions for the utility-interactive inverter(s) shall comply with (1) through (7):
[(1) through (6) as in last ed.]
(7) Inverter Output Connection. Unless the paneboard is rated not less than the sum of the ampere ratings of all overcurrent devices supplying it, a connection in a panelboard shall be positioned at the opposite (load) end from the input feeder location or main circuit location. The bus or conductor rating shall have been sized for the loads connected in accordance with Articel 220. A permanent warning label shall be applied to the distribution equipment with the following or evuivalent working:

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

Panel Statement: The panel corrected the spelling of "overcorrect" to "overcurrent"; reorganized (B) and (C) into a single section (B) for user-friendliness. Added "The bus or conductor rating shall have been sized for the loads connected in accordance with Article 220." to (7) to satisfy intent of Comment 13-78. Revised the heading for (7) to eliminate duplication.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:
BOWER, W.: The CMP 9 reviews and suggested changes were extensive and comprehensive, and the panel is to be commended on a job well done. My comments for this Public Comment are editorial in nature as below:
Note that the panel reorganized (B) and (C) into a single section (B) but that is not reflected in the report.
In 690.64(C)(3) the term "Ground Fault" in the title should be changed to "Ground-fault".
In 690.64(C)(4) the term "overcorrect" should be changed to "overcurrent".
In 690.64(C)(7) the term "paneboard" should be changed to "panelboard", the spelling of "Articel" should be changed to "Article", the word "evuivalent" should be changed to "equivalent" and the last word "working" should be changed to "marking".

13-78 Log #1179 NEC-P13 **Final Action: Accept in Principle (690.64(B))**

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 13-61
Recommendation: Revise the wording of the Panel action for 690.64(B)(5)(b) per Mr. Hornberger's comment, as follows:
690.64(B)(5)(b) End Feed Connection. Where the utility-interactive inverter breaker or fusible disconnect is connected in the distribution equipment at the opposite (load) end from the input feeder connection or main circuit location, the bus or conductor rating shall be equal to or larger than the sum of the ampere ratings of all overcurrent devices connecting premise electric power production sources to the bus or conductor. The bus or conductor rating shall have been sized for the loads connected, in accordance with Article 220. A permanent warning label shall be applied to the distribution equipment with the following or equivalent:

WARNING
ELECTRIC POWER PRODUCTION SOURCE OUTPUT
DO NOT RELOCATE THIS OVERCURRENT DEVICE.

Substantiation: The Panel's rewording of 690.64(B)(5)(b) will permit the sum of the overcurrent devices supplying current to a bus or conductor to exceed the ampacity rating of the bus or conductor by 200%. If the bus or conductor is not sized for the loads served, in accordance with Article 220, an overload condition may exist on the bus or conductor that would not be detected by any of the overcurrent devices supplying current to the system. In addition, this is a "generic" requirement for utility interactive inverters and not specifically a photovoltaic system issue. Please see recommended rewording and relocation as part of Mr. Hornberger's comment on Proposal 13-184 to incorporate a reference to Article 220 and move the text to Article 705.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 13-77.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-79 Log #1324 NEC-P13 **Final Action: Accept in Principle (690.64(B))**

Submitter: Vincent J. Saporita, Cooper Bussmann
Comment on Proposal No: 13-61
Recommendation: Replace the phrase "circuit breaker" with the phrase "disconnecting means" in the proposed last sentence of (5)(b).
)b) Where connected at the opposite (farthest) end of the busbar from the feeder or service, the sum of ampere rating of the backfed PV supply overcurrent/disconnect device(s) shall not exceed the rating of the busbar or conductor. The following permanent plaque shall be installed at the PV supply connection or ~~circuit breaker~~ disconnecting means location:
Substantiation: As written, the user might be led to think that only a circuit breaker could be utilized. This suggested change would make it clear that circuit breakers are not the only types of disconnecting means to be allowed. For example, a fusible switch could be utilized as the disconnecting means.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 13-77.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-80 Log #1747 NEC-P13 **Final Action: Accept (690.64(B))**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-61
Recommendation: The PV Industry Forum withdraws this proposal in favor of the CMP-9 submittal of a revision to the entire 690.64. See 13-59 Log 2100.
Substantiation: None given.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-81 Log #2293 NEC-P13 **Final Action: Reject (690.64(B))**

Submitter: Todd Stafford, IBEW-NJATC / Rep. IBEW
Comment on Proposal No: 13-61
Recommendation: The panel should reverse its action and revert to the 2005 code for section 690.64(B).
Substantiation: Upon reviewing the negative comments submitted by Hornberger and Nasby, it is apparent that the panel action taken will not create a safer installation. Considerable technical information is needed to properly address the issue of connecting PV interactive inverters to a bus or conductor to allow the interconnection to be properly performed. The changes made by the Panel during the ROP stage does not address the concerns raised.
Panel Meeting Action: Reject
Panel Statement: The panel actions on Comment 13-77 address the concerns of the submitter.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-82 Log #96 NEC-P13 **Final Action: Accept (690.64(B)(1) Exception)**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-61a
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal so that the text is in accordance with the NEC Style Manual, and the Panel clarify the Panel Action on this Proposal by adding the word "and" following the end of requirement (d), and commas after requirements (a) through (d) rather than periods.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-83 Log #1748 NEC-P13 **Final Action: Accept in Principle (690.64(B)(1) Exception)**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-61a
Recommendation: The PV Industry Forum proposes that this proposal should be rejected. The proposal imposes a complex set of five requirements that are not easily understood. The existing provisions of Article 690 adequately address the connection of utility-interactive inverters to dedicated circuits. Converting the branch circuit to a feeder by adding a subpanel would also address the need. Branch circuits with permanently connected loads like outside air conditioner compressors and other large motor loads are typically specified with very definite overcurrent devices based on the running and locked rotor amps of such units. To connect a PV inverter to such a circuit would significantly complicate those well-established calculations and requirements. Furthermore, the starting surge, voltage drops associated with such loads could possibly cause any PV inverter to trip off line as required by UL Standard 1741.
Code making actions this cycle with increased requirements for AFCI and GFCI protection of nearly all branch circuits would make the connections allowed by this proposal unworkable and could create safety hazards if GFCI and AFCI equipment were backfed.
Substantiation: None given.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-84.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-84 Log #2295 NEC-P13 **Final Action: Accept (690.64(B)(1) Exception)**

Submitter: Todd Stafford, IBEW-NJATC / Rep. IBEW
Comment on Proposal No: 13-61a
Recommendation: Delete proposed 690.64(B)(1) Exception.
Substantiation: The panel action was incorrect in allowing the connection of a utility interactive inverter to a dedicated branch circuit serving permanently connected loads. See panel action taken on 13-63 which specifies why connection to branch circuits is not allowed. The connection of a utility interactive inverter is the cause of the potential lack of overcurrent protection, not the issue of it being cord and plug connected as stated in 13-63. The result is the same, an overcurrent condition without protection from an overcurrent protection device.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-85 Log #1180 NEC-P13 **Final Action: Accept in Principle (690.64(B)(2))**

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 13-64
Recommendation: Revise the wording of the Panel action for 690.64(B)(5)(b) in Proposal 13-61 per Mr. Hornberger's comment as follows:
690.64(B)(5)(b) End Feed Connection. Where the utility-interactive inverter breaker or fusible disconnect is connected in the distribution equipment at the opposite (load) end from the input feeder connection or main circuit location, the bus or conductor rating shall be equal to or larger than the sum of the ampere ratings of all overcurrent devices connecting premise electric power production sources to the bus or conductor. The bus or conductor rating shall have been sized for the loads connected, in accordance with Article 220. A permanent warning label shall be applied to the distribution equipment with the following or equivalent:

WARNING
ELECTRIC POWER PRODUCTION SOURCE OUTPUT
DO NOT RELOCATE THIS OVERCURRENT DEVICE.

Substantiation: The Panel's rewording of 690.64(B)(5)(b) in Proposal 13-61 will permit the sum of the overcurrent devices supplying current to a bus or conductor to exceed the ampacity rating of the bus or conductor by 200%. If the bus or conductor is not sized for the loads served, in accordance with Article 220, an overload condition may exist on the bus or conductor that would not be detected by any of the overcurrent devices supplying current to the system. In addition, this is a "generic" requirement for utility interactive inverters and not specifically a photovoltaic system issue. Please see recommended rewording and relocation as part of Mr. Hornberger's comment on Proposal 13-184 to incorporate a reference to Article 220 and move the text to Article 705.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 13-77.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-86 Log #1749 NEC-P13 **Final Action: Accept in Principle (690.64(B)(2))**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-64
Recommendation: The PV Industry Forum withdraws this proposal in favor of the CMP-9 submittal of a revision to the entire 690.64. See 13-59 Log 2100.
The PV Industry Forum requests clarification and confirmation of the CMP 9 calculation of a 4% possible added heating due a potential 120% increase in load currents. Other calculations indicate that the potential heating may be as high as 44%. Other panel board manufacturers have indicated that the overheating is not an issue as long as the panel is fed at opposite ends.
Substantiation: None given.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 13-77.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-87 Log #1750 NEC-P13 **Final Action: Accept in Principle (690.64(B)(2) Exception No. 2)**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-65
Recommendation: The PV Industry Forum believes the intent of this proposal is covered by the CMP-9 submittal of a revision to the entire 690.64. See 13-59 Log 2100. If the CMP-9 revision with slight changes proposed in 13-59 is not accepted, then this proposal should be revisited.
The PV Industry Forum requests clarification and confirmation of the CMP 9 calculation of a 4% possible added heating due a potential 120% increase in load currents. Other calculations indicate that the potential heating may be as high as 44%. Other panel board manufacturers have indicated that the overheating is not an issue as long as the panel is fed at opposite ends.
Substantiation: None given.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 13-77.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-88 Log #1751 NEC-P13 **Final Action: Accept in Principle (690.64(B)(3))**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-66
Recommendation: The PV Industry Forum withdraws this proposal in favor of the CMP-9 submittal of a revision to the entire 690.64. See 13-59 Log 2100.
The PV Industry Forum requests clarification and confirmation of the CMP 9 calculation of a 4% possible added heating due a potential 120% increase in load currents. Other calculations indicate that the potential heating may be as high as 44%. Other panel board manufacturers have indicated that the overheating is not an issue as long as the panel is fed at opposite ends.
Substantiation: None given.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 13-77.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-89 Log #1753 NEC-P13 **Final Action: Accept in Principle (690.64(B)(4))**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-67
Recommendation: The PV Industry Forum withdraws this proposal in favor of the CMP-9 submittal of a revision to the entire 690.64. See 13-59 Log 2100
The PV Industry Forum requests clarification and confirmation of the CMP 9 calculation of a 4% possible added heating due a potential 120% increase in load currents. Other calculations indicate that the potential heating may be as high as 44%. Other panel board manufacturers have indicated that the overheating is not an issue as long as the panel is fed at opposite ends.
Substantiation: None given.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 13-77.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-90 Log #1754 NEC-P13 **Final Action: Accept in Principle (690.64(B)(5))**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-68
Recommendation: The PV Industry Forum withdraws this proposal in favor of the CMP-9 submittal of a revision to the entire 690.64. See 13-59 Log 2100.
The PV Industry Forum requests clarification and confirmation of the CMP 9 calculation of a 4% possible added heating due a potential 120% increase in load currents. Other calculations indicate that the potential heating may be as high as 44%. Other panel board manufacturers have indicated that the overheating is not an issue as long as the panel is fed at opposite ends.
Substantiation: None given.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 13-77.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-91 Log #1181 NEC-P13 **Final Action: Accept in Principle (690.64(B)(6))**

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 13-69
Recommendation: Revise the wording of the Panel action for 690.64(B)(5)(b) in Proposal 13-61 per Mr. Hornberger's comment as follows:
690.64(B)(5)(b) End Feed Connection. Where the utility-interactive inverter breaker or fusible disconnect is connected in the distribution equipment at the opposite (load) end from the input feeder connection or main circuit location, the bus or conductor rating shall be equal to or larger than the sum of the ampere ratings of all overcurrent devices connecting premise electric power production sources to the bus or conductor. The bus or conductor rating shall have been sized for the loads connected, in accordance with Article 220. A permanent warning label shall be applied to the distribution equipment with the following or equivalent:

WARNING
ELECTRIC POWER PRODUCTION SOURCE OUTPUT
DO NOT RELOCATE THIS OVERCURRENT DEVICE.

Substantiation: The Panel's rewording of 690.64(B)(5)(b) in Proposal 13-61 will permit the sum of the overcurrent devices supplying current to a bus or conductor to exceed the ampacity rating of the bus or conductor by 200%. If the bus or conductor is not sized for the loads served, in accordance with Article 220, an overload condition may exist on the bus or conductor that would not be detected by any of the overcurrent devices supplying current to the system. In addition, this is a "generic" requirement for utility interactive inverters and not specifically a photovoltaic system issue. Please see recommended rewording and relocation as part of Mr. Hornberger's comment on Proposal 13-184 to incorporate a reference to Article 220 and move the text to Article 705.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 13-77.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-92 Log #1755 NEC-P13 **Final Action: Accept in Principle (690.64(B)(6) (New))**

Submitter: John C. Wiles, Southwest Technology Development Institute, New Mexico State University / Rep. PV Industry Forum
Comment on Proposal No: 13-69
Recommendation: The PV Industry Forum withdraws this proposal in favor of the CMP-9 submittal of a revision to the entire 690.64. See 13-59 Log 2100.
Substantiation: None given.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Comment 13-77.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

ARTICLE 692 — FUEL CELL SYSTEMS

13-93 Log #754 NEC-P13 **Final Action: Reject**
(692)

Submitter: Timothy M. Croushore, Allegheny Power
Comment on Proposal No: 13-71
Recommendation: These recommended corrections to Article 692 as recommended in the original proposal are intended to comply with the current NEC organization are as follows:

1. Please accept the original proposed modifications in 692.1 Scope as published in the ROP.
2. Please delete the definition of Interactive System, as it will now appear in Article 100. Please delete the title and definition of Point of Common Coupling. Please do not delete the title of the definition of Maximum System Voltage and the title of the definition of Stand-Alone System as published in the ROP.
3. Please accept the modifications made in the original proposal to 692.3 Other Articles to correspond with the rewrite of Article 705. The proposed added and deleted text for this section is published in the ROP on page 70-750.
4. Please delete the complete title and text of 692.62 Loss of Interactive System Power as recommended in the original proposal to correspond with the rewrite of Article 705. This information is now included in Article 705.
9. Please delete the title and text of 692.64 Unbalanced Interconnections as recommended in the original proposal. This information corresponds with the rewrite of Article 705 and is now included there.
10. Please delete the title and text of 692.65 Point of Connection as recommended in the original proposal. This information corresponds with the rewrite of Article 705 and is now included there.

Substantiation: Code Making Panel 13 is to be commended for the fine job on the work on the rewrite of Article 705 and revision to Article 690 and Article 692 as it appears in the NEC 2008 Draft.

This comment is a companion comment to the comment on Proposal 13-184 dealing with the rewrite of Article 705. There is also a companion comment to the comment on Proposal 13-17 dealing with comment on Article 690. It may be best to review the comment on Article 705, proposal 13-184 before reviewing this comment and the one on 13-17.

It is recognized that the Fuel Cell community has done great work in promoting and advancing the fuel cell technology for electric power production. While there may be reluctance to remove the utility-interconnection requirements from both Articles 692 and 690, it is the best organization for the NEC to keep the nonspecific interconnection requirements in Article 705 scoped specifically for the interconnection of electric power sources and any specific technology installation requirements such as photovoltaic and fuel cells in their separate articles.

The main purpose of the original proposal is to consolidate non-photovoltaic utility interconnection issues with distributed generation in Article 705 and photovoltaic-specific technical issues in Article 690. Having nonphotovoltaic utility interconnection issues duplicated within Article 692 causes confusion with Article 705 that is intended to deal with utility interconnection issues with all distributed generation sources.

The intent of this comment on the original proposal is to clarify and correct the issues in Article 692 based on the rewrite of Article 705 and on the affirmative comments as published in the Report on Proposals suggested by the members of CMP-13. The original proposal as published in the ROP was used to identify the changes as originally proposed.

Panel Meeting Action: Reject
Panel Statement: The panel rejects the proposal in order to satisfy the intent of the original panel action on the proposal by keeping Article 692 intact while transferring selected language related to interconnection to Article 705.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-94 Log #1182 NEC-P13 **Final Action: Reject**
(692)

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 13-71
Recommendation: Accept Proposal 13-71.
Substantiation: Proposal 13-184 establishes a location in Article 705 to locate the common interconnection requirements that apply to all electric power production sources operating in parallel with a primary source of electricity. These requirements are not unique to fuel cell systems and should be relocated to Article 705 and removed from Article 692. This action is a necessary step towards standardization of interconnection requirements and improves the usability of the NEC.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-93.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

Comment on Affirmative:
HORNBERGER, B.: I agree with the panel action, however the panel discussed recommending that a Task Group be formed to review the redundant "Point of Connection" requirements for PV in 690, Fuel Cells 692 and Interconnected Electric Power Sources 705. There is no mention of this in the panel statements. The panel harmonized most of these requirements through their actions on comments 13-77, 13-97, and 13-262. Photovoltaic and Fuel Cell systems are "Interconnected Electric Power Sources", when they operate in parallel with another supply source. Article 705 should apply. Point of connection requirements in Articles 690 and 692 should only contain "special" considerations that pertain to the specific power source technology.

13-95 Log #2197 NEC-P13 **Final Action: Accept**
(692)

Submitter: Kenneth Krastins, Plug Power, Inc. / Rep. US Fuel Cell Council
Comment on Proposal No: 13-71
Recommendation: Reject the proposed change.
Substantiation: The panel acknowledged the value of such a proposal and accepted this proposal in principle to permit public comment of the proposal. Comments have been received and will be reviewed further at the CMP-13 ROC meeting in November. But, feedback to this point indicates that to adequately address the concerns of a change of this magnitude and craft language that will neither omit nor introduce wording that will compromise safety for the affected industries that a working group will need to convene to provide a comprehensive proposal for the 2011 NEC. The proposal should be rejected by the panel to ensure that the changes indicated in the 2008 NEC ROP are not inadvertently included in the final publication.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-96 Log #97 NEC-P13 **Final Action: Accept**
(692.41)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-72
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal that the intent is to delete the existing text in 692.41 and 692.41(A) and (B) as it appears in the 2005 NEC and replace it with the text in this proposal.

This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: It is the panel's intent to delete the existing text in 692.41 and 692.41(A) and (B) as it appears in the 2005 NEC and replace it with the text in the proposal.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-97 Log #314 NEC-P13 **Final Action: Accept in Principle**
(692.65)

TCC Action: The Technical Correlating Committee directs that the phrase "shall have been sized" be changed to read "shall be sized" to comply with 3.3.1 of the NEC Style Manual.
Submitter: Code-Making Panel 9,
Comment on Proposal No: 13-74
Recommendation: Modify the panel action as follows (legislative formatting in this comment applies to differences from the CMP-13 action text, and not in respect to the 2005 NEC):

692.65 Utility-Interactive Point of Connection. The output of a utility interactive inverter shall be connected as specified in 692.65(A) or 692.65(B). Distribution equipment fed by both primary and electric power production sources shall also comply with (C).

(A) Supply Side. A utility-interactive inverter shall be permitted to be connected to the supply side of the service disconnecting means as permitted in 230.82(6).

(B) Load Side. A utility-interactive inverter shall be permitted to be connected to the load side of the service disconnecting means of the other source(s) at any distribution equipment on the premises, provided that all of the ~~following~~ conditions ~~of 692.62(B)(1) through 692.65(B)(5)~~ in (C) are met:

C) Interconnection Limitations for Distribution Equipment. Where distribution equipment, including switchboards and panelboards, is fed simultaneously by a primary source(s) of electricity and one or more fuel cell system power sources, and where this distribution equipment is capable of supplying multiple branch circuits or feeders or both, the interconnecting provisions for the fuel cell system power sources shall comply with (1) through (6).

(1) Dedicated Overcurrent and Disconnect. Each source interconnection shall be made at a dedicated circuit breaker or fusible disconnecting means.

(2) Ground Fault Protection. The interconnection point shall be on the line side of all ground-fault protection equipment.

Exception: Connection shall be permitted to be made to the load side of ground-fault protection, provided that there is a ground-fault protection for equipment from all ground-fault current sources. Ground-fault protection devices used with supplies connected to the load-side terminals shall be identified and listed as suitable for backfeeding.

(3) Marking. Equipment containing overcurrent devices in circuits supplying power to a busbar or conductor shall be marked to indicate the presence of all sources.

(4) Suitable for Back Feed. Equipment such as circuit breakers, if backfed, shall be identified for such operation.

(5) Bus or Conductor Rating. ~~The rating of the bus or conductor to which the utility interactive inverter breaker or fusible disconnect is connected shall meet all of the conditions in 692.65(B)(5)(a) or 692.65(B)(5)(b).~~ Unless the panelboardis rated not less than the sum of the ampere ratings of all overcurrent devices supplying it, a connection in a panelboard shall be positioned at the opposite (load) end from the input feeder location or main circuit location.

~~(a) End Feed Connection. Where the utility interactive inverter breaker or fusible disconnect is connected in the distribution equipment at the opposite (load) end from the input feeder connection or main circuit location, the bus or conductor rating shall be equal to or larger than the sum of the ampere ratings of all overcurrent devices connecting premise electric power production sources to the bus or conductor.~~ A permanent warning label shall be applied to the distribution equipment with the following or equivalent:

WARNING
ELECTRIC POWER PRODUCTION SOURCE OUTPUT
DO NOT RELOCATE THIS OVERCURRENT DEVICE

~~(b) General Connection. Where the utility interactive inverter breaker or fusible disconnect is not end fed, the bus or conductor rating shall be equal to or larger than the sum of the ampere ratings of overcurrent devices in circuits supplying owner to the busbar or conductor. Exception: For a dwelling unit, the sum of the ampere ratings of the overcurrent devices shall not exceed 120 percent of the rating of the busbar or conductor.~~

Substantiation: Although the Technical Correlating Committee requested CMP-9 to comment on Proposal 13-61, and the panel has done so, the technical issues raised in that and in the associated proposals apply to all systems capable of interconnection and parallel operation using multiple sources. For this reason, CMP-9 believes that the CMP-13 actions in Articles 690, 692, and 705 must be correlated in this respect, and is providing comments to the comparable proposals and panel actions in all of these articles. For example, the ground-fault exception presented here correlates with the approach in Proposal 13-61.

CMP-9 agrees that it is possible to assure that the busbars of panelboards receiving supply current from two sources can be arranged so the busbars will not exceed their ampacity (the "opposite end" scenario accepted under this proposal), however, CMP-9 points out that such an arrangement allows for up to double the amount of load to be taken from the panel for indefinite periods of time. Current product standards do not anticipate the effect of I2R heating losses under these conditions, which could severely impact the performance of essential components within the distribution equipment. Before the NEC recognizes this type of connection, it is essential that careful testing be carried out to determine the acceptable parameters that should be applied in these cases.

For example, if a fuel cell system provides 100 amperes of power to a panel in an interactive system rated 100 amperes, and this panel is supplied by a normal utility supply of 100 amperes, the branch circuit and feeder loads supplied by this panel could total 200 amperes. Although such a load should not exist due to required sizing rules relative to Article 220 calculations, the requirement for individual protection for panelboards (now set to apply to all panelboards by virtue of CMP-9 action in this cycle) anticipates that these load calculations are easily circumvented given the relative ease of circuit modifications.

CMP-9 expresses its willingness to assign a task group to work with CMP-13 and other interested industry parties to provide a carefully substantiated global approach to double-fed distribution equipment applied in interactive settings for the 2011 NEC. This might include specially targeted allowances for equipment listings that would cover such interconnections. In the mean time, this comment does broaden the 120 percent allowance from dwellings to all occupancies. Because of the I2R relationship, an allowance for an additional 20 percent loading (one fifth) would only increase the heating losses by 4 percent (one twenty fifth), which should be tolerated by existing equipment designs even if the interconnection does not occur at the opposite end of the bus from the normal supply. This comment incorporates the opposite-end rule from the CMP-13 action on this proposal as a trade-off for the occupancy expansion, thereby ensuring that an overloaded busbar does not exacerbate the heating problem.

This comment has been balloted through CMP-9 with the following balloting results:

11 Eligible to Vote
10 Affirmative
1 Not Returned (H. deVega)

Panel Meeting Action: Accept in Principle
Revise CMP-9's 692.65(B) and (C) as follows:

692.65 Point of Connection. The output of a utility-interactive inverter shall be connected as specified in 692.65(A) or 692.65(B).

(A) Supply Side. The output of a utility-interactive inverter shall be permitted to be connected to the supply side of the service disconnecting means as permitted in 230.82(6).

(B) Load Side. The output of a utility-interactive inverter shall be permitted to be connected to the load side of the service disconnecting means of the other source(s) at any distribution equipment on the premises**.** Where distribution equipment including switchboards and panelboards is fed simultaneously by a primary source(s) of electricity and one or more utility-interactive inverters, and where this distribution equipment is capable of supplying multiple branch circuits or feeders or both, the interconnecting provisions for the utility-interactive inverter(s) shall comply with (1) through (7).

(1) Dedicated Overcurrent and Disconnect. Each source interconnection shall be made at a dedicated circuit breaker or fusible disconnecting means.

(2) Bus or Conductor Rating. The sum of the ampere ratings of overcurrent devices in circuits supplying power to a busbar or conductor shall not exceed 120 percent of the rating of the busbar or conductor.

(3) Ground Fault Protection. The interconnection point shall be on the line side of all ground-fault protection equipment.

Exception: Connection shall be permitted to be made to the load side of ground-fault protection, provided that there is ground-fault protection for equipment from all ground-fault current sources. Ground-fault protection devices used with supplies connected to the load-side terminals shall be identified and listed as suitable for backfeeding.

(4) Marking. Equipment containing overcurrent devices in circuits supplying power to a busbar or conductor supplied from multiple sources shall be marked to indicate the presence of all sources.

(5) Suitable for Back Feed. Circuit breakers, if backfed, shall be suitable for such operation.

FPN: Circuit breakers that are marked "Line" and "Load" have been evaluated only in the direction marked. Circuit breakers without "Line" and "Load" have been evaluated in both directions.

(6) Fastening. Listed plug-in type circuit breakers backfed from utility-interactive inverters complying with 692.60 shall be permitted to omit the additional fastener normally required by 408.36(F) for such applications.

(7) Inverter Output Connection. Unless the panelboard is rated not less than the sum of the ampere ratings of all overcurrent devices supplying it, a connection in a panelboard shall be positioned at the opposite (load) end from the input feeder location or main circuit location. The bus or conductor rating shall have been sized for the loads connected in accordance with Article 220. A permanent warning label shall be applied to the distribution equipment with the following or equivalent wording:

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

Panel Statement: The panel reorganized (B) and (C) into a single section (B) for user-friendliness and added "The bus or conductor rating shall have been sized for the loads connected in accordance with Article 220" to (7) to satisfy intent of Comment 13-78. The panel revised the heading for (7) to eliminate duplication, then added (2) and (6) from CMP-9's recommendation in Comment 13-77, Point of Connection for PV systems. Inverter interconnection requirements for PV and fuel cell systems are similar and should be harmonized.

Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:

BOWER, W.: In 692(B)(3), the term "Ground Fault" in the title should be changed to "Ground-fault".

13-98 Log #2196 NEC-P13 **Final Action: Accept in Principle (692.65(B)(2))**

Submitter: Kenneth Krastins, Plug Power, Inc. / Rep. US Fuel Cell Council
Comment on Proposal No: 13-74
Recommendation: Modify the proposed wording to conform with the 8/1/2006 memorandum from CMP-9 on this proposal and the follow-up comments from the PV Industry Forum to Proposal 13-61. Add the comment to permit the 120 percent allowance substantiated in the CMP-9 memorandum and included in their comments to Proposal 13-61.
Substantiation: Although it could be argued that circumventing the language of the NEC will necessarily introduce hazards, this writer concedes that the relative ease of circumventing the rules of Article 220 make it prudent at this time to revise the text as recommended by CMP-9 and the PV Industry Forum. The above comment will address this concern as well as provide consistency between Articles 690 and 692. The recommendation to add the 120 percent allowance is also made for consistency, as it has been included in the CMP-9 recommendation for Proposal 13-61 as well as the substantiation section for Proposal 13-74, but it has been omitted from their text of the revised, proposed wording for Proposal 13-74.

Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-97.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-99 Log #2298 NEC-P13 **Final Action: Reject (692.65(B)(2))**

Submitter: Todd Stafford, IBEW-NJATC / Rep. IBEW
Comment on Proposal No: 13-74
Recommendation: The panel should reverse its action and revert to the 2005 code for section 692.65(B)(2).
Substantiation: The panel action taken will not create a safer installation. Considerable technical information is needed to properly address the issue of connecting PV interactive inverters to a bus or conductor to allow the interconnection to be properly performed. The changes made by the Panel during the ROP stage does not address the concerns raised. See my comments to the negative for the ROP stage as well as those submitted by Hornberger.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-97.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-100 Log #1183 NEC-P13 **Final Action: Accept in Principle (692.65(B)(5)(a))**

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 13-74
Recommendation: Revise the wording of the Panel action for 692.65(B)(5)(a) per Mr. Hornberger's comment, as follows:
692.65(B)(5)(a) End Feed Connection. Where the utility-interactive inverter breaker or fusible disconnect is connected in the distribution equipment at the opposite (load) end from the input feeder connection or main circuit location, the bus or conductor rating shall be equal to or larger than the sum of the ampere ratings of all overcurrent devices connecting premise electric power production sources to the bus or conductor. The bus or conductor rating shall have been sized for the loads connected, in accordance with Article 220. A permanent warning label shall be applied to the distribution equipment with the following or equivalent:

WARNING
ELECTRIC POWER PRODUCTION SOURCE OUTPUT
DO NOT RELOCATE THIS OVERCURRENT DEVICE.

Substantiation: The Panel's rewording of 692.65(B)(5)(a) will permit the sum of the overcurrent devices supplying current to a bus or conductor to exceed the ampacity rating of the bus or conductor by 200%. If the bus or conductor is not sized for the loads served, in accordance with Article 220, an overload condition may exist on the bus or conductor that would not be detected by any of the overcurrent devices supplying current to the system. In addition, this is a "generic" requirement for utility interactive inverters and not specifically a fuel cell system issue. Please see recommended rewording and relocation as part of Mr. Hornberger's comment on Proposal 13-184 to incorporate a reference to Article 220 and move the text to Article 705.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-97.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

13-101 Log #1185 NEC-P13 **Final Action: Accept in Principle (692.65(B)(5)(a))**

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 13-75
Recommendation: Revise the wording of the Panel action for 692.65(B)(5)(a) in Proposal 13-74 per Mr. Hornberger's comment, as follows:
692.65(B)(5)(a) End Feed Connection. Where the utility-interactive inverter breaker or fusible disconnect is connected in the distribution equipment at the opposite (load) end from the input feeder connection or main circuit location, the bus or conductor rating shall be equal to or larger than the sum of the ampere ratings of all overcurrent devices connecting premise electric power production sources to the bus or conductor. The bus or conductor rating shall have been sized for the loads connected, in accordance with Article 220. A permanent warning label shall be applied to the distribution equipment with the following or equivalent:

WARNING
ELECTRIC POWER PRODUCTION SOURCE OUTPUT
DO NOT RELOCATE THIS OVERCURRENT DEVICE.

Substantiation: The Panel's rewording of 692.65(B)(5)(a) in Proposal 13-74 will permit the sum of the overcurrent devices supplying current to a bus or conductor to exceed the ampacity rating of the bus or conductor by 200%. If the bus or conductor is not sized for the loads served, in accordance with Article 220, an overload condition may exist on the bus or conductor that would not be detected by any of the overcurrent devices supplying current to the system. In addition, this is a "generic" requirement for utility interactive inverters and not specifically a fuel cell system issue. Please see recommended rewording and relocation as part of Mr. Hornberger's comment on Proposal 13-184 to incorporate a reference to Article 220 and move the text to Article 705.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-97.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 16
Ballot Not Returned: 1 Gustafson, R.

ARTICLE 695 — FIRE PUMPS

13-102 Log #98 NEC-P13 **Final Action: Accept (695)**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-77
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" because of the number of technical inconsistencies, style manual issues, and the inclusion of material outside the scope and purpose of Article 695.

It was the action of the Technical Correlating Committee that this proposal be reconsidered by the panel and that the panel limit the requirements to those within the scope of those necessary for a safe electrical installation. The Technical Correlating Committee agrees with the negative commenters that much of the material added by the panel is inappropriate for the NEC. The panel should not attempt to recreate NFPA 20 in the NEC. In addition, the panel is directed to address the large number of style manual issues noted in Mr. Nasby's negative comment. This action shall be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-103 Log #1037 NEC-P13 **Final Action: Hold (695)**

The Technical Correlating Committee directs that the panel action on Comment 13-103 be reported as "Hold" consistent with Section 4.4.6.2.2 of the NFPA Regulations Governing Committee Projects.

In reviewing Comment 13-103, the Technical Correlating Committee found a significant number of correlation, style and technical issues that make the rewrite of Article 695 unacceptable. These issues include, but are not limited to:

1.References to material within Article 695 that are incorrect

2. Addition of material from NFPA 20 that is not appropriate for Article 695

3. Requirements added that are outside the scope of Article 695

4. Deletion of text that was not substantiated by any proposal or comment

5. FPNs that contain requirement and intent statements

6. Redundant text that is already covered by 90.3

Through this Technical Correlating Committee action, Article 695 will appear as it did in the Report on Proposals draft as modified by Comments 13-113 and 13-134.

Although the Technical Correlating Committee is concerned with the fact that there may be valid proposals and comments that will not move forward, the panel's attempt to rewrite the entire Article without acting on the individual proposals and comments creates technical issues that cannot move forward and cannot be corrected by the Technical Correlating Committee.

Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-77
Recommendation: Revise the text of the TCC write-up in the A2007 ROP to read as follows.
Revisions to the ROP Version of

Article 695 for the
2008 Edition of NFPA-70
ARTICLE 695 Fire Pumps

FPN: Rules that are followed by a reference in brackets contain text that has been extracted from NFPA 20-2006, Standard for the Installation of Stationary Pumps for Fire Protection. Only editorial changes were made to the extracted text to make it consistent with this Code.

695.1 Scope.

(A) Covered. This article covers the installation of the following:
(1) Electric power sources and interconnecting circuits
(2) Switching and control equipment dedicated to fire pump drivers
(3) Associated fire pump accessory equipment

(B) Not Covered. This article does not cover the performance, maintenance, and acceptance testing of the fire pump system, and the internal wiring of the components of the system.

FPN: See NFPA 20-2006, Standard for the Installation of Stationary Pumps for Fire Protection, for further information.

695.2 Definitions.

Fault Tolerant External Control Circuit. Those control circuits entering or leaving the fire pump controller enclosure, which if broken, disconnected, or shorted will not prevent the controller from starting the fire pump from all

other internal or external means and may cause the controller to start the pump under these conditions.

On-Site Power Production Facility. The normal supply of electric power for the site that is expected to be constantly producing power.

On-Site Standby Generator. A facility producing electric power on site as the alternate supply of electric power. It differs from an on-site power production facility, in that it is not constantly producing power.

695.3 Power Source(s) for Electric Motor-Driven Fire Pumps.

Electric motor-driven fire pumps shall have a reliable source of power.

FPN: NFPA 20-2006, *Standard for the Installation of Stationary Pumps for Fire Protection,* covers characteristics of reliable of reliable sources. Also see the cross-reference in Annex J.

(A) Scope. This section covers the minimum performance and testing requirements of the sources and transmission of electrical power to motors driving fire pumps.

(B) Equipment. Also covered are the minimum performance requirements of all intermediate equipment between the source(s) and the pump, including the motor(s) but excepting the electric fire pump controller, transfer switch, and accessories

FPN: See Chapter 10 of NFPA 20.

(C) General. All electrical equipment and installation methods shall comply with this Code except as modified by Article 695.

(D) Hazards. All power supplies shall be located and arranged to protect against damage by fire from within the premises and exposing hazards.

FPN: Where the power supply involves an on-site power production facility, the protection is required for the facility in addition to the wiring and equipment.

(E) Continuous Duty. All power supplies shall have the capacity to run the fire pump on a continuous basis.

(F) Voltage Drop. All power supplies shall comply with the voltage drop requirements of Section 695.8

(G) Phase Converters. Phase converters shall not be permitted to be used for fire pump service.

695.4 Continuity of Power.

(A) Continuously Available. An electric motor driven fire pump shall be provided with a normal source of power as a continually available source.

(B) Arrangement. The normal source of power required in 695.4(A) and its routing shall be arranged in accordance with one of the following:

(1) Service connection dedicated to the fire pump installation.

(2) On-site power production facility connection dedicated to the fire pump installation.

(3) A dedicated feeder connection derived directly from the dedicated service to the fire pump installation.

(4) As a feeder connection where all of the following conditions are met:

a. The protected facility is part of a multi-building campus style arrangement.

b. A back-up source of power is provided from a source independent of the normal source of power

.c. It is impractical to supply the normal source of power through arrangement 695.4(B)(1), 695.4(B)(2), 695.4(B)(3) or 695.4(B)(5).

d. The arrangement is acceptable to the authority having jurisdiction.

e. The overcurrent protection device(s) in each disconnecting means shall be selectively coordinated with any other supply side overcurrent protective device(s).

(5) A dedicated transformer connection directly from the service meeting the requirements of Article 695.6.

(C) Connections. For fire pump installations using the arrangement of 695.4(B)(1), 695.4(B)(2), 695.4(B)(3), 695.4(B)(5) for the normal source of power, no more than one disconnecting means and associated overcurrent protection device shall be installed in the power supply to the fire pump controller.

(D) Disconnecting Means. Where the disconnecting means permitted by 695.4(C) is installed, the disconnecting means shall meet all of the following:

(1) Identified as being suitable for use as service equipment.

(2) Lockable in the closed position.

(3) Located remote from other building disconnecting means.

FPN: This is to avoid the inadvertent simultaneous operation of the building and fire pump disconnect switches.

(4) Located remote from other fire pump source disconnecting means.

FPN: This is to avoid the inadvertent simultaneous operation of the disconnect switches of other fire pumps. (5) Marked "Fire Pump Disconnecting Means" in letters that are no less than one inch (25 mm) in height and that can be seen without opening enclosure doors or covers.

(E) Placard. Where the disconnecting means permitted by 695.4(C) is installed, a placard shall be placed adjacent to the fire pump controller stating the location of this disconnection means and the location of any key needed to unlock the disconnect.

(F) Supervision. Where the disconnecting means permitted by 695.4(C) is installed, the disconnect shall be supervised in the closed position by one of the following methods:

(1) Central station, proprietary or remote station signal device

(2) Local signaling service that will cause the sounding of an audible signal at a constantly attended location

(3) Locking the disconnecting means in the closed position

(4) Sealing of disconnecting means and approved weekly recorded inspections where the disconnecting means are located within fenced enclosures or in buildings under the control of the owner

(G) Overcurrent Protection Where the overcurrent protection permitted by 695.4(C) is installed, the overcurrent protection device shall be selected or set to carry indefinitely the sum of the locked-rotor current of the fire pump motor(s) and the pressure maintenance pump motor(s) and the full-load current of the associated fire pump accessory equipment. The next standard overcurrent device shall be used in accordance with 240.6. The requirement to carry the locked-rotor currents indefinitely shall not apply to conductors or devices other than overcurrent devices in the fire pump motor circuit(s).

695.5 Alternate Power.

(A) When Required. Except for an arrangement described in 695.5(C), at least one alternate source of power shall be provided when the height of the structure is beyond the pumping capacity of the fire department apparatus or when required by the AHJ. The alternate source shall, as a minimum, comply with the requirements of this section.

FPN: Local codes and/or AHJ often require alternate power for certain occupancies, such as high rise buildings, places of assembly and etc. These alternate power sources are considered to be the Emergency Source of Power for a motor driven fire pump as opposed to the Normal Source of Power.

(B) Unreliable Source. Except for an arrangement described in 695.5(C), at least one alternate source of power shall be provided where the normal source is not reliable.

FPN See Alternate Power, Other Sources in NFPA-20, *Standard for the Installation of Stationary Pumps for Fire Protection*, for specifics.

(C) Back-up Pump. An alternate source of power is not required where a back-up engine driven or back-up steam turbine driven fire pump is installed in accordance with this standard.

FPN: See NFPA-20 for requirements of engine driven or steam turbine fire pumps. In either case, operation of the pump is intended to be independent of the source of electrical power.

(D) Alternate Source. When provided, the alternate source of power shall be supplied from one of the following sources:

(1) A generator installed in accordance with 695.9.

(2) One of the sources identified in 695.4(B)(1); 695.4(B)(2); 695.4(B)(3); or 695.4(B)(5) when the power is provided independent of the normal source of power.

(E) Overhead Lines. When provided, the alternate supply shall be arranged so that the power to the fire pump is not disrupted when overhead lines are de-energized for fire department operations.

695.6 Transformers. Where the service or system voltage is different from the utilization voltage of the fire pump motor, transformer(s) protected by disconnecting means and overcurrent protective devices shall be permitted to be installed between the system supply and the fire pump controller in accordance with 695.6(A) and (B), or (C). Only transformers covered in 695.6(C) shall be permitted to supply loads not directly associated with the fire pump system.

FPN: This may apply to low voltage and medium voltage installations as well as when the service is high voltage.

(A) Size. Where a transformer supplies an electric motor-driven fire pump, it shall be rated at a minimum of 125 percent of the sum of the fire pump motor(s) and pressure maintenance pump(s) motor loads, and 100 percent of the associated fire pump accessory equipment supplied by the transformer.

(B) Overcurrent Protection. The primary overcurrent protective device(s) shall be selected or set to carry indefinitely the sum of the locked-rotor current of the fire pump motor(s) and the pressure maintenance pump motor(s) and the full-load current of the associated fire pump accessory equipment when connected to this power supply. Secondary overcurrent protection shall not be permitted. The requirement to carry the locked-rotor currents indefinitely shall not apply to conductors or devices other than overcurrent devices in the fire pump motor circuit(s).

(C) Feeder Source. Where a feeder source is provided in accordance with 695.4(B)(4), transformers supplying the fire pump system shall be permitted to supply other loads. All other loads shall be calculated in accordance with Article 220, including demand factors as applicable.

(1) Size. Transformers shall be rated at a minimum of 125 percent of the sum of the fire pump motor(s) and pressure maintenance pump(s) motor loads, and 100 percent of the remaining load supplied by the transformer.

(2) Overcurrent Protection. The transformer size, the feeder size, and the overcurrent protective device(s) shall be coordinated such that overcurrent protection is provided for the transformer in accordance with 450.3 and for the feeder in accordance with 215.3, and such that the overcurrent protective device(s) is selected or set to carry indefinitely the sum of the locked-rotor current of the fire pump motor(s), the pressure maintenance pump motor(s), the full-load current of the associated fire pump accessory equipment, and 100 percent of the remaining loads supplied by the transformer. The requirement to carry the locked-rotor currents indefinitely shall not apply to conductors or devices other than overcurrent devices in the fire pump motor circuit(s).

695.7 Power Wiring. Power circuits and wiring methods shall comply with the requirements in 695.7(A) through (H), and as permitted in 230.90(A), Exception No. 4; 230.94, Exception No. 4; 230.95, Exception No. 2; 240.13; 230.208; 240.4(A); and 430.31.

(A) Supply Conductors.

(1) Services and On-Site Power Production Facility. Service conductors and conductors supplied by an on-site power production facility shall be physically routed outside a building(s) and shall be installed as service conductors in accordance with Part III and Part IV of Article 230. Where supply conductors cannot be physically routed outside of buildings, they shall be permitted to be routed through the building(s) where installed in accordance with 230.6(1) or 230.6(2).

(2) Multi-Building Campus Style Complexes. Where a fire pump is wired under the provisions of 695.4(B)(4), all supply conductors on the load side of the service disconnecting means that constitute the normal source of supply to that fire pump shall be physically routed outside a building(s) and shall be installed

as outside feeder conductors in accordance with Article 225. Where the feeder conductors cannot be physically routed outside of buildings, they shall be permitted to be routed through the building(s) where installed in accordance with 230.6(1) or 230.6(2).

Exception to (A) (2): Where there are multiple sources of supply with means for automatic connection from one source to the other, the requirement for routing outside of the building(s) shall apply only to those conductors on the load side of that point automatic connection between sources.

(3) Supervised or On-Site Standby Generator Connections. Fire pump supply conductors on the load side of the final disconnecting means and overcurrent device(s) permitted by 695.4(C) or conductors that connect directly to an on-site generator shall comply with all of the following:

a. Independent Routing. The conductors shall be kept entirely independent of all other
wiring.

b. Associated Fire Pump Loads. The conductors shall supply only loads that are directly associated with the fire pump system.

c. Protection from Potential Damage. The conductors shall be protected to resist potential damage by fire, structural failure, or operational accident.

d. Inside a Building. When routed through a building, the conductors shall be installed using one of the following methods;

(1) Be encased in a minimum 50 mm (2 in.) of concrete

(2) Be protected by a fire-rated assembly listed to achieve a minimum fire rating of 2-hour and dedicated to the fire pump circuit(s).

(3) Be a listed electrical circuit protective system with a minimum 2-hour fire rating

FPN: UL guide information for electrical circuit protective systems (FHIT) contains information on proper installation requirements to maintain fire rating.

Exception to (3)(d): The supply conductors located in the electrical equipment room where they originate and in the fire pump room shall not be required to have the minimum 1-hour fire separation or fire resistance rating, unless otherwise required by
700. 9(D) of this Code.

(B) Conductor Size.

(1) Fire Pump Motors and Other Equipment. Conductors supplying a fire pump motor(s), pressure maintenance pumps, and associated fire pump accessory equipment shall have a rating not less than 125 percent of the sum of the fire pump motor(s) and pressure maintenance motor(s) full-load current(s), and 100 percent of the associated fire pump accessory equipment.

(2) Fire Pump Motors Only. Conductors supplying only a fire pump motor shall have a minimum ampacity in accordance with 430.22 and shall comply with the voltage drop requirements in 695.8.

(C) Overload Protection. Power circuits shall not have automatic protection against overloads. Except for protection of transformer primaries provided in 695.6(C)(2), branch-circuit and feeder conductors shall be protected against short circuit only. Where a tap is made to supply a fire pump, the wiring shall be treated as service conductors in accordance with 230.6. The applicable distance and size restrictions in 240.21 shall not apply.

Exception No. 1: Conductors between storage batteries and the engine shall not require overcurrent protection or disconnecting means.

Exception No. 2: For on-site standby generator(s) rated to produce continuous current in excess of 225 percent of the full-load amperes of the fire pump motor, the conductors between the on-site generator(s) and the combination fire pump transfer switch controller or separately mounted transfer switch shall be installed in accordance with 695.7(A)(3)d.

The protection provided shall be in accordance with the short-circuit current rating of the combination fire pump transfer switch controller or separately mounted transfer switch.

(D) Pump Wiring. All wiring from the controllers to the pump motors shall be in rigid metal conduit, intermediate metal conduit, liquidtight flexible metal conduit, or liquidtight flexible nonmetallic conduit Type LFNC-B, listed Type MC cable with an impervious covering, or Type MI cable.

(E) Junction Points. Where wire connectors are used in the fire pump circuit, the connectors shall be listed. A fire pump controller or fire pump power transfer switch, where provided, shall not be used as a junction box to supply other equipment, including a pressure maintenance (jockey) pump(s). A fire pump controller and fire pump power transfer switch, where provided, shall not serve any load other than the fire pump for which it is intended.

(F) Mechanical Protection. All wiring from engine controllers and batteries shall be protected against physical damage and shall be installed in accordance with the controller and engine manufacturer's instructions.

(G) Ground Fault Protection of Equipment. Ground fault protection of equipment shall not be permitted for fire pumps.

(H) Onsite Standby Generator Disconnecting Means. Where the power source is supplied by on-site generator(s), the supply conductors shall connect to a generator disconnecting means dedicated for the purpose of serving the fire pump. The disconnecting means shall be located in a separate enclosure from other generator disconnecting means.

695.8 Voltage Drop.

(A) Starting Voltage Drop. The voltage at the controller line terminals shall not drop more than 15 percent below normal (controller-rated voltage) under motor starting conditions.

(B) Mechanical Operator. The requirements of 695.8(A) shall not apply to emergency- run mechanical starting.

(C) Running Voltage Drop. The voltage at the motor terminals shall not drop more than 5 percent below the voltage rating of the motor when the motor is operating at 115 percent of the full-load current rating of the motor.

695.9 On-Site Standby Generator Systems.

(A) Capacity.

(1) Where on-site generator systems are used to supply power to fire pump motors to meet the requirements of 695.5(B), they shall be of sufficient capacity to allow normal starting and rung of the motor(s) driving the fire pump(s) while supplying all other simultaneously operated load(s) while meeting the requirements of 695.8

(2) A tap ahead of the on-site generator disconnecting means shall not be required.

(B) Power Sources.

These power sources shall comply with 695.8 and shall meet the requirements of Level 1 , Type 10 emergency power systems. .

FPN: Type 10 systems are required to make emergency power available in 10 or less seconds. See NFPA-110 *Standard for Emergency and Standby Power Systems* for definition of Level 1Emergency Power System. See NFPA-20 for fuel capacity requirements.

(C) Sequencing. Automatic sequencing of the fire pumps shall be permitted as a means of meeting the voltage drop requirements of 695.8.

(D) Transfer of Power. Transfer of power to the fire pump controller between the normal supply and one alternate supply shall take place within the pump room.

(E) Protective Devices. Where protective devices are installed in the on-site power source circuits at the generator, such devices shall allow instantaneous pickup of the full pump room load

FPN: This is to prevent any Generator Protective Devices from tripping when the fire pump load is transferred to the generator. The generator will instantaneous pickup the full pump room load, including the staring any and all connected fire pumps in the across-the-line (direct on line) full voltage staring mode. This is always the case when the fire pump(s) is running by use of the Emergency Mechanical Operator of the fire pump controller(s). (See NFPA-20 9.6 On-Site Standby Generator Systems.).

695.10 Junction Boxes. Where fire pump wiring to or from a fire pump controller is routed through a junction box, the following requirements shall be met.

(A) Mounting. The junction box shall be securely mounted.

(B) Controller Enclosure Integrity. Mounting and installing of a junction box shall not violate the enclosure type (NEMA) rating of the fire pump controller(s).

(C) Controller Short Circuit Rating Integrity. Mounting and installing of a junction box shall not violate the integrity of the fire pump controller(s) and shall not affect the
short-circuit rating of the controller(s).

(D) Type Rating. As a minimum, a Type 2, dripproof enclosure (junction box) shall be used. The enclosure shall be listed for the subject to match the fire pump controller enclosure Type rating.

FPN See Article 430.91 Motor Controller Enclosure Types for further information. See UL-250, *Standard for Enclosures for Electrical Equipment*, for requirements.

(E) Terminals. Terminals, junction blocks, splices, and the like, when used, shall be listed.

695.11 Listed Electrical Circuit Protective System to Controller Wiring.

(A) Single Conductors. Where single conductors (individual conductors) are used, they shall be terminated in a separate junction box and in accordance with this code.

FPN This is to avoid violating the enclosure type rating, and/or the controller short-circuit (withstand) rating. See also 300.20 and Article 322.

(B) Single conductors (individual conductors) shall not enter the fire pump enclosure separately.

(C) Smoke Seal. Where required by the listing of the electrical circuit protective system, the raceway between a junction box and the fire pump controller shall be sealed at the junction box end as required and per the instructions of the manufacturer or listing agency.

FPN When so required, this seal is to prevent flammable gases from entering into the fire pump controller.

(D) Standard wiring between junction box and controller is acceptable.

695.12 Raceway Terminations.

(A) Hubs. Listed conduit hubs shall be used to terminate raceway (conduit) to the fire pump controller.

(B) Type Rating. The NEMA Type rating of the conduit hub(s) shall be at least equal to that of the fire pump controller.

(C) Installation. The installation instructions of the manufacturer of the fire pump controller shall be followed.

(D) Controller Alterations. No alterations to the fire pump controller, other than conduit entry as allowed by this code, shall be made without the approval of the authority having jurisdiction.

695.13 Listed Equipment. Diesel engine fire pump controllers, electric fire pump controllers, electric motors, fire pump power transfer switches, foam pump controllers, and limited service controllers shall be listed for fire pump service. [NFPA 20:9.5.1.1, 10.1.2.1, 12.1.3.1]

695.14 Equipment Location.

(A) Controllers and Transfer Switches. Electric motor-driven fire pump controllers and power transfer switches shall be located as close as practicable to, and within sight of, the motors that they control.

(B) Engine-Drive Controllers. Engine-drive fire pump controllers shall be located as close as is practical to, and within sight of, the engines that they control.

(C) Storage Batteries. Storage batteries for fire pump engine drives shall be supported above the floor, secured against displacement, and located where they are not subject to physical damage, flooding with water, excessive temperature, or excessive vibration.

(D) Energized Equipment. All energized equipment parts shall be located at least 300 mm (12 in.) above the floor level.

(E) Protection Against Pump Water. Fire pump controllers and power transfer switches shall be located or protected so that they are not damaged by water escaping from pumps or pump connections.

(F) Mounting. All fire pump control equipment shall be mounted in a substantial manner on noncombustible supporting structures.

695.15 Control Wiring.

(A) Control Circuit Failures. External control circuits that extend outside the fire pump room shall be arranged so that failure of any external circuit (open or short circuit) shall not prevent the operation of a pump(s) from all other internal or external means. Breakage, disconnecting, shorting of the wires, or loss of power to these circuits could cause continuous running of the fire pump but shall not prevent the controller(s) from starting the fire pump(s) due to causes other than these external control circuits. All control conductors within the fire pump room that are not fault tolerant shall be protected against physical damage. [NFPA 20:10.5.2.6, 12.5.2.5]

(B) Sensor Functioning. No undervoltage, phase-loss, frequency-sensitive, or other sensor(s) shall be installed that automatically or manually prohibit actuation of the motor contactor. [NFPA 20:10.4.5.6]

Exception: A phase loss sensor(s) shall be permitted only as a part of a listed fire pump controller.

(C) Remote Device(s). No remote device(s) shall be installed that will prevent automatic operation of the transfer switch. [NFPA 20:10.8.1.3]

(D) Engine-Drive Control Wiring. All wiring between the controller and the diesel engine shall be stranded and sized to continuously carry the charging or control currents as required by the controller manufacturer. Such wiring shall be protected against physical damage. Controller manufacturer's specifications for distance and wire size shall be followed. [NFPA 20:12.3.5.1]

(E) Electric Fire Pump Control Wiring Methods. All electric motor-driven fire pump control wiring shall be in rigid metal conduit, intermediate metal conduit, liquidtight flexible metal conduit, liquidtight flexible nonmetallic conduit Type B (LFNC-B), listed Type MC cable with an impervious covering, or Type MI cable.

(F) Generator Control Wiring Methods. Control conductors installed between the fire pump power transfer switch and the standby generator supplying the fire pump during normal power loss shall be kept entirely independent of all other wiring. They shall be protected to resist potential damage by fire or structural failure. They shall be permitted to be routed through a building(s) encased in 50 mm (2 in.) of concrete or within enclosed construction dedicated to the fire pump circuits and having a minimum 1-hour fire resistance rating, or circuit protective systems with a minimum of 1-hour fire resistance. The installation shall comply with any restrictions provided in the listing of the electrical circuit protective system used.

Substantiation: The recommended text is based upon the TCC write-up in the A2007 ROP.

Revisions are also per the NEMA Explanation of Negative Vote Comments printed in the NEC ROP.

Revisions are also per R. Swayne's Explanation as follows:

Revisions to the ROP Version of
Article 695 for the
2008 Edition of NFPA-70
ARTICLE 695 Fire Pumps
Responses to Explanations of Negative Vote Comments

NEMA C & S Rejection Text:

NASBY, J.: NEMA disagrees with the rewrite outlined in this proposal. The arrangement of the material introduces new confusion to an Article that was already not clear in its intent. In addition, the revision adds material that is in NFPA 20 and should remain in NFPA 20. The responsibility of the NEC is for the installation requirements for the fire pump. Design requirements related to performance should not be moved to the NEC. An example of this problem is in proposed 695.5(A) to require an alternate source when the pumping capacity is beyond that of fire department apparatus. This is not an installation requirement, but is information that should remain in NFPA 20 only. -- Text of 695.5(A) revised. Also, Fine Print Note (FPN) added to 695.5(A) and 695.5(C). Also corrected some missed spelling and typo. errors. In addition, the revisions add a number of Fine Print Notes that are unacceptable and in violation of the NEC Style Manual. Examples of these notes include:

1. 695.4(D)(3) FPN – Contains a recommendation -- Done.
2. 695.4(D)(4) FPN – Contains a recommendation -- Done.
3. 695.5(B) FPN – Contains recommendations as well as an attempted interpretation of the requirement -- Done.
4. 695.9(E) FPN – contains recommendations -- Done.
5. 695.11(E) FPN – deals with warranty issues and is inappropriate in the NEC and in a FPN -- Done.

Other technical issues include (but are not limited to):

1. 695.6(I) – does not recognize installations where large generator sets are paralleled and supply switchboards or switchgear that then serves the various connected loads. -- There is no clause "695.6(I)".
2. 695.4(C) – limits the installation to one disconnect between the source and the controller. Should a transfer switch be installed ahead of the controller, another disconnect would not be permitted. This is contrary to typical installation where a remote disconnect is applied at the normal source of supply and then supplies the transfer switch. -- Correct. Only a single disconnect and OCPD is allowed ahead of the Normal Source and the fire pump controller. This is illustrated in NFPA-20 FIGURE A.9.3.2 "Typical Power Supply Arrangements from Source to Motor" " Arrangement B" and in FIGURE A.10.8 "Typical Fire Pump Controller and Transfer Switch Arrangements" " ARRANGEMENT II". A single disconnect (with or without OCPD) is allowed ahead of an upstream transfer switch.
3. 695.4(D) – it would appear that the requirement to not locate the disconnecting means in with other equipment has been lost in the revision without any substantiation. -- Noted. The only four connections allowed are (#1) Direct Connection via: Dedicated Service (695.4(B)(1), On-Site Power Plant (695.4(B)(2), Dedicated Fire Pump Feeder(695.4(B)(3); #2 Campus style feeder (695.4(B)(4); #3 Supervised Connection (695.4(D); and Transformer Connection (695.4(B)(5). Made editorial correction to incorrect reference to 695.4(A) which should be 695.4(C). Done.
4. 695.4(B)(4)(e) – the requirement for selective coordination creates significant technical concern. It may be impossible to design a system where the overcurrent protection for the fire pump circuit (size very large to carry locked rotor current) could be selectively coordinated with an upstream device that is part of the normal distribution system protection. It may also end up causing the other parts of the distribution system equipment to be oversized to simply accomplish the selectivity requirement. This is not justified or substantiated and decreases safety because of the increase in arc flash hazard. This is part of the requirements for mulit-building campus style connection where allowed. Fire pump equipment is considered expendable while fighting a fire. The equipment is designed to and intended to run to destruction. No other loads are allowed to pose a hazard to the power supply for a fire pump or pumps. Arc-flash protection is part of NFPA-70E. Fire pump controllers very often have high short circuit current rating with 100,000 Amp Symmetrical be the most common. This is due to their use in large buildings or facilities. **[Thru buildings clause missing?]**

Other requirements that are inappropriate for the NEC include:

1. 695.9(A)(1) – a direct mandatory reference to NFPA 110, which is prohibited by the NEC Style Manual -- Done. Moved reference to new FPN.
2. 695.9(B)(2) – requirements for fuel supply capacity for a generator which is not an NEC installation issue -- Done. Deleted. Moved reference to NFPA-20 to new FPN.
3. 695.10(D) – A mandatory reference to NEMA Type 2 – which is reference to another standard that is prohibited by the NEC Style Manual. -- Done. Moved to new FPN.
4. 695.12(D) – is in conflict with the provisions of 90.4 -- Done. Wording was incorrect.
5. 695.3(C) – this material is redundant with 90.3 -- Clause isn't redundant with 90.3. This clause is for inspection and enforcement agencies to prevent installation materials and equipment not complying with this standard. This is important for both low voltage and medium voltage installations since auxiliary and ancillary equipment is often installed in the power path or signal paths. Said equipment varies widely.The complete concept of this revision needs to be addressed in the comment phase with the objective of keeping Article 695 limited to installation requirements necessary for the application of the NEC. -- Done.

Swane Rejection Text:

SWAYNE, R.: This proposal should be rejected for many reasons. NFPA 20 has its place and Article 695 has its place, the two should not become one. The Scope of Article 695 covers the installation of power sources and interconnecting units and the installation of switching and control equipment dedicated to fire pump drives. It does not cover performance, maintenance, and testing of the fire pump system. The Scope of NFPA 20 covers minimum performance and testing requirements of the sources and transmission of electric power to motors driving fire pumps. The two scopes are not the same and each is necessary. -- Noted. Note that these installations are usually reviewed by at least two plan approval agencies and two inspection groups, namely electrical and fire prevention. This section (695) has carried the power supply extracted text from NFPA-20 since the NFPA-70 (NEC®) has wider circulation than NFPA-20, the extracted text helps prevent rejections and delays and unreliable installations. The wholesale replacement of one standard by another will leave electricians and Authorities Having Jurisdiction without the guidance necessary to provide safe installations of fire pumps. If it is felt that Article 695 is lacking in some of the requirements that NFPA 20 indicates as being important, then a paragraph by paragraph review should be performed. In this way, there will not be any danger in deleting any of the safe practices that exist today. -- Also noted. This is the purpose of Article 695. The purpose is not to replicate NFPA-20; but, to carry over only those clauses pertinant to plan approval agencies, installers, and inspectors.

As examples of where the proposed action is deficient:

1) Section 695.3(G) prohibits phase converters which was not accepted by NFPA 20 as documented in the substantiation to Proposal 13-81. See Negative Comment on Proposal 13-81. -- See the somewhat confusing history of this topic in NFPA-20 copied below. At this time, Phase Converters are not allowed by the NFPA-20 Technical Committee.

20-71 Log #59 Final Action: Reject
(9.2.1.1)

SUBMITTER: Kevin J. Kelly, National Fire Sprinkler Association
RECOMMENDATION: State whether or not phase converters are allowed where a 3-phase motor is being used for the fire pump, but three-phase electricity isn't available.
SUBSTANTIATION: The users of NFPA 20 need guidance on whether or not the use of phase converters constitutes "a reliable source" of power. The situation occurs frequently where three-phase power is not available. How is this problem intended to be addressed?
Is there a need to list phase converters for fire pump service? Is there a need to regulate how phase reversal will be monitored and annunciated?
Users of the standard need answers to these questions.
COMMITTEE MEETING ACTION: Reject
COMMITTEE STATEMENT: Performance of this equipment is not suitable for this service.
NUMBER ELIGIBLE TO VOTE: 27
BALLOT RESULTS: Affirmative: 24 Negative: 1
BALLOT NOT RETURNED: 2 LEICHT, MEZSICK
EXPLANATION OF NEGATIVE:
HAAGENSEN: If the Committee strongly considers that phase converters are not suitable for this purpose, then the provisions of NFPA 20 should clearly state that sentiment.

20- 8 Log #38 Final Action: Accept in Principle
(9.2.1)

Submitter: Jon Nisja, Northcentral Regional Fire Code Development Committee
Comment on Proposal No: 20-71
Recommendation: Add a new section to read:
9.2.x Phase converters shall not be permitted to be used for fire pump service.
Substantiation: Based on the committee statement to the proposal and the negative comment of Mr. Haagensen we have submitted a comment to include the prohibition of the converters to clarify the issue.
Committee Meeting Action: Accept in Principle
See Committee Action and Statement on 20-42 (Log #37).
Committee Statement: See Committee Action and Statement on 20-42 (Log #37).
Number Eligible to Vote: 27
Ballot Results: Affirmative: 26
Ballot Not Returned: Mezsick, S.

20-42 Log #37 Final Action: Accept
(A.9.2.1.1)

Submitter: Kenneth E. Isman, National Fire Sprinkler Association
Comment on Proposal No: 20-71
Recommendation: Add an annex note to 9.2. . as follows:
A.9.2 Phase converters that take single phase power and convert it to three phase power for the use of fire pump motors are not recommended because of the imbalance in the voltage between the phases when there is no load on the equipment. If the power utility installs a phase converters in their own power transmission lines, such phase converters are outside the scope of this standard and need to be evaluated by the AHJ to determine the reliability of the electric supply.
Substantiation: This was our understanding from the discussion at the ROP meeting as to the reason for the rejection of our proposal. If this information is true, it should be recorded in the annex.
Committee Meeting Action: Accept
Number Eligible to Vote: 27
Ballot Results: Affirmative: 26
Ballot Not Returned: Mezsick, S.

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2) Section 695.4(B)(4)(c) refers to itself as being impractical. -- Done. Clause corrected. This is a numbering error carried forward.

3) Section 695.4(B)(5) refers to "service" whereas the facility does not have to be a campus to have a primary service with a low voltage supply feeding the building or structure. -- Although place last, this clause, 695.4(B)(5) does not relate to the campus style method of 695.4(B)(4). It also applies service at low voltage, medium voltage or high voltage. For example: 480 Vac to 208 Vac, 7,000 Vac to 480 Vac or 13.8 KVac to 240 Vac.

4) Section 695.4(F)(4) refers to weekly recorded inspections which are proper for NFPA 20, but not for NFPA 70 which is an installation code. -- Although periodic inspections and maintenance are generally covered in NFPA-25 for sprinkler systems, this clause is separate and does not fall in the realm of normal inspection of fire pumps or sprinkler systems. It applies directly to the assurance of power being available for the fire pump. This is important to plan approval agencies, installers and inspectors to know of this provision along with the other electrical requirements so that provisions can be made.

5) Section 695.5(A) is a new requirement that may be enforced by the Fire Marshal, but not by the electrical AHJ. Noted. Clause revised.

6) Section 695.5(B) requires an alternate source when the normal source is not reliable without defining "reliable". "Reliable" is not defined in Article 100 and the attempt to define it by the unenforceable FPN is confusing. Noted. Clause modified.

7) Section 695.5(B), FPN No. 4 refers to conditions that are not permitted. This may signal the installer that it may not be permitted, but you can do it anyway if you provide an alternate source. This sends the wrong signal. Noted. FPN deleted.

8) Editorially, "when" should be replaced by "where" in several locations to meet the Style Manual. -- Noted. I'm asking for direction from NFPA staff I'm trying to minimize differences in extracted text compared to the source document.

9) It is not apparent what is included in Section 695.7(A) and what is in Section 695.7(B). -- Corrected spelling error and missing text in title of 695.7 and sub-clause (A). Proposed 695.7 [Power Wiring] (A) [Supply Conductors] is essentially similar to extant [2005] 695.6 [Power Wiring] sub-clauses (A) [Service Conductors] and (B) [Circuit Conductors]. 695.7(B) [Conductor Sizes] is essentially similar to extant 695.6(C) [Conductor Size].

10) Section 695.7(A)(B)(3) refers to load side of the "service" disconnecting means. A multi-building campus or a facility with a primary service generally does not have a "service" to each of its buildings. -- Acknowledge. The term "service" here means the campus service equipment, such as double ended switchgear (main-tie-main). A FPN may be in order to help clarify since the campus distribution, while typically medium voltage, is also typically down stream of transformers, and where the primary side, the secondary side, or both may be arranged as double ended.

11) Section 695.7(A)(B)(3) refers to disconnecting means and overcurrent devices permitted by Section 695.4(B). Section 695.4(B) does not cover these items. -- Correct. Corrected reference to read "695.4(C)".

This proposal is premature and should be rejected. The Proposer should come back with a detailed comparison for consideration. Noted. Revisions made accordingly with appreciation for these observations and corrections.

Panel Meeting Action: Accept in Principle in Part

Revise Article 695 to read as follows:

ARTICLE 695 Fire Pumps

FPN: Rules that are followed by a reference in brackets contain text that has been extracted from NFPA 20-2007 ~~3~~, *Standard for the Installation of Stationary Pumps for Fire Protection*. Only editorial changes were made to the extracted text to make it consistent with this *Code*.

695.1 Scope.

(A) Covered. This article covers the installation of the following:

(1) Electric power sources and interconnecting circuits

(2) Switching and control equipment dedicated to fire pump drivers

(3) Associated fire pump accessory equipment, which includes wiring and overcurrent protection of other loads connected to the power supply.

(B) Not Covered. This article does not cover the following:

(1) The performance, maintenance, and acceptance testing of the fire pump system, and the internal wiring of the components of the system

(2) Pressure maintenance (jockey or makeup) pumps

FPN: See NFPA 20-~~2003~~ 2007, *Standard for the Installation of Stationary Pumps for Fire Protection*, for further information.

695.2 Definitions.

Fault Tolerant External Control Circuits. Those control circuits either entering or leaving the fire pump controller enclosure, which if broken, disconnected, or shorted will not prevent the controller from starting the fire pump from all other internal or external means and may cause the controller to start the pump under these conditions.

On-Site Power Production Facility. The normal supply of electric power for the site that is expected to be constantly producing power.

On-Site Standby Generator. A facility producing electric power on site as the alternate supply of electric power. It differs from an on-site power production facility, in that it is not constantly producing power.

695.3 Power Source(s) for Electric Motor-Driven Fire Pumps.

Electric motor-driven fire pumps shall have a reliable source of power.

FPN: NFPA 20-2007, *Standard for the Installation of Stationary Pumps for Fire Protection*, covers characteristics of reliable of reliable sources. Also see the cross-reference table in Annex J.

(A) Individual Sources. Where reliable, and where capable of carrying indefinitely the sum of the locked-rotor current of the fire pump motor(s) and the pressure maintenance pump motor(s) and the full-load current of the associated fire pump accessory equipment when connected to this power supply, the power source for an electric motor-driven fire pump shall be one or more of the following.

(1) Electric Utility Service Connection. A fire pump shall be permitted to be supplied by a separate service, or from a connection located ahead of and not within the same cabinet, enclosure, or vertical switchboard section as the service disconnecting means. The connection shall be located and arranged so as to minimize the possibility of damage by fire from within the premises and from exposing hazards. A tap ahead of the service disconnecting means shall comply with 230.82(5). The service equipment shall comply with the labeling requirements in 230.2 and the location requirements in 230.72(B). [NFPA 20:9.2.2]

(2) On-Site Power Production Facility. A fire pump shall be permitted to be supplied by an on-site power production facility. The source facility shall be located and protected to minimize the possibility of damage by fire. [NFPA 20:9.2.3]

(3) Dedicated Feeder. A dedicated feeder shall be permitted where it is derived from a service connection as described in 695.3(A)(1).
(B) Multiple Sources. Where reliable power cannot be obtained from a source described in 695.3(A), power shall be supplied one of the following:
(1) Two Individual Sources. ~~from a~~ An approved combination of two or more of ~~either of such sources~~ the sources from 695.3(A).
(2) Individual Source and Generator. An approved combination of one or more of the sources in 695.3(A) and an on-site generator complying with 695.3(D). ~~or from an approved combination of feeders constituting two or more power sources as covered in 695.3(B)(2), or from an approved combination of one or more of such power sources in combination with an on-site standby generator complying with 695.3(B)(1) and (B)(3).~~
(C) Multibuilding Campus-Style Complexes. Where the sources in 695.3(A) are not practicable and the installation is part of a multibuilding campus style complex, feeder sources shall be permitted where approved by the authority having jurisdiction and installed in accordance with (1) or (2).
(1) Two Feeder Sources. Two feeders shall be permitted as more than one power source where such feeders are connected to or derived from separate utility services. The connection(s), overcurrent protective device(s), and disconnecting means for such feeders shall meet the requirements of 695.4(B).
(2) Feeder and Alternate Source. A feeder shall be permitted as a normal source of power when an alternate source of power independent from the feeder is provided. The connection(s), overcurrent protective device(s), and disconnecting means for such feeders shall meet the requirements of 695.4(B).
~~**(1) Generator Capacity.** An on-site generator(s) used to comply with this section shall be of sufficient capacity to allow normal starting and running of the motor(s) driving the fire pump(s) while supplying all other simultaneously operated load. Automatic shedding of one or more optional standby loads in order to comply with this capacity requirement shall be permitted. A tap ahead of the on-site generator disconnecting means shall not be required. The requirements of 430.113 shall not apply. [NFPA 20:9.6.1]~~
~~**(2) Feeder Sources.** This section applies to multibuilding campus-style complexes with fire pumps at one or more buildings. Where sources in 695.3(A) are not practicable, and with the approval of the authority having jurisdiction, two or more feeder sources shall be permitted as one power source or as more than one power source where such feeders are connected to or derived from separate utility services. The connection(s), overcurrent protective device(s), and disconnecting means for such feeders shall meet the requirements of 695.4(B). [NFPA 20:9.2.5.3]~~
~~**(3) Arrangement.** The power sources shall be arranged so that a fire at one source will not cause an interruption at the other source. [NFPA 20:9.2.5.1]~~
(~~1~~D) Generator ~~Capacity~~ as Alternate Source. ~~An~~ Where an on-site generator(s) is used ~~to comply with this section~~ as an alternate source of power. The following shall apply:
(1) Capacity. The generator shall have ~~shall be of~~ sufficient capacity to allow normal starting and running of the motor(s) driving the fire pump(s) while supplying all other simultaneously operated load. Automatic shedding of one or more optional standby loads in order to comply with this capacity requirement shall be permitted.
(2) Connection. A tap ahead of the on-site generator disconnecting means shall not be required.
(3) Adjacent Disconnects. The requirements of 430.113 shall not apply.
(4) Phase Converters. Phase converters shall not be permitted to be used in the fire pump circuit.
~~**(3)** **(E) Arrangement.** The power sources shall be arranged so that a fire at one source will not cause an interruption at the other source. [NFPA 20:9.2.5.1]~~
The normal source of power required in 695.4(A) and its routing shall be arranged in accordance with one of the following:
(1) Service connection dedicated to the fire pump installation.
(2) On-site power production facility connection dedicated to the fire pump installation.
(3) A dedicated feeder connection derived directly from the dedicated service to the fire pump installation.
(4) As a feeder connection where all of the following conditions are met:
a. The protected facility is part of a multi-building campus style arrangement.
b. A back-up source of power is provided from a source independent of the normal source of power.
c. It is impractical to supply the normal source of power through arrangement 695.3(E)(4)(a), 695.3(E)(4)(b), 695.3(C)(4)(c) or 695.3(E)(4)(e).
d. The arrangement is acceptable to the authority having jurisdiction.
e. The overcurrent protection device(s) in each disconnecting means shall be selectively coordinated with any other supply side overcurrent protective device(s).
(5) A dedicated transformer connection directly from the service meetin g the requirements of Article 695.5.

695.4 Continuity of Power.
Circuits that supply electric motor-driven fire pumps shall be supervised from inadvertent disconnection as covered in 695.4(A) or 695.4(B).
~~(A) Direct Connection. The supply conductors shall directly connect the power source to either a listed fire pump controller or listed combination fire pump controller and power transfer switch. [NFPA 20:9.3.2.2.2]~~
(A) Continuously Available. An electric motor driven fire pump shall be provided with a normal source of power as a continually available source.
(B) Supervised Connection. A single disconnecting means and associated overcurrent protective device(s) shall be permitted to be installed between a remote power source and one of the following:
(1) A listed fire pump controller
(2) A listed fire pump power transfer switch
(3) A listed combination fire pump controller and power transfer switch

For systems installed under the provisions of 695.3(B)(2) only, such additional disconnecting means and associated overcurrent protective device(s) shall be permitted as required to comply with other provisions of this *Code*. Overcurrent protective devices between an on-site standby generator and a fire pump controller shall be selected and sized according to 430.62 to provide short-circuit protection only. All disconnecting devices and overcurrent protective devices that are unique to the fire pump loads shall comply with 695.4(B)(1) and 695.4(B)(2). ~~through (B)(5).~~
(1) Overcurrent Device Selection. The overcurrent protective device(s) shall be selected or set to carry indefinitely the sum of the locked-rotor current of the fire pump motor(s) and the pressure maintenance pump motor(s) and the full-load current of the associated fire pump accessory equipment when connected to this power supply. The requirement to carry the locked-rotor currents indefinitely shall not apply to conductors or devices other than overcurrent devices in the fire pump motor circuit(s).
~~**(2)** Disconnecting Means. The disconnecting means shall comply with all the following:~~
~~**(1)** Be identified as suitable for use as service equipment~~
~~**(2)** Be lockable in the closed position~~
~~**(3)** Not be located within equipment that feeds loads other then the fire pump~~
~~**(4)** Be located sufficiently remote from other building or other fire pump source disconnecting means such that inadvertent contemporaneous operation would be unlikely~~
~~**(3)** Disconnect Marking. The disconnecting means shall be marked "Fire Pump Disconnecting Means." The letters shall be at least 25 mm (1 in.) in height, and they shall be visible without opening enclosure doors or covers.~~
~~**(4)** Controller Marking. A placard shall be placed adjacent o the fire pump controller, stating the location of this disconnecting means and the location of the key (if the disconnecting means is locked).~~
(2) ~~**(5)**~~ **Supervision.** The disconnecting means shall be supervised in the closed position by one of the following methods:
(1) Central station, proprietary, or remote station signal device
(2) Local signaling service that causes the sounding of an audible signal at a constantly attended point
(3) Locking the disconnecting means in the closed position
(4) Sealing of disconnecting means and approved weekly recorded inspections when the disconnecting means are located within fenced enclosures or in buildings under the control of the owner. [NFPA 20:9.3.2.2.3]
(C) Connections. For fire pump installations using the arrangement of 695.3(E)(4)(a), 695.3(E)(4)(b), 695.3(E)(4)(c), and 695.3(E)(4)(e), for the normal source of power, no more than one disconnecting means and associated overcurrent protection device shall be installed in the power supply to the fire pump controller.
(D) Disconnecting Means. Where the disconnecting means permitted by 695.4(C) is installed, the disconnecting means shall meet all of the following:
(1) Identified as being suitable for use as service equipment.
(2) Lockable in the closed position.
(3) Located remote from other building disconnecting means.
FPN: This is to avoid the inadvertent simultaneous operation of the building and fire pump disconnect switches.
(4) Located remote from other fire pump source disconnecting means.
FPN: This is to avoid the inadvertent simultaneous operation of the disconnect switches of other fire pumps.
(5) Marked "Fire Pump Disconnecting Means" in letters that are no less than 1 inch (25 mm) in height and that can be seen without opening enclosure doors or covers.
(E) Placard. Where the disconnecting means permitted by 695.4(C) is installed, a placard shall be placed adjacent to the fire pump controller stating the location of this disconnection means and the location of any key needed to unlock the disconnect.
(F) Supervision. Where the disconnecting means permitted by 695.4(C) is installed, the disconnect shall be supervised in the closed position by one of the following methods:
(1) Central station, proprietary or remote station signal device
(2) Local signaling service that will cause the sounding of an audible signal at a constantly attended location
(3) Locking the disconnecting means in the closed position
(4) Sealing of disconnecting means and approved weekly recorded inspections where the disconnecting means are located within fenced enclosures or in buildings under the control of the owner
(G) Overcurrent Protection. Where the overcurrent protection permitted by 695.4(C) is installed, the overcurrent protection device shall be selected or set to carry indefinitely the sum of the locked-rotor current of the fire pump motor(s) and the pressure maintenance pump motor(s) and the full-load current of the associated fire pump accessory equipment. The next standard overcurrent device shall be used in accordance with 240.6. The requirement to carry the locked-rotor currents indefinitely shall not apply to conductors or devices other than overcurrent devices in the fire pump motor circuit(s).
695.5 Transformers. Where the service or system voltage is different from the utilization voltage of the fire pump motor, transformer(s) protected by disconnecting means and overcurrent protective devices shall be permitted to be installed between the system supply and the fire pump controller in accordance with 695.5(A) and (B), or (C). Only transformers covered in 695.5(C) shall be permitted to supply loads not directly associated with the fire pump system.
(A) Size. Where a transformer supplies an electric motor-driven fire pump, it shall be rated at a minimum of 125 percent of the sum of the fire pump motor(s) and pressure maintenance pump(s) motor loads, and 100 percent of the associated fire pump accessory equipment supplied by the transformer.
(B) Overcurrent Protection. The primary overcurrent protective device(s)

shall be selected or set to carry indefinitely the sum of the locked-rotor current of the fire pump motor(s) and the pressure maintenance pump motor(s) and the full-load current of the associated fire pump accessory equipment when connected to this power supply. Secondary overcurrent protection shall not be permitted. The requirement to carry the locked-rotor currents indefinitely shall not apply to conductors or devices other than overcurrent devices in the fire pump motor circuit(s).

(C) Feeder Source. Where a feeder source is provided in accordance with 695.3(B)(2), transformers supplying the fire pump system shall be permitted to supply other loads. All other loads shall be calculated in accordance with Article 220, including demand factors as applicable.

(1) Size. Transformers shall be rated at a minimum of 125 percent of the sum of the fire pump motor(s) and pressure maintenance pump(s) motor loads, and 100 percent of the remaining load supplied by the transformer.

(2) Overcurrent Protection. The transformer size, the feeder size, and the overcurrent protective device(s) shall be coordinated such that overcurrent protection is provided for the transformer in accordance with 450.3 and for the feeder in accordance with 215.3, and such that the overcurrent protective device(s) is selected or set to carry indefinitely the sum of the locked-rotor current of the fire pump motor(s), the pressure maintenance pump motor(s), the full-load current of the associated fire pump accessory equipment, and 100 percent of the remaining loads supplied by the transformer. The requirement to carry the locked-rotor currents indefinitely shall not apply to conductors or devices other than overcurrent devices in the fire pump motor circuit(s).

695.6 Power Wiring.

Power circuits and wiring methods shall comply with the requirements in 695.6(A) through (H), and as permitted in 230.90(A), Exception No. 4; 230.94, Exception No. 4; 230.95, Exception No. 2; 240.13; 230.208; 240.4(A); and 430.31.

(A) ~~Service~~ Supply Conductors. ~~Supply conductors shall be physically routed outside a building(s) and shall be installed as service entrance conductors in accordance with Article 230. Where supply conductors cannot be physically routed outside buildings, they shall be permitted to be routed through buildings where installed in accordance with 230.6(1) or 230.6(2). Where a fire pump is wired under the provisions of 695.3(B)(2), this requirement shall apply to all supply conductors on the load side of the service disconnecting means that constitute the normal source of supply to that fire pump.~~

(1) Services and On-Site Power Production Facility. Service conductors and conductors supplied by an on-site power production facility shall be physically routed outside a building(s) and shall be installed as service conductors in accordance with 230.6, 230.9 and Part III and Part IV of Article 230. Where supply conductors cannot be physically routed outside of buildings, they shall be permitted to be routed through the building(s) where installed in accordance with 230.6(1) or 230.6(2).

(2) Multi-Building Campus Style Complexes. Where a fire pump is wired under the provisions of 695.4(B)(4), all supply conductors on the load side of the service disconnecting means that constitute the normal source of supply to that fire pump shall be physically routed outside a building(s) and shall be installed as outside feeder conductors in accordance with Article 225. Where the feeder conductors cannot be physically routed outside of buildings, they shall be permitted to be routed through the building(s) where installed in accordance with 230.6(1) or 230.6(2).

Exception: Where there are multiple sources of supply with means for automatic connection from one source to the other, the requirement shall apply only to those conductors on the load side of that point of automatic connection between sources.

(3) ~~(B) **Circuit Conductors.**~~ **Supervised or On-Site Standby Generator Connections.** Fire pump supply conductors on the load side of the final disconnecting means and overcurrent device(s) permitted by 695.4(B) or conductors that connect directly to an onsite generator shall comply with all the following:

a. Independent Routing. The conductors shall be kept entirely independent of all other wiring.

b. Associated Fire Pump Loads. The conductors ~~They~~ shall supply only loads that are directly associated with the fire pump system.

c. Protection From Potential Damage. The conductors ~~and they~~ shall be protected to resist potential damage by fire, structural failure, or operational accident.

d. Inside a Building. When routed through a building, the conductors ~~They~~ shall be ~~permitted~~ installed and routed ~~through a building(s)~~ using one of the following methods:

(1) Be encased in a minimum 50 mm (2 in.) of concrete

(2) Be ~~within an enclosed construction~~ protected by a fire rated assembly listed to achieve a minimum fire rating of 2 hours and dedicated to the fire pump circuit(s). ~~and having a minimum of a 1 hour fire resistive rating~~

(3) Be a listed electrical circuit protective system with a minimum ~~1~~ 2-hour fire rating

Exception: The supply conductors located in the electrical equipment room where they originate and in the fire pump room shall not be required to have the minimum ~~1~~ 2-hour fire separation or fire resistance rating, unless otherwise required by 700.9(D) of this Code.

FPN: UL guide information for electrical circuit protective systems (FHIT) contains information on proper installation requirements to maintain the fire rating.

~~(C)~~ (B) Conductor Size.

(1) Fire Pump Motors and Other Equipment. Conductors supplying a fire pump motor(s), pressure maintenance pumps, and associated fire pump accessory equipment shall have a rating not less than 125 percent of the sum of the fire pump motor(s) and pressure maintenance motor(s) full-load current(s), and 100 percent of the associated fire pump accessory equipment.

(2) Fire Pump Motors Only. Conductors supplying only a fire pump motor shall have a minimum ampacity in accordance with 430.22 and shall comply with the voltage drop requirements in 695.7.

~~(D)~~ (C) Overload Protection. Power circuits shall not have automatic protection against overloads. Except for protection of transformer primaries provided in 695.5(C)(2), ~~Branch~~ branch-circuit and feeder conductors shall be protected against short circuit only. Where a tap is made to supply a fire pump, the wiring shall be treated as service conductors in accordance with 230.6. The applicable distance and size restrictions in 240.21 shall not apply.

Exception No. 1: Conductors between storage batteries and the engine shall not require overcurrent protection or disconnecting means.

Exception No. 2: For on-site standby generator(s) rated to produce continuous current in excess of 225 percent of the full-load amperes of the fire pump motor, the conductors between the on-site generator(s) and the combination fire pump transfer switch controller or separately mounted transfer switch shall be installed in accordance with 695.6(B). ~~or protected in accordance with 430.52.~~The protection provided shall be in accordance with the short-circuit current rating of the combination fire pump transfer switch controller or separately mounted transfer switch.

~~(E)~~ (D) Pump Wiring. All wiring from the controllers to the pump motors shall be in rigid metal conduit, intermediate metal conduit, liquidtight flexible metal conduit, or liquidtight flexible nonmetallic conduit Type LFNC-B, listed Type MC cable with an impervious covering, or Type MI cable.

~~(F)~~ (E) Junction Points. Where wire connectors are used in the fire pump circuit, the connectors shall be listed. A fire pump controller or fire pump power transfer switch, where provided, shall not be used as a junction box to supply other equipment, including a pressure maintenance (jockey) pump(s). A fire pump controller and fire pump power transfer switch, where provided, shall not serve any load other than the fire pump for which it is intended.

~~(G)~~ (F) Mechanical Protection. All wiring from engine controllers and batteries shall be protected against physical damage and shall be installed in accordance with the controller and engine manufacturer's instructions.

~~(H)~~ (G) Ground Fault Protection of Equipment. Ground fault protection of equipment shall not be permitted for fire pumps.

(H) Onsite Standby Generator Disconnecting Means. Where the power source is supplied by on-site generator(s), the supply conductors shall connect to a generator disconnecting means dedicated for the purpose of serving the fire pump. The disconnecting means shall be located in a separate enclosure from other generator disconnecting means.

695.7 Voltage Drop.

~~The voltage at the controller line terminals shall not drop more than 15 percent below normal (controller-rated voltage) under motor starting conditions. The voltage at the motor terminals shall not drop more than 5 percent below the voltage rating of the motor when the motor is operating at 115 percent of the full-load current rating of the motor.~~

~~*Exception: This limitation shall not apply for emergency run mechanical starting. [NFPA 20:9.4]*~~

(A) Starting Voltage Drop. The voltage at the controller line terminals shall not drop more than 15 percent below normal (controller-rated voltage) under motor starting conditions.

(B) Mechanical Operator. The requirements of 695.7(A) shall not apply to emergency- run mechanical starting.

(C) Running Voltage Drop. The voltage at the motor terminals shall not drop more than 5 percent below the voltage rating of the motor when the motor is operating at 115 percent of the full-load current rating of the motor.

695.10 Listed Equipment.

Diesel engine fire pump controllers, electric fire pump controllers, electric motors, fire pump power transfer switches, foam pump controllers, and limited service controllers shall be listed for fire pump service. [NFPA 20:9.5.1.1, 10.1.2.1, 12.1.3.1]

695.11 Listed Electrical Circuit Protective System to Controller Wiring.

(A) Single Conductors. Where single conductors (individual conductors) are used, they shall be terminated in a separate junction box in accordance with this Code.

FPN This is to avoid violating the enclosure-type rating and/or the controller short-circuit (withstand) rating. See also 300.20 and Article 322.

(B) Single conductors (individual conductors) shall not enter the fire pump enclosure separately.

(C) Smoke Seal. Where required by the listing of the electrical circuit protective system, the raceway between a junction box and the fire pump controller shall be sealed at the junction box end as required and per the instructions of the manufacturer or listing agency.

FPN: When so required, this seal is to prevent flammable gases from entering into the fire pump controller.

(D) Standard wiring between junction box and controller is acceptable.

695.12 Equipment Location.

(A) Controllers and Transfer Switches. Electric motor-driven fire pump controllers and power transfer switches shall be located as close as practicable to, and within sight of, the motors that they control.

(B) Engine-Drive Controllers. Engine-drive fire pump controllers shall be located as close as is practicable to, and within sight of, the engines that they control.

(C) Storage Batteries. Storage batteries for fire pump engine drives shall be supported above the floor, secured against displacement, and located where they are not subject to physical damage, flooding with water, excessive temperature, or excessive vibration.

(D) Energized Equipment. All energized equipment parts shall be located at least 300 mm (12 in.) above the floor level.

(E) Protection Against Pump Water. Fire pump controllers and power transfer switches shall be located or protected so that they are not damaged by water escaping from pumps or pump connections.
(F) Mounting. All fire pump control equipment shall be mounted in a substantial manner on noncombustible supporting structures.
695.14 Control Wiring.
(A) Control Circuit Failures. External control circuits that extend outside the fire pump room shall be arranged so that failure of any external circuit (open or short circuit) shall not prevent the operation of a pump(s) from all other internal or external means. Breakage, disconnecting, shorting of the wires, or loss of power to these circuits could cause continuous running of the fire pump but shall not prevent the controller(s) from starting the fire pump(s) due to causes other than these external control circuits. All control conductors within the fire pump room that are not fault tolerant shall be protected against physical damage. [NFPA 20:10.5.2.6, 12.5.2.5]
(B) Sensor Functioning. No undervoltage, phase-loss, frequency-sensitive, or other sensor(s) shall be installed that automatically or manually prohibit actuation of the motor contactor. [NFPA 20:10.4.5.6]
Exception: A phase loss sensor(s) shall be permitted only as a part of a listed fire pump controller.
(C) Remote Device(s). No remote device(s) shall be installed that will prevent automatic operation of the transfer switch. [NFPA 20:10.8.1.3]
(D) Engine-Drive Control Wiring. All wiring between the controller and the diesel engine shall be stranded and sized to continuously carry the charging or control currents as required by the controller manufacturer. Such wiring shall be protected against physical damage. Controller manufacturer's specifications for distance and wire size shall be followed. [NFPA 20:12.3.5.1]
(E) Electric Fire Pump Control Wiring Methods. All electric motor-driven fire pump control wiring shall be in rigid metal conduit, intermediate metal conduit, liquidtight flexible metal conduit, liquidtight flexible nonmetallic conduit Type B (LFNC-B), listed Type MC cable with an impervious covering, or Type MI cable.
(F) Generator Control Wiring Methods. Control conductors installed between the fire pump power transfer switch and the standby generator supplying the fire pump during normal power loss shall be kept entirely independent of all other wiring. They shall be protected to resist potential damage by fire or structural failure. They shall be permitted to be routed through a building(s) encased in 50 mm (2 in.) of concrete or within enclosed construction dedicated to the fire pump circuits and having a minimum 1-hour fire resistance rating, or circuit protective systems with a minimum of 1-hour fire resistance. The installation shall comply with any restrictions provided in the listing of the electrical circuit protective system used.
695. 15 Alternate Power.
(A) When Required. Except for an arrangement described in 695.15(C), at least one alternate source of power shall be provided when the height of the structure is beyond the pumping capacity of the fire department apparatus or when required by the AHJ. The alternate source shall, as a minimum, comply with the requirements of this section.
FPN: Local codes and/or AHJ often require alternate power for certain occupancies, such as high rise buildings, places of assembly, etc. These alternate power sources are considered to be the Emergency Source of Power for a motor driven fire pump as opposed to the Normal Source of Power.
(B) Unreliable Source. Except for an arrangement described in 695.15(C), at least one alternate source of power shall be provided where the normal source is not reliable.
FPN: See Alternate Power, Other Sources in NFPA-20, *Standard for the Installation of Stationary Pumps for Fire Protection*, for specifics.
(C) Back-up Pump. An alternate source of power is not required where a back-up engine driven or back-up steam turbine driven fire pump is installed in accordance with this standard.
FPN: See NFPA-20 for requirements on engine-driven or steam turbine fire pumps. In either case, operation of the pump is intended to be independent of the source of electrical power.
(D) Alternate Source. When provided, the alternate source of power shall be supplied from one of the following sources:
(1) A generator installed in accordance with 695.16.
(2) One of the sources identified in 695.3(E)(4)(a), 695.3(E)(4)(b), 695.3(E)(4)(c) or 695.3(E)(4)(e) when the power is provided independent of the normal source of power.
(E) Overhead Lines. When provided, the alternate supply shall be arranged so that the power to the fire pump is not disrupted when overhead lines are de-energized for fire department operations.
695.16 On-Site Standby Generator Systems.
(A) Capacity.
(1) Where on-site generator systems are used to supply power to fire pump motors to meet the requirements of 695.15(B), they shall be of sufficient capacity to allow normal starting and running of the motor(s) driving the fire pump(s) while supplying all other simultaneously operated load(s) while meeting the requirements of 695.7
(2) A tap ahead of the on-site generator disconnecting means shall not be required.
(B) Power Sources.
These power sources shall comply with 695.7 and shall meet the requirements of Level 1, Type 10 emergency power systems.
FPN: Type 10 systems are required to make emergency power available in 10 or less seconds. See NFPA-110 *Standard for Emergency and Standby Power Systems*, for definition of Level 1 Emergency Power System. See NFPA 20 for fuel capacity requirements.
(C) Sequencing. Automatic sequencing of the fire pumps shall be permitted as a means of meeting the voltage drop requirements of 695.7.
(D) Transfer of Power. Transfer of power to the fire pump controller between the normal supply and one alternate supply shall take place within the pump room.
(E) Protective Devices. Where protective devices are installed in the on-site power source circuits at the generator, such devices shall allow instantaneous pickup of the full pump room load.
FPN: This is to prevent any generator protective devices from tripping when the fire pump load is transferred to the generator. The generator will instantaneous pick up the full pump room load, including the starting of any and all connected fire pumps in the across-the-line (direct on line) full voltage starting mode. This is always the case when the fire pump(s) is running by use of the emergency mechanical operator of the fire pump controller(s). (See NFPA 20, 9.6 On-Site Standby Generator Systems).
695.17 Junction Boxes. Where fire pump wiring to or from a fire pump controller is routed through a junction box, the following requirements shall be met.
(A) Mounting. The junction box shall be securely mounted.
(B) Controller Enclosure Integrity. Mounting and installing of a junction box shall not violate the enclosure type (NEMA) rating of the fire pump controller(s).
(C) Controller Short-Circuit Rating Integrity. Mounting and installing of a junction box shall not violate the integrity of the fire pump controller(s) and shall not affect theshort-circuit rating of the controller(s).
(D) Type Rating. As a minimum, a Type 2, dripproof enclosure (junction box) shall be used. The enclosure shall be listed for the subject to match the fire pump controller enclosure-type rating.
FPN See Article 430.91, Motor Controller Enclosure Types for further information. See UL-50, *Standard for Enclosures for Electrical Equipment*, for requirements.
(E) Terminals. Terminals, junction blocks, splices, and the like, when used, shall be listed.
695.18 Raceway Terminations.
(A) Hubs. Listed conduit hubs shall be used to terminate raceway (conduit) to the fire pump controller.
(B) Type Rating. The type rating of the conduit hub(s) shall be at least equal to that of the fire pump controller.
(C) Installation. The installation instructions of the manufacturer of the fire pump controller shall be followed.
(D) Controller Alterations. No alterations other than installation of raceway(s) and multiconductor cable(s) shall be made to the fire pump controller.
Panel Statement: Changes were made to comply with the TCC direction. This panel action incorporates the following comments: 13-105, 13-107, 13-109, 13-111, 13-112, 13-113, 13-114, 13-115, 13-116, 13-117, 13-118, 13-119, 13-121, 13-122, 13-126, 13-128, 13-129, 13-133, 13-134, 13-135, 13-138, 13-139, 13-144, 13-145, 13-146, 13-147, 13-148, 13-149, 13-151, 13-153.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: The panel action to add NFPA 20 extract material has added numerous new, changed, and deleted sections into Article 695 without documentation. The comment is new material as a result of the TCC rejection of the original proposal. The attempt to integrate this new material into the existing text has resulted in numerous errors and inconsistencies that indicate that the panel action is not in a form to be included in the 2008 NEC. Some examples from the panel actions are as follows:
1) 695.3(A)(3) is new material.
2) 695.3(B)(2) Individual Source and Generator is changed from the previous text without justification.
3) 695.3(D)(4) Phase Converters are prohibited with no justification from NFPA 20.
See Negative vote on Comment 13-117 for evidence.
4) 695.3(E)(1), (2), and (3) is a repeat of 695.3(A)(1), (2) and (3).
5) 695.3(E)(4)(a), (b), and (c) are covered in 695.3(C)(1) and (2).
6) 695.4(A) is a new requirement.
7) There are two 695.4(B)(1) and (2).
8) 695.4 requires compliance with (A) and (B) but there is no tie into (C), (D), and (E).
9) 695.6(A)(2) refers to service disconnecting means for a multi-building campus whereas there would not be a "service" to the building but a feeder.
10) 695.6(A)(3)(d) requires a 2 hour fire rating for the supply conductors but the exception does not require the 2 hour rating in the fire pump room even though NFPA 20 requires the room to have a 2 hour rating.
11) 695.14 Alternate Power is new text and is a rehash of the requirements in 695.3.
12) 695.16(B) requires compliance with "Level 1, Type 10 emergency power" with no definition other than an FPN note reference to NFPA 110.
The present Comment 13-103 is new material that was not contained in the original proposal, has not had public review, and requires considerable editing.
Comment on Affirmative:
FLACH, G.: Change "when" to "where" in a few places. Remove "etc.". Change the language in the FPN by removing "required" in the FPN following 695.16(B). References must be corrected in 695.3(E)(4)(C).

13-104 Log #1038 NEC-P13 **Final Action: Reject**
(695)

TCC Action:It was the action of the Technical Correlating Committee that this comment be reported as "Reject". The Technical Correlating Committee does not agree with the placement of a cross-reference in the Annex. The objective of the extract identification requirements of the Style Manual make a cross-reference unnecessary.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-78
Recommendation: Do not reject the proposal. Revise the table content as shown below:

NFPA 70 Section 695 (Fire Pumps) Extract Material from NFPA 20

NFPA-20 2007 Edition	NFPA-70 2008 Pro forma	Section 695 Titles -or- [Subjects]
N/A	**695.1**	**Scope**
	695.2	**Definitions.**
3.3.7.2	(ditto)	**Fault Tolerant External Control Circuits.**
3.3.34	(ditto)	**On-Site Power Production Facility.**
3.3.35	(ditto)	**On-Site Standby Generator.**
9.1	**695.3**	**Power Source(s) for Electric Motor-Driven Fire Pumps.**
9.1.1	**695.3(A)**	**Scope**
9.1.2	**695.3(B)**	**Equipment**
9.1.3	**695.3(C)**	**General**
9.1.4*	**695.3(D)**	**Hazards**
A.9.1.4	**695.3(D) FPN**	Annex / Fine Print Note
9.1.5	**695.3(E)**	**Continuous**
9.1.6	**695.3(F)**	**Voltage Drops**
N/A	**695.3(G)**	**Phase Converters**
9.2	**695.4**	**Continuity of Power [Normal Power]**
9.2.1	**695.4(A)**	**Continuously Available**
9.2.2	**695.4(B)**	**Arrangement**
9.2.2(1)	**695.4(B)(1)**	[Service Connection]
9.2.2(2)	**695.4(B)(2)**	[On-Site Power Plant]
9.2.2(3)	**695.4(B)(3)**	[Dedicated Feeder - Dedicated Service]
9.2.2(4)	**695.4(B)(4)**	[Campus Style Feeder]
9.2.2(4)(a)	**695.4(B)(4)(a)**	[Multi-building]
9.2.2(4)(b)	**695.4(B)(4)(b)**	[Back-up Power]
9.2.2(4)(c)	**695.4(B)(4)(c)**	[Others Impractical]
9.2.2(4)(d)	**695.4(B)(4)(d)**	[Acceptable to AHJ]
9.2.2(4)(e)	**695.4(B)(4)(e)**	[Selectively Coordinated OCP]
9.2.2(5)	**695.4(B)(5)**	[Transformer Connection]
9.2.3	**695.4(C)**	**Connections**
9.2.3.1	**695.4(D)**	**Disconnecting Means**
9.2.3.1(1)	**695.4(D)(1)**	[Identified]
9.2.3.1(2)	**695.4(D)(2)**	[Locable]
9.2.3.1(3)*	**695.4(D)(3)**	[Remote from Main Disconnect]
A.9.2.3.1(3)*	**695.4(D)(3) FPN**	[Avoid Simultaneous Operation]
9.2.3.1(4)	**695.4(D)(4)**	[Remote from Other Fire Pump Disconnects]
A.9.2.3.1(4)*	**695.4(D)(4) FPN**	Annex / Fine Print Note
9.2.3.1(5)	**695.4(D)(5)**	[Marked "Fire Pump Disconnecting Means"]
9.2.3.2	**695.4(E)**	**Placard**
9.2.3.3	**695.4(F)**	Supervision
9.2.3.3(1)	**695.4(F)(1)**	[Central Station]

NFPA 70 Section 695 (Fire Pumps) Extract Material from NFPA 20

NFPA-20	NFPA-70	
2007 Edition	**2008 Pro forma**	**Section 695 Titles -or-** [Subjects]
9.2.3.3(2)	**695.4(F)(2)**	[Local Signaling Service]
9.2.3.3(3)	**695.4(F)(3)**	[Locking Disconnect Closed]
9.2.3.3(4)	**695.4(F)(4)**	[Sealing Disconnect & Inspection]
9.2.3.4	**695.4(G)**	**Overcurrent Protection**
9.3	**695.5**	**Alternate Power**
9.3.1	**695.5(A)**	**When Required**
N/A	**695.5(A) FPN**	Annex / Fine Print Note
9.3.2*	**695.5(B)**	**Unreliable Source**
A.9.3.2	**695.5(B) FPN**	Annex / Fine Print Note
9.3.3	**695.5(C)**	**Back-up Pump**
9.3.4	**695.5(D)**	**Alternate Source**
9.3.4(1)	**695.5(D)(1)**	[On-Site Gen-Set]
9.3.4(1)	**695.5(D)(2)**	[Other Sources]
9.3.5	**695.5(E)**	**Overhead Lines**
N/A	**695.6**	**Transformers.**
N/A	**695.7**	**Power Wiring.**
9.4*	**695.8**	**Voltage Drop.**
9.4.1	**695.8(A)**	**Starting Voltage Drop**
9.4.2	**695.8(B)**	**Mechanical Operator**
9.4.3	**695.8(C)**	**Running Voltage Drop**
9.6	**695.9**	**On-Site Standby Generator Systems.**
9.6.1	**695.9(A)**	**Capacity**
9.6.2.1	**695.9(B)**	**Power Sources**
9.6.2.2	**695.9(B) FPN**	Annex / Fine Print Note
9.6.3	**695.9(C)**	**Sequencing**
9.6.4	**695.9(D)**	**Transfer of Power**
9.6.5	**695.9(E)**	**Protective Devices**
N/A	**695.9(E) FPN**	Annex / Fine Print Note
9.3.6	**695.10**	**Junction Boxes**
9.3.6(1)	**695.10(A)**	**Mounting**
9.3.6(2)	**695.10(B)**	**Controller Enclosure Integrity**
9.3.6(3)	**695.10(C)**	**Controller Short Circuit Rating Integrity**
9.3.6(4)	**695.10(D)**	**Type Rating**
9.3.6(5)	**695.10(E)**	**Terminals**
9.3.7	**695.11**	**Listed Electrical Circuit Protective System to Controller Wiring**
9.3.7.1*	**695.11(A)**	**Single Conductors**
A.9.3.7.1	**695.11(A) FPN**	Annex / Fine Print Note
9.3.7.2*	**695.11(B)**	**[Individual Conductors]**
9.3.7.2*	**695.11(C)**	**Smoke Seal**
A.9.3.7.2	**695.11(C) FPN**	[Flammable Gases]
9.3.7.3	**695.11(D)**	[Standard Wiring]
9.3.8	**695.12**	**Raceway Terminations**
9.3.8.1	**695.12(A)**	**Hubs**

NFPA 70 Section 695 (Fire Pumps) Extract Material from NFPA 20

NFPA-20 2007 Edition	NFPA-70 2008 Pro forma	Section 695 Titles -or- [Subjects]
9.3.8.2	**695.12(B)**	**Type Rating**
9.6.3.3	**695.12(C)**	**Installation**
9.3.8.4	**695.12(D)**	**Controller Alterations**
9.5.1.1,	**695.13**	**Listed Equipment.**
10.1.2.1,	(ditto)	(ditto)
10.8.3.1,	(ditto)	(ditto)
12.1.3.1	(ditto)	(ditto)
N/A	**695.13**	**Equipment Location.**
10.2.1,	**695.13(A)**	**Controllers and Transfer Switches.**
12.2.1	**695.13(B)**	**Engine-Drive Controllers.**
11.2.5.2.5	**695.13(C)**	**Storage Batteries.**
11.2.5.2.6	**695.13(D)**	**Energized Equipment.**
10.2.2,	**695.13(E)**	**Protection Against Pump Water.**
12.2.2	(ditto)	(ditto)
10.3.2,	**695.13(F)**	**Mounting.**
12.3.2	(ditto)	(ditto)
10.5.2.6,	**695.14(A)**	**Control Circuit Failures.**
12.5.2.5,	(ditto)	(ditto)
12.6.12	(ditto)	(ditto)
10.4.5.6	**695.14(B)**	**Sensor Functioning.**
10.8.1.3	**695.14(C)**	**Remote Device(s).**
12.3.5.1,	**695.14(D)**	**Engine-Drive Control Wiring.**
12.6.4.1	(ditto)	(ditto)
	695.14(E)	**Electric Fire Pump Control Wiring Methods.**
9.9.4	**695.13(A)**	**Controllers and Transfer Switches.**
A.9.2.4(3)	**(Same)**	**Generator Control Wiring Methods.**

Note: "N/A" - Not Applicable (Not Extract Text).

Substantiation: This cross reference table is needed since the revised Manual of Style of NFPA 70 makes it difficult to tell which exact clauses are extract text or not. E.g.: The stars are no longer used. As a result, a number of Public Proposals and Public Comments have been rejected by the Panel for scope which delays NFPA action on said Proposals and Comments until the next cycle of NFPA 20. This has already resulted in five year delays for Final Action on submitted Proposals and Comments. It's important for prospective submitters of Public Proposals or Public Comments to know where to send them or (Which standard) and/or for NFPA staff to help submitters re-direct said proposals and comments to avoid the cycle delay for consideration and action to occur. Note that this submitter has worked with NFPA staff at length before proposing this cross reference table to NFPA 70 and to take this step to reduce the delays that have occurred. This is the best solution known at this time. Also note that a cross reference table does already exists in NFPA 70 Annex "F".

Revised content per the Negative Vote Explanation suggestion of Robert Swayne.

Panel Meeting Action: Accept in Principle

Due to changes made in Comment 13-103, create a new annex, Annex J, "NFPA 70 Article 695 (Fire Pumps) Extract Material From NFPA 20" to read as shown following

Panel Statement: CMP-13 desires that a cross-reference table be placed in Annex J and revised per action on Comment 13-103. See panel action and statement on Comment 13-103.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Gustafson, R.

Explanation of Negative:

RAPPAPORT, E.: See my explanation of negative vote on Comment 13-103.

NFPA-70 Section 695 (Fire Pumps) Extract Material from NFPA-20

NFPA-20 2007 Edition	NFPA-70 (NEC) 2008 Edition	Reference Only NFPA-70 (NEC) 2005 Edition	Section 695 Titles -or- [Subjects]
N/A	**695.1**	**695.1**	**Scope**
	695.2	**695.2**	**Definitions.**
3.3.7.2	(ditto)	(ditto)	**Fault Tolerant External Control Circuits.**
3.3.34	(ditto)	(ditto)	**On-Site Power Production Facility.**
3.3.35	(ditto)	(ditto)	**On-Site Standby Generator.**
9.2.1	**695.3**	**695.3**	**Power Source(s) for Electric Motor-Driven Fire Pumps.**
N/A	[FPN]	[FPN]	**Reference to NFPA-20**
N/A	**695.3(A)**	**695.3(A)**	**Individual Sources**
N/A	**695.3(B)**	**695.3(B)**	**Multiple Sources**
N/A	**695.3(C)**	(New)	**Multiuilding Campus-Style Complexes**
9.6.1	**695.3(D)**	(New)	**Generator as Ataernate Source**
9.6.1.1	**695.3(D)(1)**	(New)	**Capacity**
9.6.1.2	**695.3(D)(2)**	(New)	**Connections**
N/A	**695.3(D)(3)**	(New)	**Adjacent Disconnects**
9.2.2	**695.3(E)**	(New)	**Arrangement**
9.2	**695.4**	**695.4**	**Continuity of Power [Normal Power]**
9.2.1	**695.4(A)**	(New)	**Continuously Available**
9.2.3	**695.4(B)**	**695.4(B)**	**Supervised Connection**
9.2.3.4	**695.4(B)(1)**	**695.4(B)(1)**	**Overcurrent Device Selection**
9.2.3.3	**695.4(B)(2)**	**695.4(B)(5)**	**Supervision**
9.2.3	**695.4(C)**	(New)	**Connections**
9.2.3.1	**695.4(D)**	(B)(2) - revised)	**Disconnecting Means**
N/A	**695.4(E)**	(B)(4) - revised)	**Placard**
9.2.3.3	**695.4(F)**	(B)(5) - revised)	**Supervision**
9.2.3.4	**695.4(G)**	(New)	**Overcurrent Protection**
N/A	**695.5**	**695.5**	**Transformers.**
N/A	**695.6**	**695.6**	**Power Wiring.**
9.4*	**695.7**	**695.7**	**Voltage Drop.**
9.4.1	**695.7(A)**		**Starting Voltage Drop**
9.4.2	**695.7(B)**		**Mechanical Operator**
9.4.3	**695.7(C)**		**Running Voltage Drop**
	(Not Used)		695.8 and 695.9 not used
9.5.1.1,	**695.10**	**695.10**	**Listed Equipment.**
10.1.2.1,	(ditto)		(ditto)
10.8.3.1,	(ditto)		(ditto)
12.1.3.1	(ditto)		(ditto)
9.3.7	**695.11**	(New)	**Listed Electrical Circuit Protective System to Controller Wiring**
9.3.7.1*	**695.11(A)**		**Single Conductors**
A.9.3.7.1	**695.11(A) FPN**		Annex / Fine Print Note
9.3.7.2*	**695.11(B)**		**[Individual Conductors]**
9.3.7.2*	**695.11(C)**		**Smoke Seal**
A.9.3.7.2	**695.11(C) FPN**		[Flammable Gases]
9.3.7.3	**695.11(D)**		[Standard Wiring]
(Title)	**695.12**	**695.12**	**Equipment Location.**
10.2.1,	**695.12(A)**		**Controllers and Transfer Switches.**
12.2.1	**695.12(B)**		**Engine-Drive Controllers.**
11.2.5.2.5	**695.12(C)**		**Storage Batteries.**
11.2.5.2.6	**695.12(D)**		**Energized Equipment.**
10.2.2,	**695.12(E)**		**Protection Against Pump Water.**
12.2.2	(ditto)		(ditto)
10.3.2,	**695.12(F)**		**Mounting.**
12.3.2	(ditto)		(ditto)
	(Not Used)	(Not Used)	695.13 not used
(Title)	**695.14**	**695.14**	**Control Wiring**

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10.5.2.6,	**695.14(A)**		**Control Circuit Failures.**
12.5.2.5,	(ditto)		(ditto)
12.6.12	(ditto)		(ditto)
10.4.5.6	**695.14(B)**		**Sensor Functioning.**
10.8.1.3	**695.14(C)**		**Remote Device(s).**
12.3.5.1,	**695.14(D)**		**Engine-Drive Control Wiring.**
12.6.4.1	(ditto)		(ditto)
N/A	**695.14(E)**		**Electric Fire Pump Control Wiring Methods.**
A.9.2.4(3)	**695.14(F)**		**Generator Control Wiring Methods.**
9.3	**695.15**	(New)	**Alternate Power**
9.3.1	**695.15(A)**		**When Required**
N/A	**695.15(A) FPN**		Annex / Fine Print Note
9.3.2*	**695.15(B)**		**Unreliable Source**
A.9.3.2	**695.15(B) FPN**		Annex / Fine Print Note
9.3.3	**695.15(C)**		**Back-up Pump**
9.3.4	**695.15(D)**		**Alternate Source**
9.3.4(1)	**695.15(D)(1)**		[On-Site Gen-Set]
9.3.4(1)	**695.15(D)(2)**		[Other Sources]
9.3.5	**695.15(E)**		**Overhead Lines**
9.6	**695.16**	(New)	**On-Site Standby Generator Systems.**
9.6.1	**695.16(A)**		**Capacity**
9.6.2.1	**695.16(B)**		**Power Sources**
9.6.2.2	**695.16(B) FPN**		Annex / Fine Print Note
9.6.3	**695.16(C)**		**Sequencing**
9.6.4	**695.16(D)**		**Transfer of Power**
9.6.5	**695.16(E)**		**Protective Devices**
N/A	**695.16(E) FPN**		Annex / Fine Print Note
9.3.6	**695.17**	(New)	**Junction Boxes**
9.3.6(1)	**695.17(A)**		**Mounting**
9.3.6(2)	**695.17(B)**		**Controller Enclosure Integrity**
9.3.6(3)	**695.17(C)**		**Controller Short Circuit Rating Integrity**
9.3.6(4)	**695.17(D)**		**Type Rating**
9.3.6(5)	**695.17(E)**		**Terminals**
9.3.8	**695.18**	(New)	**Raceway Terminations**
9.3.8.1	**695.18(A)**		**Hubs**
9.3.8.2	**695.18(B)**		**Type Rating**
9.6.3.3	**695.18(C)**		**Installation**
9.3.8.4	**695.18(D)**		**Controller Alterations**
A.9.9.2	**695.19**	(New)	**Phase Converters**

Notes:
1) "N/A" - Not Applicable (Not Extract Text).
2) "*" Indicates an Annex Item in NFPA-20.

13-105 Log #1091 NEC-P13 **Final Action: Hold**
(695)

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 13-77
Recommendation: This Proposal should remain Rejected.
Substantiation: The TCC was correct to return this proposal back to the panel. It has so many problems introduced by the revision that the panel should not try to salvage any type of significant rewrite during the comment phase. The panel should revisit the individual proposals for Article 695 and review each one based on its merit for inclusion in Article 695. The revision proposed by Proposal 13-77 is completely unacceptable for the NEC.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

(Note: The sequence no. 13-106 was not used)

(Note: The sequence no. 13-108 was not used)

13-107 Log #1945 NEC-P13 **Final Action: Hold**
(695)

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Barry F. O'Connell, Tyco Thermal Controls
Comment on Proposal No: 13-77
Recommendation: Continue to Reject.
Substantiation: The material introduces new confusion to an Article that was already confusing, as pointed out in the NEMA negative comment.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-109 Log #1039 NEC-P13 **Final Action: Hold**
(695.1(A) and (B))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-79
Recommendation: Suggested revision:
Replace (3) with "Wiring, Overcurrent Protection and other aspects of loads connected to the power supply or interconnecting circuits."
Substantiation: Direction of the TCC to clarify panel action. Suggested wording.
The intent is to indicate that there is proscriptive code regarding other connected loads, but, not the loads themselves. Also note that most, but not all, fire pump systems have pressure maintenance (jockey) pumps which may or may not be connected to the fire pump power supply.
Panel Meeting Action: Accept in Principle
695.1 Scope
(A) Covered. This article covers the installation of the following:
(1) Electric power sources and interconnecting circuits.
(2) Switching and control equipment dedicated to fire pump drivers.
(3) Associated fire pump accessory equipment which includes wiring and overcurrent protection of other loads connected to the power supply.
(B) Not Covered. This article does not cover the following:
(1) The performance, maintenance, and acceptance testing of the fire pump system, and the internal wiring of the components of the system
(2) Performance maintenance (jockey or makeup) pumps.
FPN: See NFPA 20-2007, Standard for the Installation of Stationary Pumps for Fire Protection, for further information.
Panel Statement: A new (3) was added to clarify the panel action on Proposal 13-79 and under the direction of the TCC. The FPN reference document was updated to the latest edition.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-103.

13-110 Log #619 NEC-P13 **Final Action: Hold**
(695.1(A) and (B))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Joseph C. Warren, Joseph C. Warren Electrical Consulting Services
Comment on Proposal No: 13-79
Recommendation: Revise text to read as follows:
695.1 Scope.
(A) Covered. This article covers the installation of the following:
(1) Electric power sources and interconnecting circuits.
(2) Switching and control equipment dedicated to fire pump drivers.
(3) Pressure maintenance (jockey or makeup) pumps.
(4) Associated fire pump accessory equipment for alarms that signal an alarm for improper conditions that exist in a fire pump.
(B) Not Covered. This article does not cover the following:
(1) The performance, maintenance, and acceptance testing of the fire pump system, and the internal wiring of the components of the system
~~(2) Pressure maintenance (jockey or makeup) pumps.~~
Substantiation: We DO need to state that jockey or makeup pump motors are covered because they do exist in fire pump installations. The present language, by not including them, is a very bad format even if we do go to Article 430 for jockey pumps. Accessory equipment also needs to be covered because the alarms that are part of the fire pump installation indicate improper conditions in fire pump equipment if something occurs that is wrong. 695.5(A), (B), and (C)(2) tell us to include jockey and makeup pumps in load calculations.
Panel Meeting Action: Reject
Panel Statement: See panel action on Comment 13-109.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-103.
Comment on Affirmative:
ZGONENA, T.: To clarify the panel action, item (3) was rejected as the requirements for jockey or makeup pump motors are within the scope of Article 430, not Article 695.

13-111 Log #1154 NEC-P13 **Final Action: Hold**
(695.1(A) and (B))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-79
Recommendation: Suggest revision:
Replace (3) with "Wiring, Overcurrent Protection and other aspects of loads connected to the power supply or interconnecting circuits."
Substantiation: Direction of the TCC to clarify panel action. Suggested wording.
The intent is to indicate that there is proscriptive code regarding other connected loads, but, not the loads themselves.
Also note that most, but not all, fire pump systems have pressure maintenance (jockey) pumps which may or may not be connected to the fire pump power supply.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-109.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-112 Log #99 NEC-P13 **Final Action: Hold**
(695.1(A) & (B))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-79
Recommendation: The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee rejects the Panel Action until the Panel Action has been clarified regarding the deletion of (B)(2) and acceptance of the underlined (4).
The Technical Correlating Committee directs the Panel to clarify the Panel Action relative to the addition of Item 4, associated fire pump accessory equipment, since that equipment appears to be related to mechanical equipment rather than the electrical installation.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 13-109.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-103.
Comment on Affirmative:
ZGONENA, T.: Regarding the TCC comment, the additional item 4 relates to electrical loads and their circuits such as fire pump alarm and signaling devices.

13-113 Log #1136 NEC-P13 **Final Action: Accept**
(695.2)

Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-80
Recommendation: Consider adding back the word "either" to agree with NFPA-20.
Note that the phrase " from all other internal or external means" is new to NFPA-20 to agree with the NEC.
Substantiation: To agree with NFPA-20-2007.
Note that I should have deleted the above phrase from my Public Proposal 13-80 before sending it.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-103.

13-114 Log #100 NEC-P13 **Final Action: Hold**
(695.3)

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-81
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal. It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-115 Log #1040 NEC-P13 **Final Action: Hold**
(695.3)

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-82
Recommendation: Continue to Accept in Principle per CMP-13 Panel Action. Do not Reject the proposal.
Substantiation: This proposal does meet the requirements of Section 4-3.3 Regulations Governing Committee Projects since five pages of supporting material were on file with the NFPA as stated in the ROP. This material was part of the proposal material sent to CMP-13 members. This material is essentially identical with the text proposed in Proposal 13-77.
I don't know why the TCC changed the Panel vote from AIP to Reject. TCC doesn't state how 4.3.3 is violated.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-103.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-103.

13-116 Log #1093 NEC-P13 **Final Action: Hold**
(695.3)

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 13-77
Recommendation: Revise 695.3 from the ROP Draft to read as follows:
695.3 Power Source(s) for Electric Motor-Driven Fire Pumps. Electric motor-driven fire pumps shall have a reliable source of power.

(A) Individual Sources. Where reliable, and where capable of carrying indefinitely the sum of the locked-rotor current of the fire pump motor(s) and the pressure maintenance pump motor(s) and the full-load current of the associated fire pump accessory equipment when connected to this power supply, the power source for an electric motor driven fire pump shall be one or more of the following.

(1) Electric Utility Service Connection. A fire pump shall be permitted to be supplied by a separate service, or from a connection located ahead of and not within the same cabinet, enclosure, or vertical switchboard section as the service disconnecting means. The connection shall be located and arranged so as to minimize the possibility of damage by fire from within the premises and from exposing hazards. A tap ahead of the service disconnecting means shall comply with 230.82(5). The service equipment shall comply with the labeling requirements in 230.2 and the location requirements in 230.72(B). [NFPA 20:9.2.2]

(2) On-Site Power Production Facility. A fire pump shall be permitted to be supplied by an on-site power production facility. The source facility shall be located and protected to minimize the possibility of damage by fire. [NFPA 20:9.2.3]

(3) Dedicated Feeder. A dedicated feeder shall be permitted where it is derived from a service connection as described in 695.3(A)(1).

(B) Multiple Sources. Where reliable power cannot be obtained from a source described in 695.3(A), power shall be supplied one of the following:

(1) Two Individual Sources. ~~from a~~ An approved combination of two or more of ~~either of such sources~~ the sources from 695.3(A).

(2) Individual Source and Generator. An approved combination of one or more of the sources in 695.3(A) and an on-site generator complying with 695.3(D). ~~or from an approved combination of feeders constituting two or more power sources as covered in 695.3(B)(2), or from an approved combination of one or more of such power sources in combination with an on-site standby generator complying with 695.3(B)(1) and (B)(3).~~

(C) Multibuilding Campus-Style Complexes. Where the sources in 695.3(A) are not practicable and the installation is part of a multibuilding campus style complex, feeder sources shall be permitted where approved by the authority having jurisdiction and installed in accordance with (1) or (2).

(1) Two Feeder Sources. Two feeders shall be permitted as more than one power source where such feeders are connected to or derived from separate utility services. The connection(s), overcurrent protective device(s), and disconnecting means for such feeders shall meet the requirements of 695.4(B).

(2) Feeder and Alternate Source. A feeder shall be permitted as a normal source of power when an alternate source of power independent from the feeder is provided. The connection(s), overcurrent protective device(s), and disconnecting means for such feeders shall meet the requirements of 695.4(B).

~~**(1) Generator Capacity.** An on-site generator(s) used to comply with this section shall be of sufficient capacity to allow normal starting and running of the motor(s) driving the fire pump(s) while supplying all other simultaneously operated load. Automatic shedding of one or more optional standby loads in order to comply with this capacity requirement shall be permitted. A tap ahead of the on-site generator disconnecting means shall not be required. The requirements of 430.113 shall not apply. [NFPA 20:9.6.1]~~

~~**(2) Feeder Sources.** This section applies to multibuilding campus-style complexes with fire pumps at one or more buildings. Where sources in 695.3(A) are not practicable, and with the approval of the authority having jurisdiction, two or more feeder sources shall be permitted as one power source or as more than one power source where such feeders are connected to or derived from separate utility services. The connection(s), overcurrent protective device(s), and disconnecting means for such feeders shall meet the requirements of 695.4(B). [NFPA 20:9.2.5.3]~~

~~**(3) Arrangement.** The power sources shall be arranged so that a fire at one source will not cause an interruption at the other source. [NFPA 20:9.2.5.1]~~

~~(1~~D) Generator ~~Capacity~~ as Alternate Source. ~~An~~ Where an on-site generator(s) is used ~~to comply with this section~~ as an alternate source of power. The following shall apply:

(1) Capacity. The generator shall have ~~shall be of~~ sufficient capacity to allow normal starting and running of the motor(s) driving the fire pump(s) while supplying all other simultaneously operated load. Automatic shedding of one or more optional standby loads in order to comply with this capacity requirement shall be permitted.

(2) Connection. A tap ahead of the on-site generator disconnecting means shall not be required.

(3) Adjacent Disconnects. The requirements of 430.113 shall not apply.

~~**(3)**~~ **(E) Arrangement.** The power sources shall be arranged so that a fire at one source will not cause an interruption at the other source. [NFPA 20:9.2.5.1]
Substantiation: This comment is to revise the layout and arrangement of 695.3 to provide a more logical approach to the power sources. The following list explains each of the revisions:
1. 695.3(A)(1) and (2) are unchanged from the present text
2. 695.3(A)(3) is new and intended to pick up the provision that recognizes a feeder derived from a service connection. The reference to 695.3(A)(1) would recognize that the feeder may come from a dedicated service (but the service conductors don't go directly to the FP controller) or from a tap ahead of the main. This is the same provision accepted by the panel in Proposal 13-77 as 695.4(B)(3)

3. 695.3(B) is rearranged to create a list of the two provisions dealing with combinations of sources. Item 1 captures the combination of two of the sources recognized in 695.3(A). Item 2 captures the basic combination of a 695.3(A) source and an on-site generator. The provisions for the generator are moved to create a new 695.3(D), so that reference is given here. These two provisions of this list are recognized in the current text of 695.3(B).
4. 695.3(C) is a new section to cover the multi-building campus installations with more clarity. The intro paragraph captures the three requirements in the present text that the sources in 695.3(A) are not practicable, that the AHJ approve the use of the feeder source and that you have a multi-building campus application. The paragraph then allows either of two options to be used
a. Item (1) covers the application of two feeder sources. This provision is already allowed in the current 695.3(B) and recognizes that you can utilize two feeders from separate utility services as more than one power source. The provision that any disconnects and overcurrent devices comply with 695.4(B) is captured.
b. Item (2) will recognize a feeder along with an alternate source. This provision was accepted by the panel in Proposal 13-77 as section 695.4(B)(4). This addition will correct what has been a significant issue in Article 695 since the present article did not recognize a feeder and on-site generator as an acceptable combination. It should be noted that the text maintains the panel accepted text (from Proposal 13-77) of "alternate power source independent of the feeder" instead of referencing an on-site generator specifically.
c. It is also important to point out that the provision from Proposal 13-77 regarding selective coordination of the overcurrent devices is specifically omitted. This provision (regardless of whether it is in NFPA 20 or not) creates significant technical concern. Keep in mind that the overcurrent devices in the fire pump feeder must be capable of carrying locked rotor current. So a 100A fire pump would have a 600A overcurrent device upstream. If for example, this were an 800A service, the next feeder device upstream (which may be shared with other parts of the system) may have to be 1200A to gain pure selectivity. This could potentially require that the entire system be much larger than needed for the installation, just to accomplish selective coordination. There is no technical basis for requiring that the fire pump feeder be selectively coordinated.
5. The "Generator Capacity" section is moved from 695.3(B)(1) to become 695.3(D). This section is also editorially rearranged to break the three requirements of the generator into three sections titled "Capacity", "Connection" and "Adjacent Disconnects".
695.3(E) is the old 695.3(B)(3) regarding arrangement of the power sources. This placement will allow it to apply to the multiple sources of both (B) and (C).
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-103.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-103.

13-117 Log #1137 NEC-P13 **Final Action: Hold**
(695.3)

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-81
Recommendation: Continue to Accept the Proposal to prohibit phase converters.
Substantiation: Phase converters are prohibited by NFPA-20. My substantiation is confusing; but, the NFPA-20 Technical Committee via Action on Proposal 20-71 (Log #59) and on Comments 20-8 (Log #38) and 20-42 Log #37 prohibits phase converters as unsuitable for fire pump service. One reason is imbalances that occur with varying loads. Another is adding another energy converter in the critical path. Another problem is keeping the controller energized at all times.
This is consistent with Panel Action on Proposal 13-77 and also with my Comment suggesting revisions to 13-77.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: The substantiation for prohibiting phase converters for fire pump service is erroneous and misleading. None of the NFPA 20 proposals cited in the substantiation prohibit phase converters. NFPA 20 Proposal 20-71 is a request that phase converters be either permitted or prohibited in the text. This proposal was REJECTED. NFPA 20 Proposal 20-8 provided specific wording to prohibit phase converters and the committee action was to refer to the action on Proposal 20-42. NFPA 20 Proposal 20-42, which was accepted, added a note in the Annex (not enforceable) indicating that phase converters are not recommended for fire pump motors. The note left it open for the AHJ to determine the reliability of the electric supply.
There does not appear to be any substantiation to prohibit the use of phase converters. It should be left up to the AHJ since phase converter operation may be the best alternative to provide fire protection where three phase power is not available. If phase converters are to be prohibited, it should be done by NFPA 20 and they have, at present, declined to do so.

(Note: The sequence no. 13-118 was not used)

13-119 Log #101 NEC-P13 **Final Action: Hold**
(695.3, FPN (New))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-83
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the Technical Correlating Committee action on Proposal 13-77. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-120 Log #1138 NEC-P13 **Final Action: Hold**
(695.3, FPN (New))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-83
Recommendation: Continue to Accept in Principle Public Proposal 13-83.
Substantiation: At the risk of a small amount of redundancy, this reference back to NFPA-20 on characteristics of a "reliable power source" is vital and a source of daily confusion and conflicts. The intent is to aid plan approval and inspection agencies and other AHJs in resolving conflicts. Note that the submitter of Proposal 13-81, F. Hartwelll, is both an AHJ and is also very familiar with fire pump installations; but, is seeking this additional guidance. This is also important since NFPA-70 has far wider distribution than NFPA-20. Hopefully, this reference will lead readers to NFPA-20 clause A.9.3.2 which has several paragraphs of guidance on this topic.
Panel Meeting Action: Reject
Panel Statement: A fine print note is available and presently exists above the scope of Article 695.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-121 Log #1139 NEC-P13 **Final Action: Hold**
(695.3(A)(3) (New))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-84
Recommendation: Continue to Reject this proposal.
Substantiation: This is extract text from NFPA-20. The proposal should go to the NFPA-20 Technical Committee.
Five methods are now allowed for supplying fire pump controllers. Included is the transformer connection which can be and is used at low voltage, medium voltage and high voltage.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: The panel action on these comments ignores the needs of large industrial concerns who purchase power at a high voltage where a second disconnect and transformer for a fire pump service is impractical. Large industrial concerns should be permitted to provide service to fire water pumps which is identical physically to that used by users which purchase power at a medium voltage. Since power purchased at higher voltage is generally more reliable and the additional high voltage disconnect and transformer are not required, the installation would actually be more reliable than what is now permitted.

13-122 Log #1140 NEC-P13 **Final Action: Hold**
(695.3(A)(3) (New))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-85
Recommendation: Continue to Reject this proposal.
Substantiation: This is extract text from NFPA-20. The proposal should go to the NFPA-20 Technical Committee.
Five methods are now allowed for supplying fire pump controllers. Included is the transformer connection which can be and is used at low voltage, medium voltage and high voltage.

The issue of deviation being justified by a redundant pump is proper matter for the AHJ and the specific installation.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See My Explanation of Negative on Comment 13-121.
RAPPAPORT, E.: The proposal is correct and is contained in NFPA 20-9.3.3. It is desirable to have this exemption in NFPA 70 so that an AHJ will not require alternate power if a redundant diesel fire pump is installed.

13-123 Log #1866 NEC-P13 **Final Action: Hold**
(695.3(A)(3) (New))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 13-84
Recommendation: Add text to read as follows:
695.3(A)(3) In industrial establishments only, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, a fire pump controller shall be permitted to be supplied power by a single feeder from disconnect dedicated to the fire water pump in a site-wide power distribution system located sufficiently remote from the facilities served as to minimize the possibility of damage to the fire pump service by fire from within the facilities.
Substantiation: This comment modifies the original proposal to address comments concerning security, segregation and safety of the feeder to the fire pump controller during a fire. The intent of this change is to address the needs of large industrial concerns which purchase power at a high voltage where a second disconnect and transformer for a fire pump service as required 695.3(A)(1) is impractical while still maintaining the ability of the fire fighters to quickly isolate power to the facility on fire while retaining a power supply to the fire pumps. This proposal permits these large industrial concerns to provide service to fire water pumps which is identical physically to that used by concerns which purchase power at a medium voltage. This modified proposal adds the requirement that the service be separate from the disconnect for power to the facilities and is sufficiently remote from the facilities to not be at risk of damage by the fire. Since power purchased at higher voltage is generally more reliable and the additional high voltage disconnect and transformer are not required, this installation is actually more reliable than what is permitted.
Panel Meeting Action: Reject
Panel Statement: The submitter does not provide sufficient conditions whereby a single feeder constitutes a reliable source.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See My Explanation of Negative on Comment 13-121.

13-124 Log #1867 NEC-P13 **Final Action: Hold**
(695.3(A)(3) (New))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 13-85
Recommendation: Add text to read as follows:
695.3 (A)(3) An alternative source of power to the electric fire pump motor is not required where a back-up engine or back-up steam turbine driven fire pump is installed. [NFPA 20:9.3.3]
Substantiation: The revised wording is a direct quote from NFPA 20 and addresses part of the intent of the original proposal.
Panel Meeting Action: Reject
Panel Statement: The submitter does not provide a valid reason for extracting text from NFPA 20. Also, the revised wording is not a direct quote from NFPA 20, and there are other permitted arrangements where an alternate source of power to the electric fire pump motor is not required that the submitter has not extracted.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: This comment should have been accepted by the panel. The panel action rejected proposed wording which is a direct quote from NFPA 20 which permits a simpler supply to a fire water pump motor which has a turbine or diesel motor driven pump backup.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-122.

13-125 Log #2182 NEC-P13 **Final Action: Hold**
(695.3(B))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Patrick Gaffney, Ronk Electrical Industries, Inc.
Comment on Proposal No: 13-95
Recommendation: New text as proposed in Proposal 13-95 should be Accepted. “Reliable” sources are defined in 695.3(A). All other sources by definition, are not “reliable”, and, therefore, require multiple sources. If no utility supplied three-phase source is available but a single-phase source is, a phase converter could be utilized as one of the “unreliable” multiple sources, either as back-up or primary to the generator source(s). Many rural or suburban areas do not have readily available three-phase sources of utility power available, and at least with a phase converter, they would have a utility supplied source available. Also, the proposal limits their use, by stating “where the only source of utility power is a single-phase source,...”.
Substantiation: Generators, unless considered an “on-site power production facility” [per 695.3(A)], are also considered “unreliable” by definition. If multiple sources are required, wouldn’t a utility supplied source be preferable to multiple generators? Maintenance of generator systems is not always as it should be, and even if it is, that is not always a guarantee of proper performance. Phase converters at least give the option of using a utility supplied source as either a back-up (or primary) source to a generator system. Phase converters have been utilized in many pumping systems, including fire pumps, for many decades with success, and are a recognized part of the code (Article 455).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Proposal 13-95.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-117.

13-126 Log #102 NEC-P13 **Final Action: Hold**
(695.4(B))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-89
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the Technical Correlating Committee action on Proposal 13-77.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-127 Log #1092 NEC-P13 **Final Action: Hold**
(695.4(B))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 13-89
Recommendation: Accept the Proposal as submitted.
Substantiation: Rather than attempt to rewrite the entire article through a panel proposal or comment, the panel should accept proposals that were submitted to correct deficiencies in the current Article. Proposal 13-89 provides a logical rearrangement of the current text to make the article easier to use and to remove some ambiguity in the text. The substantiation to make these changes is well detailed.
Panel Meeting Action: Reject
Panel Statement: The original proposal was accepted in principle. However, extracted text cannot be modified by this panel.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-128 Log #1488 NEC-P13 **Final Action: Hold**
(695.4(B))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-89
Recommendation: Continue to Accept in Principle Public Proposal 13-89.
Substantiation: The Proposer, J. Pauley proposes clarification of extant Article 695.4(B) "Supervised Connection." However, this is extracted text and is part of the Power Supply section which has been completely re-written and submitted as Proposal 13-77. My Public Comment in P13-77 hopes to clarify the new text sufficiently to satisfy the proposer.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-129 Log #103 NEC-P13 **Final Action: Hold**
(695.4(B)(1))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-90
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the Technical Correlating Committee action on Proposal 13-77.
Technical Correlating Committee understands that the Panel Action was to add a new second sentence in 695.4(B)(1) and the existing second sentence now becomes the third sentence.
This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-130 Log #1868 NEC-P13 **Final Action: Hold**
(695.4(B)(2)(3))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 13-91
Recommendation: Add text to read as follows:
Exception: In industrial establishments, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, a metal clad disconnecting means may be located within equipment that feeds loads other than the fire pump if the other provisions of 695.4 (B)(2) are met.
Substantiation: The original comment was modified to include the requirement for metal clad equipment addressing the need for a secure enclosure. The addition of separate switchgear, cable/bus, six cable terminators and bus connections to meet the "not located within equipment that feeds other loads..." requirement added in 2005 actually lowers the installation's reliability in these industrial installations since additional equipment must be connected to the bus.
Panel Meeting Action: Reject
Panel Statement: The panel's statement on Proposal 13-91 is still valid; the present wording is clear.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:
ZGONENA, T.: In addition to the panel statement, the exception would be in violation of Section 695.4(B)(2)(3).

13-131 Log #1613 NEC-P13 **Final Action: Hold**
(695.4(B)(2)(b))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Lawrence A. Bey, Cummins Power Generation
Comment on Proposal No: 13-89
Recommendation: Change "full pump room load" to "fire pump" so that the clause reads: "sized to allow for instantaneous pickup of the fire pump" (same wording to the end of the sentence).
Substantiation: Each fire pump is required to have a dedicated transfer switch and other loads are not allowed to be connected to it. Therefore, the generator feeder overcurrent device is sized based on the fire pump only. Where there are additional fire pump rooms loads (jockey pumps, lighting, etc.), they must be served by a separate feeder and transfer switch.
Panel Meeting Action: Reject
Panel Statement: The extracted text is from NFPA 20, and the submitter's intention is not clear regarding placement in Article 695.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-132 Log #1612 NEC-P13 **Final Action: Hold**
(695.4(B)(3))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Lawrence A. Bey, Cummins Power Generation
Comment on Proposal No: 13-89
Recommendation: Change "All disconnecting devices" to "All disconnecting devices except standby generator disconnects" (same wording to the end of sentence).
Substantiation: Confusion exists between service supplied feeders and on-site generator set feeders. Use of the term "all disconnects" in this section is read by some to apply to both. The intent of Proposal 13-89 is to clear up the confusion, but it does not address this point.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-131.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-133 Log #1094 NEC-P13 **Final Action: Hold**
(695.6)

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 13-97
Recommendation: The panel should reconsider and Accept the Proposal.
Substantiation: The proposal provides a logical rearrangement of the existing material making it easier to use. Rather than attempt a complete rewrite at the comment stage, the better path would be to accept proposal the clean up the language and arrangement in the existing Article 695. This proposal would help to reduce a number of questions that arise from the present text.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-134 Log #1969 NEC-P13 **Final Action: Accept**
(695.6(A))

Submitter: Elliot Rappaport, Electro Technology Consultants
Comment on Proposal No: 13-96
Recommendation: Change the text to read: ".. in accordance with 230.6, 230.9 and Part III and Part IV of Article 230.
Substantiation: There are additional sections to be complied with in addition to Part III and Part IV.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-135 Log #104 NEC-P13 **Final Action: Hold**
(695.6(A) and (B))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-97
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the Technical Correlating Committee action on Proposal 13-77.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-136 Log #1563 NEC-P13 **Final Action: Hold**
(695.6(A) and (B))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-97
Recommendation: Revise text to read as follows

Re-consider Accepting, or Accept in Principle or Accepting In Principle in Part Proposal 13-97. However, do not completely eliminate extant 695.6(B) "Conductor Size."
Substantiation: This Proposal was considered by the panel to be part of the consolidation of Public Proposals on sections of Article 695 into the rewrite of Proposal 13-77 in error. This largely my oversight. In fact, these clauses are not extract text. Note that extant section 695.6 changes to 695.7 under the 13-77 re-write. This section is otherwise untouched by 13-77. The information in extant 695.6(B)(1) regarding other loads is vital. The Voltage Drop information in 695.6(B)(2) is also important since this is a very frequent problem with the Transformer Connection and also with the Alternate Supply.
Panel Meeting Action: Reject
Panel Statement: This comment does not comply with 4.4.5 of the NFPA Regulations Governing Committee Projects in that it does not provide text of the comment, including the wording to be added, revised (and how revised), or deleted.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-137 Log #1881 NEC-P13 **Final Action: Reject**
(695.6(B)(2))

Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 13-99
Recommendation: Continue to accept the proposal, with the following change:
Replace the term "fire-rated" with "fire resistance rated".
Substantiation: The term "fire resistance rated" is more commonly accepted than the term "fire rated", and is used in most adopted building codes.
Panel Meeting Action: Reject
Panel Statement: The panel contends that "fire-rated" in the context of building construction is the correct term.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-138 Log #105 NEC-P13 **Final Action: Accept**
(695.6(B)(2) & (3))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-100
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 13-99.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-139 Log #1990 NEC-P13 **Final Action: Accept in Principle**
(695.6(B)(2) & (3))

Submitter: Robert Konnik, Rockbestos-Surprenant
Comment on Proposal No: 13-100
Recommendation: Continue to accept the change to 2 hour fire resistive rating from 1 hour.
Substantiation: NFPA 20 does not contain the requirements for the duration to fire rate circuit conductors. The section which does have time requirements in NFPA 20-2007 for fire ratings is Table 5.121.1.1.2 for equipment protection which requires a 2 hour fire rating unless both the pump room/house and building(s) exposing pump rooms/house are fully sprinklered. Additionally, the fire pump may be required to operate even after the fire department has arrived to provide supplemental pressure in some cases.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action on Proposal 13-99.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: The substantiation clearly does not support the proposed change for four reasons. First, NFPA 20 has not found it necessary to provide more than a one hour rating. If the attempt is to harmonize NFPA 70 with NFPA 20, why is NFPA 70 more stringent than NFPA 20 requirements? Second, the 2 hour fire rating cited in the substantiation is for the fire pump room, not for any external wiring. Third, there is no direct connection between the 2 hour requirement in NFPA 72 for notification circuit wiring and the requirements for fire pump wiring cited in the substantiation to Proposal 13-100. Fourth, fire protection of feeder circuit wiring in Section 700.9(D)(1) requires 1 hour rating. There are no cited incidents that a 1 hour rating has been found to be inadequate. No justification has been provided to have the requirements of NFPA 70 exceed the requirements of NFPA 20.
Comment on Affirmative:
ZGONENA, T.: It is unclear why the panel statement refers to action on Proposal 13-99 when the submitter's recommendation was covered by action of Proposal 13-100. Also, the panel action should have been "Accept" since the panel made no changes that would conflict with the submitter's recommendation. An "Accept" would eliminate the need for the reference to action on a proposal that only serves to confuse the reader.

13-140 Log #1971 NEC-P13 **Final Action: Reject**
(695.6(B)(2) and (3))

Submitter: Elliot Rappaport, Electro Technology Consultants
Comment on Proposal No: 13-100
Recommendation: Reject the proposal.
Substantiation: The criteria for notification is not the same as the criteria for operation of a fire pump. Within the one hour time window, the fire department has time to connect their equipment and then the fire pump equipment is not critical. Notification is necessary for a longer period.
Panel Meeting Action: Reject
Panel Statement: The panel agrees with the original submitter's substantiation.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-139.

13-141 Log #1131 NEC-P13 **Final Action: Hold**
(695.6(E))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 13-105
Recommendation: Please reconsider and accept the proposal.
Substantiation: 348.12(1) permits flexible metal conduit in wet locations when the conductors are approved for the specific conditions and a "W" type conductor would be required. The Panel seems to feel that the installation of a sprinkler head creates a wet location. If that's the case, then we have a problem with all the electrical equipment in the fire pump room and throughout the building.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Proposal 13-105.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:
ZGONENA, T.: The panel statement in proposal 13-105 does not imply that the pump room is a wet location nor is it identified as such anywhere in Article 695 or NFPA 20. However, dripping and splashing water can occur in the pump room and protection against water intrusion into a raceway is required.

13-142 Log #1132 NEC-P13 **Final Action: Hold**
(695.6(E))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Andre R. Cartal, Princeton Borough Building Dept.
Comment on Proposal No: 13-106
Recommendation: Please review and reconsider the proposal.
Substantiation: The Panel expresses concern that the EMT from the controller to the pump should not be permitted as EMT does not have "sufficient mechanical strength to prevent damage to the conductors". However, 695.6(B) Exception, does not restrict the use of EMT to supply the controller so where is the logic that the inspector needs for enforcement?
Panel Meeting Action: Reject
Panel Statement: See panel statement on Proposal 13-106.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-143 Log #2205 NEC-P13 **Final Action: Hold**
(695.6(E))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 13-106
Recommendation: This Proposal should be Accepted.
Substantiation: The concern in 695.6(E) is for physical protection of the conductors between the controller and the pump. Article 358 allows the use of electrical metallic tubing in areas where it is not exposed to *severe* physical damage. MC cable, even with an impervious covering, is not allowed where subject to any physical damage. The impervious covering only protects the MC against corrosive conditions. The Panel should really remove the permission for MC cable but if they continue to allow that use, EMT should certainly be allowed.

The physical properties of EMT are more robust than those of MC cable. Chapter 3 allows the use of EMT where exposed to physical damage but does not allow the use of MC cable where so exposed. The 1999 NEC was very clear about the use of MC cable. Section 334-3 Uses Permitted stated: *ÒUnless specifically prohibited elsewhere in the Code and* ***where not subject to physical damage,*** *Type MC cables shall be permitted as follows:Ó* During the 2002 NEC cycle, the cable articles were reformatted, leading to current language that causes confusion about the use of MC cables where exposed to physical damage.
Panel Meeting Action: Reject
Panel Statement: See panel statement on Comment 13-142.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:

ZGONENA, T.: Although the panel action is correct, rejection of comment 13-142 should not serve as the basis for rejection of this comment, which, in turn, refers to action on a proposal.

13-144 Log #106 NEC-P13 **Final Action: Hold**
(695.8 (New))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-107
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the Technical Correlating Committee action on Proposal 13-77.

This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-145 Log #1141 NEC-P13 **Final Action: Hold**
(695.8 (New))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-107
Recommendation: Continue to Accept in Principle.
Substantiation: This was already correlated with 13.77. It is now clause 695.9(E). Note: This proposal originated with NEMA SC-10, Sub-committee on Fire Pump controllers. This requirement is not the same as the requirement to carry locked rotor current indefinitely. 1) Starting a single Design “B” Code “F” or “G” motor can incur first half cycle offset currents of over 12 times motor FLC (FLA). 2). The OCP in the Emergency (Alternate) power supply path must be able to start a fire pump motor in the Across-the-Line (Full Voltage Starting) mode regardless of whether or not the fire pump controller is of the reduced inrush starting type, due to the use of the Manual Mechanical Emergency Operator. 3) The same OCP must be able to start all such pumps plus any other connected loads. This is especially vital where fire pumps are connected either in series (high rise) or in parallel (large facilities such as aircraft hangers).
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-146 Log #107 NEC-P13 **Final Action: Hold**
(695.13 (New))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-109
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the Technical Correlating Committee action on Proposal 13-77.

This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-147 Log #1142 NEC-P13 **Final Action: Hold**
(695.13 (New))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-109
Recommendation: Continue to Accept in Principle Proposal 13-109.
Substantiation: This proposal was/is correlated with Proposal 13-77 as clause 695.10.

This is extracted text. This text was added to NFPA-20 due to substantial numbers of compromised installations and confusion in the field over this topic. Junction boxes are frequently used due to the prohibition of using the fire pump controller as a junction box. Numerous controllers have been ruined or compromised regarding both reliability and personnel safety due to the high short circuit ratings -- usually 100,000 Arms Sym., but up to 200 Ka -- of typical controllers. Countless others are in the same condition; but, are unknown. This is to give both guidance and clout to inspection personnel.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-148 Log #108 NEC-P13 **Final Action: Hold**
(695.14 (New))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-110
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the Technical Correlating Committee action on Proposal 13-77.

This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-149 Log #1143 NEC-P13 **Final Action: Hold**
(695.14 (New))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-110
Recommendation: Continue to Accept in Principle Proposal 13-110.
Substantiation: This proposal was /is correlated with Proposal 13-77 as clause 695.12.

This is extracted text. This text was added to NFPA-20 due to substantial numbers of compromised installations and confusion in the field over this topic. Numerous controllers have been ruined or compromised due to flooding because of inadequate raceway (conduit) terminations. Numerous others are vulnerable to the same problem, especially the use of star nuts on 3” and larger top entry or exit conduit. One instance known which nearly required the evacuation of the top two thirds of a high rise hotel due to a flooded middle zone controller. This is a pervasive problem. Fire protection is often interrupted when a sole source controller needs extensive repair or replacement. This is exacerbated by the fact that many, if not most of these controllers are used as service entrance equipment.
Panel Meeting Action: Accept in Principle

Accept the proposal, but change 695.14(D) to read as follows:

No alterations other than installation of raceway(s) and multiconductor cable(s) shall be made to the fire pump controller.

Panel Statement: The revised text clarifies the requirement.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-150 Log #1973 NEC-P13 **Final Action: Hold**
(695.14)

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Elliot Rappaport, Electro Technology Consultants
Comment on Proposal No: 13-110
Recommendation: Reject the proposal.
Substantiation: The proposed text gives the AHJ authority that neither the manufacturer or the testing agency would accept without appropriate testing. Alterations to the structure should void the listing.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on 13-149.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:
ZGONENA, T.: Although the panel action is correct, it is not clear from the panel statement what is the reason for the rejection. The submitter recommends rejection of the entire proposal, but objects to only part of it. While the submitter's substantiation is true, there is no reason why an AHJ could not accept alterations to the fire pump controller.

13-151 Log #109 NEC-P13 **Final Action: Hold**
(695.15 (New))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-111
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the Technical Correlating Committee action on Proposal 13-77.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-152 Log #1145 NEC-P13 **Final Action: Hold**
(695.15 (New))

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-111
Recommendation: Continue to Accept in Principle Proposal 13-110.
Substantiation: This proposal was/is correlated with Proposal 13-77 as clause 695.11.
This is extracted text. This text was added to NFPA-20 due to substantial numbers of compromised installations and confusion in the field over this topic. Numerous controllers have been ruined or compromised due major hacking (modifications by way of large cut-outs to accommodate individual conductors. An unknown number of others exist. This is a poorly understood area. Use of individual conductors is increasing. This is partly due to the placement of fire pumps in the middle of high rise buildings. Both the Normal Source and the Emergency Source are so connected in many cases. Guidance is needed for both installers and inspection agencies. This is a matter of both reliability of the equipment, protecting it from flooding, and personal safety due to the high short circuit ratings of typical fire pump controllers.
Panel Meeting Action: Reject
Panel Statement: This proposal would prohibit the use of conduit and wire to a controller and only permit cable. The panel believes that Comment 13-149 satisfies the submitter's concerns with single conductors entering the controller. In addition the panel recognizes that the submitter's original Comment 13-152 referred to Proposal 13-111 rather than Proposal 13-110 as stated.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:
ZGONENA, T.: The panel action should have been to accept in principle. The submitter's recommendation was accepted by the panel action on comment 13-103, specifically, in the changes made to 695.11(B), and in 695.18(D).

13-153 Log #1974 NEC-P13 **Final Action: Hold**
(695.15)

TCC Action: See the Technical Correlating Committee action on Comment 13-103.
Submitter: Elliot Rappaport, Electro Technology Consultants
Comment on Proposal No: 13-111
Recommendation: Reject the proposal.
Substantiation: The proposal would prohibit the use of conduit and wire to a controller and only permit cable. The substantiation does not address any problem with conduit and wire, but only discusses problems with terminating solid conductors.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:
ZGONENA, T.: The panel action should have been to accept in principle. The submitter is not reading and correclty interpreting the added text from prpoosal 13-111. The special provisions for terminating conductors apply only when using single conductor cable. The revisions were made to 695.15, which covers only Listed Electrical Circuit Protective System to Controller Wiring. The other wiring methods and raceways referred to by the submitter are covered in 695.6. The submitter's concern was addressed by the panel action on comment 13-103, specifically, in the changes made to 695.11(B), and in 695.18(D).

ARTICLE 700 — EMERGENCY SYSTEMS

13-154 Log #949 NEC-P13 **Final Action: Reject**
(700.6(C))

Submitter: Steven R. Terry, Electronic Theatre Controls Inc.
Comment on Proposal No: 13-117
Recommendation: Change proposed wording to be added as a last sentence of 700.6(C) as follows, including an FPN:
Automatic Transfer Switches, rated at 600 VAC and below and utilized to transfer feeders or branch circuits between two separate, non-synchronized power sources, shall be listed for emergency system use.
FPN: The standard for listed Automatic Transfer Switches in ANSI/UL 1008, Standard for Safety for Transfer Switch Equipment.
Substantiation: The submitter of this proposal is precisely correct in his substantiation, but the proposal does not go far enough in helping to prevent misapplication of inappropriate devices as transfer switches. The original proposal asked that Automatic Transfer Switches be listed "for emergency system use". Unfortunately, recent experience has shown that stand-alone Load Control Relays that have a perfectly valid emergency listing under UL 924, (Emergency Lighting and Power Equipment), are being misapplied as branch circuit Automatic Transfer Switches, where UL 1008 devices should in fact be used. These misapplied Load Control Relays are being used to transfer a load between two non-synchronous power sources, but they are not subject to any of the stringent requirements of UL 1008 that are needed for this application, such as fault current testing and mechanical interlock to prevent inadvertent connection of the two power sources. Thus, "listed for use in emergency systems" does not adequately clarify the listing requirements for transfer switches.
The misapplication of non-UL 1008 devices is happening for the following reasons:
A. The NEC is silent in Article 700 on what equipment is required to transfer a branch circuit between two non-synchronous power sources. NFPA 110 is similarly silent on this issue. Automatic Transfer Switches are most commonly used as feeder-level devices. Therefore, installers and engineers are often unaware that devices used to transfer branch circuits are subject to similar switching phenomena, and thus similar risk concerns, as feeder circuit transfer devices. This can lead them to incorrectly assume that devices used to transfer branch circuits need not be UL 1008 listed Transfer Switches.
B. Branch Circuit Automatic Transfer Switches listed under UL 1008 are relatively new devices, as is the concept of transferring single or multiple branch circuits between utility and emergency power sources. Previously, this type of transfer was almost always handled by an upstream feeder-level UL 1008 transfer switch.
C. Stand-alone Load Control Relays (LCRs) listed under UL 924 have recently become available. These are typically double-pole, double-throw devices, but single-pole, double-throw and single-pole, single-throw devices also exist. They are intended only for load energization during loss of utility power, that is accomplished by performing a bypass of the wall switch or dimmer controlling the branch circuit. In this case, an upstream UL 1008 transfer switch is doing the actual transfer from normal to emergency power. However, engineers and installers often incorrectly assume that these UL 924 devices can be used to actually transfer the branch circuit load between normal and emergency power.
This situation is not helped by the fact that some manufacturers of these devices have produced data sheets that can be misleading, and do not specifically prohibit this type of transfer. Presumably, this is because no standard, including the NEC, speaks directly to the requirements of this

relatively new branch circuit transfer application. UL has publicly asserted that UL 924 Load Control Relays are not to be used to transfer a load between two non-synchronous power sources, and that only a UL 1008 device is suitable for this application. In the Spring 2005 issue of "The Code Authority" (UL's newsletter on Code issues), the article "Focus on Emergency Lighting Equipment" appears on page 3. That article states:

"An important issue to recognize is that an LCR does not switch the load between the normal and emergency supplies. Load switching of this type should only be performed by a transfer switch listed in accordance with UL 1008, Standard for Safety for Transfer Switch Equipment."

I believe that industry, UL, and AHJs all need crystal-clear help from the NEC in this situation. The proposed revised wording above would accomplish the following:

1. Require all Automatic Transfer Switches to be listed.
2. Clarify that a listed ATS is required when it is applied either in feeders or in branch circuits, if the application is transferring a load between two non-synchronous power sources.
3. Provide an informative FPN to point the reader to the applicable standard for Automatic Transfer Switches.

Panel Meeting Action: Reject
Panel Statement: The additional text "... and utilized to transfer..." would add confusion. The FPN is already covered in Annex A. Listed transfer switches are required according to the action on Comment 13-155.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.
Comment on Affirmative:
ZGONENA, T.: We agree that the text of the original proposal should be maintained without the additional text requested in the comment. Although the standard is identified in Annex A, we still contend that the addition of the FPN referring to UL 1008 is helpful in this situation.

13-155 Log #2343 NEC-P13 **Final Action: Reject**
(700.6(C))

Submitter: Alan Manche, Square D Company
Comment on Proposal No: 13-117
Recommendation: Reconsider and Reject Proposal 13-117.
Substantiation: There has been no substantiation presented that equipment failure is an issue where appropriately rated and installed electrical equipment is used. The proposed text only requires a transfer switch to be listed, which is only one of many solutions for transferring power to alternate sources. Multiple switchboards from multiple manufacturers are often employed in large facilities to control the power from multiple power sources. It is not reasonable to require such an installation to have equipment that is specifically listed for the transfer or paralleling of sources.

Let's specifically review the submitter's substantiation:

1) "When the two power sources are not synchronized, as much as twice rated voltage may be seen across the transfer switch contacts." This particular issue does not exist where the transfer equipment or transfer switch is constructed to be a break-before-make configuration. A simple delay between breaking on source and closing on the other addresses this issue. So this substantiation simply inaccurately restricts existing products and technology that is safely used today.

2) "Unless listed, a problem of uncoordinated overcurrent protection may exist should the transfer switch close into a short circuit." This particular test is found in almost all product standards for equipment, however, we still do not require a switchboard, panelboard or circuit breaker to be listed which is just as critical and where this condition is more likely to encounter in the electrical system. Where is the substantiation that a safety issue exists today? Why is the panel moving to potentially exclude product and system solutions that are safely being used today with no reported incidents?

3) "The recognized national standard for testing Automatic Transfer Switch Equipment is ANSI/UL 1008." The panel should also note that number of other product standards address the issues above including UL 67, UL 98, ad UL 891 to name a few. It should be noted that automatic transfer functionality is often embedded in panelboards and switchboards as a secondary function and may not be specifically listed to UL 1008 and still perform safely.

4) "This proposed requirement as placed under 700.6(C) would specifically apply only to automatic transfer switches. The intent is to not rule out other types of transfer system transfer equipment identified for emergency system use and acceptable to the AHJ under 700.6(A)." If the intent of the committee is to place this restriction only on transfer switches and not require listing on other viable options that are currently safely in use today, then a second sentence should be included to clarify that point. "This listing requirement is specific to transfer switches and is not intended to exclude other approved transfer equipment configurations."

The panel should reconsider the lack of substantiation and consider the broader applications of products that control the electrical system. The panel must consider the restriction being placed on the user by requiring listing which inherently will exclude safe product solutions and unnecessarily added cost to products without any substantiation that safety will be enhanced by requiring listing. Proposal 13-117 should be rejected.

Panel Meeting Action: Reject
Panel Statement: Without the requirement for listed transfer equipment, the use of untested combinations is possible and may present a safety hazard or reduce reliability. For example, the use of two electrically interlocked contactors could easily result in a source-to-source fault if transferring under an out-of-phase condition.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: This comment requesting that Proposal 13-117 be rejected should have been accepted by the Panel. No substantial justification for the additional listing requirement was provided. The reason noted for requiring listing was an engineering error which can occur whether a switch is listed or not. Listing a transfer switch as required will not prevent misapplication.

RAPPAPORT, E.: The panel statement indicates that the panel intends for the listing requirement to apply to more than the section title, Automatic Transfer Switches, implies. Transfer equipment includes automatic transfer switches but also includes circuit breakers and contactors. To what does this proposal apply? UL may have a different definition of "automatic transfer switches" which may be more inclusive than what was proposed. The present text in section 700.6(A) already requires that transfer equipment (inclusive of all types) "be designed and installed to prevent the inadvertent interconnection of normal and emergency sources". The use of "break before make" operation prevents the misapplication described in the Proposal 13-117 substantiation and the panel statement to this comment. The original proposal should be rejected as it would not increase safety and reliability but would increase cost and eliminate safe product solutions that have been used successfully in the past and that are acceptable to the AHJ.

13-156 Log #110 NEC-P13 **Final Action: Accept**
(700.9)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-118
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal so that the text is in accordance with the NEC Style Manual. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise 700.9(B)(5)(a) of the ROP draft to read as follows:
(a) From separate vertical switchboard sections, with or without a common bus, or from individual disconnects mounted in separate enclosures.
Panel Statement: The panel accepts the direction of the TCC. This change complies with the direction of the TCC to comply with the NEC Style Manual.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-157 Log #2342 NEC-P13 **Final Action: Reject**
(700.9(B))

Submitter: Alan Manche, Square D Company
Comment on Proposal No: 13-118
Recommendation: The Panel Action on Proposal 13-118 should continue to be Accepted in Principle, but the text should be revised to read as follows:

Revise existing section 700.9(B) by adding a new Number (5) to (B) to read as follows:

(5) Wiring from an emergency source shall be permitted to supply any combination of emergency, legally required, or optional loads in accordance with (a), (b) and (c).

(a) Wiring ~~From~~ from ~~separate~~ different vertical switchboard sections ~~of a vertical switchboard~~, with or without a common bus, or from individual disconnects mounted in separate enclosures shall be permitted.

(b) The common bus of ~~or separate~~ different vertical switchboard sections ~~of the switchboard~~ or the individual enclosures shall be permitted to be supplied by single or multiple feeders ~~without overcurrent protection at the source~~.

(c) Legally required and optional standby circuits shall not originate from the same vertical switchboard section, panelboard enclosure or individual disconnect enclosure as emergency circuits.

~~Exception to (5) (b). Overcurrent protection shall be permitted at the source or for the equipment, provided the overcurrent protection is selectively coordinated with the down stream overcurrent protection.~~

Substantiation: We agree with Mr. Nasby's contention, in the explanation of his negative vote, that the revision of 700.9(B) if left as it was accepted at the ROP could create confusion. We suggest the proposal should be revised as shown, for the following reasons:

1) The term "sections of a vertical switchboard," used in (a), is not a commonly used term. The phrase "vertical switchboard sections" parallels that

of other article of the NEC such as NEC 695.3.

2) Use of the term "separate sections," as in (a) and (b), may drive and unnecessary expectation of physical barriers between the sections as this is also consistent with other separation requirements such as NEC 695.3. Standard switchboards are typically open between the sections, and there is nothing in the proposal that should cause that open construction to be unacceptable. "Different vertical switchboard sections" conveys the proper message.

3) Item (5)(b) gives permission to omit overcurrent protection in the supply feeders, with the subsequent Exception to (5)(b) allowing overcurrent protection as long as the protective devices are selectively coordinated. Neither of these points are suitable or necessary for this section of Article 700, since 700.9 deals only with the separation of circuits – not the overcurrent protection rules. The presence or absence of overcurrent protection, in this situation, should be governed by the rules in Articles 240 or 445. Any specific deviations from the requirements of Article 240 should be located in Part VI of Article 700, and so noted in Articles 240 and/or 445 by exception where applicable. Selective coordination has nothing to do with the objectives of 700.9, and furthermore selectivity is not a substitute for circuit separation. Based on NFPA 70E and arc-flash events that are always assumed to propagate to the line side of overcurrent protection within a panel, selectivity does nothing to protect the system from a separation concern.

Panel Meeting Action: Reject

Panel Statement: The panel believes that different vertical sections must have barriers, and the panel's previous proposal wording is clearer.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Gustafson, R.

Explanation of Negative:

NASBY, J.: NEMA disagrees with the Panel Action with the following reason: The requirement to have barriers between the vertical sections of a switchboard is overly burdensome and not substantiated for the application.

13-158 Log #1478 NEC-P13 **Final Action: Reject**
(700.9(B)(5))

Submitter: James E. Degnan, Sparling

Comment on Proposal No: 13-118

Recommendation: Delete all text for the new proposed 700.9(B)(5).

Substantiation: It is a mistake to describe the emergency feeders to a transfer switch in the same manner as the emergency subsystem served by the transfer switches. Anything on the source side of a transfer switch should be considered as the emergency system, anything downstream of the transfer switch should be identified according to the type of load it serves; 700, 701, or 702. The normal and emergency feeders upstream of a transfer switch offer redundancy and the isolation of a system is not as critical as it is downstream of the switch. In the extremely rare event that a fault on one system would propagate an effect multiple emergency feeders, the emergency systems are complementary and the survival of one may not benefit the public. What good are lights in an exit stair if the stair is full of smoke?

Most faults result in some consumption of material with associated vaporization, hazardous gasses, etc. The materials often leave deposits throughout a switchboard, even if the sections are separated by metal panels this requirement may not accomplish what it is intended to do.

Complying with the proposal will result in onerous design choices:

1. Most buildings utilize single transfer switches to feed the loads of Articles 700, 701, and 702. Often the life safety feeder is rated 100 amps or less. Placing a small single overcurrent device in a dedicated vertical section is not an effective use of resources. A building without a 702 load will need three times the space (main, 701 feeder, 702 feeder) than it did previously. The additional space and the larger switchboard will increase the cost of buildings with a very small potential benefit to the public.

2. The proposed language notes that group mounted switches comply with the code. Considering the expense and space requirements of switchboards using a wireway to serve individual overcurrent devices becomes a cost effective alternative. However, a wireway with field made taps to switches has a much better chance of erroneous assembly than a regulated product like a panelboard. Is this the intent of the code?

3. The code language requires a separate vertical section, but is not really clear on the degree of isolation that the vertical sections are suppose to offer. Switchboards can be constructed with separate vertical sections that are not barried between the sections. If barriers are the intent, then do they extend all the way to the rear and across the horizontal bus or is it adequate to just isolate the feeders? At some point there still must be a separate definition of emergency system vs subsystem, where does this occur?

4. Wouldn't low voltage power circuit breakers in a single vertical switchgear section provide reliable separation that is similar to switchboard vertical sections?

5. Coupling the proposed requirement for vertical sections with the selective coordination requirements is likely to result in low voltage power circuit breakers in dedicated vertical sections that require rear access. Each vertical section will cost $35,000. Will our society truly see benefit by increasing the cost of electrical systems in this manner?

Panel Meeting Action: Reject

Panel Statement: Separation of circuits is necessary.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Gustafson, R.

13-159 Log #2123 NEC-P13 **Final Action: Reject**
(700.9(B)(5) (New))

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)

Comment on Proposal No: 13-118

Recommendation: I disagree with the panel action. Recommend that Proposal 13-118 be Accepted in Principle and be revised to read as follows:

Revise existing 700.9(B) by adding a new (5) to (B) to read as follows:

(5) Wiring from an emergency source shall be permitted to supply any combination of emergency, legally required, or optional loads in accordance with (a), (b), and (c).

(a) Wiring ~~F~~from ~~separate~~ different vertical sections of a ~~vertical~~ switchboard, with or without a common bus, or from individual disconnects mounted in separate enclosures shall be permitted.

(b) The common bus or ~~separate~~ different vertical sections of the switchboard or the individual enclosures shall be permitted to be supplied by single or multiple feeders ~~without overcurrent protection at the source~~.

(c) Legally required and optional standby circuits shall not originate from the same vertical switchboard section, panelboard enclosure or individual disconnect enclosure as emergency circuits.

Exception to (5)(b). Overcurrent protection shall be permitted at the source or for the equipment~~, provided the overcurrent protection is selectively coordinated with the down stream overcurrent protection~~.

Substantiation: As previously stated by Mr. Nasby in the explanation of his negative vote, this proposal may create confusion and thus should be revised as shown. The reasons for these revisions are:

1) The term "vertical switchboard" was used in (a). This is not an industry recognized term. We suggest the panel meant to say, "vertical sections of a switchboard."

2) The term "separate sections" was used in (a) and (b). This may lead AHJs to believe that there must be physical barriers between the sections, however, standard switchboards are typically open between the sections. Better wording would be "different vertical sections of a switchboard."

3) Omission of overcurrent protection in the supply feeders appears to be permitted by (b). This omission could result in improperly protected conductors and equipment. NEMA does not support the omission of overcurrent protection in this situation unless it is covered by a rule in Articles 240 or 445. The intent of (B) is to delineate when separation is required between emergency source/ emergency source overcurrent protection wiring and wiring from other systems and equipment, not to stipulate requirements for overcurrent protection. Any requirement for overcurrent protection or allowed deviation from the requirements of Article 240 should be located in Part VI of Article 700, and so noted in Articles 240 and/or 445 by exception where applicable.

4) The proposed exception to (b) is not suitable for this section of Article 700 as 700.9 deals with the separation of circuits. Selective coordination has nothing to do with this objective. Further, selective coordination is a system design issue, not a Code issue.

NEMA strongly supports selective coordination as a valuable safety asset in the current range where overloads most often occur. However, NEMA does not support the mandate for Selective Coordination for ALL current ranges and ALL overcurrent devices because safety and reliability can both actually be diminished. This is due to increased hazardous arc flash energy with increased equipment damage and potential fire initiation, decreased reliability, and extended downtime before service restoration. Mandates for selective coordination for ALL current ranges and ALL overcurrent devices will not always provide the optimum safety solution or optimum reliability. Such a solution requires the expertise and judgment of a Professional Engineer who can balance the design, safety and operating requirements in order to determine the optimum design for each specific facility.

The wording of this section states that ALL overcurrent devices selectively coordinate, but this is not what the definition in Article 100 implies. The definition deals with localization of an overcurrent and, in many cases, selective coordination for ALL overcurrent devices serves no useful localization purpose such as when: 1) Overcurrent devices are located on the primary and secondary sides of a low voltage transformer with no loads in-between. 2) A feeder overcurrent device is connected in series with the main overcurrent device in a downstream panelboard with no loads in-between. 3) An overcurrent device on a generator is in series with an overcurrent device in a switchboard with no loads in-between. In these instances, requiring both devices to be selectively coordinated does not add to the reliability of the system, which is the stated objective of the CMP.

When overcurrent devices are located on the primary and secondary sides of a low voltage transformer, sized to meet the NEC transformer protection requirements, it is almost impossible to also meet the requirement for selective coordination of this section, regardless of the type of overcurrent protective device chosen.

In many instances,it may not be possible to meet the requirements for generator protection provided by an overcurrent device located on or near the generator and provide selective coordination with downstream overcurrent devices. Further, the generator protection functions provided within the engine-generator controller by the manufacturer might not be able to selectively coordinate with down stream overcurrent devices.

The paralleling of generators is often done to enhance system reliability, which is the stated objective of the CMP, however, in order to meet the requirement for selective coordination each generator overcurrent device and controller must selectively coordinate with all downstream overcurrent devices. This may not be possible if the generators are of unequal size.

The upgrade or expansion of an existing building may require the replacement of existing upstream equipment so that it will selectively coordinate with the new downstream equipment it must feed. The State of Washington has recognized the significant economic burden this is placing on building owners and businesses and has issued an emergency order exempting existing buildings from meeting the selective coordination requirements of the 2005 NEC.

Systems are normally designed for selective coordination in the overload region of the overcurrent device time-current curves. If this were not so, they would not operate under normal conditions, so what is really being called for in this requirement is overload and short circuit selective coordination. In order to achieve total short circuit selective coordination, the size of upstream overcurrent protective devices may need to be increased and/or time delay trip characteristics increased, thereby possibly increasing the arc flash hazard. In other words, by forcing selective coordination for an event that most likely will never occur, namely a bolted fault, the hazards involved in performing tasks which most likely will occur, namely system maintenance, may be increased. This is another reason why system designers need the flexibility to optimize the design of a system, which the current requirement does not allow.

As stated in the original NEMA substantiation to delete the text in proposal 13-137, we wish to once again point out the following:

4. The need for the flexibility to optimize the design of a system is recognized in IEEE Standard 242-2001 (The Buff Book). Section 15.1 states, "In applying protective devices, it is occasionally necessary to compromise between protection and selectivity. While experience may suggest one alternative over another, the preferred approach is to favor protection over selectivity. Which choice is made, however, is dependent on the equipment damage and the affect on the process."

5. The need for the flexibility to optimize the design of a system is also recognized in NFPA 110-2005, Standard for Emergency and Standby Power Systems. Section 6.5.1 states, "The overcurrent protective devices in the EPSS shall be coordinated to optimize selective tripping of the circuit overcurrent protective devices when a short circuit occurs. A further explanation of this statement is given in Annex A section A.6.5.1, "It is important that the various overcurrent devices be coordinated, as far as practicable, to isolate faulted circuits and to protect against cascading operation on short circuit faults. In many systems, however, full coordination is not practicable without using equipment that could be prohibitively costly or undesirable for other reasons."

6. This NEC text conflicts with Chapter 27 of the International Building Code that specifically requires compliance with NFPA 110 for emergency systems. This presents a conundrum for the system design and the AHJ. Which code takes precedence, the IBC or the NEC?

Finally, it must be recognized that the emergency system will typically be fed from the same main overcurrent protective device as the "normal" system. If the "normal" system is not also totally selectively coordinated, there is the possibility that the main device may open unnecessarily due to a fault in the "normal" system, thereby defeating the purpose of having a totally selectively coordinated emergency system. While this may not be of concern in most occupancies where the emergency system feeds primarily egress lighting, an unplanned transfer of power from the normal to the alternate source in the essential electrical system of a healthcare facility could be undesirable. It is unreasonable to require total selective coordination in the emergency system (and essential system in a healthcare facility as required by 517.26) and not also on the "normal" (nonessential) system as well.

In summary, NEMA strongly supports selective coordination as a valuable safety asset in the current range where overloads most often occur. However, NEMA does not support the mandate for Selective Coordination for ALL current ranges and ALL overcurrent devices because safety and reliability can both actually be diminished, thus the section should be deleted.

5. As pointed out by Mr. Swayne in his affirmative comment, (a) is not a complete sentence, hence the words "Wiring" and "shall be permitted" have been added.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-157.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

NASBY, J.: NEMA disagrees with the Panel Action with the following reason: See NEMA Explanation of Negative on Comment 13-157

13-160 Log #296 NEC-P13 **Final Action: Accept (700.9(D))**

TCC Action: The Technical Correlating Committee directs that this comment be reported as Accept since the requirements for hospitals and health care facilities are within the Scope of Article 517, not Article 700.
Submitter: Code-Making Panel 15,
Comment on Proposal No: 13-121
Recommendation: Proposal 13-121, which was Accepted in Principle by CMP-13 should be rejected, returning 700.9(D) to its wording in the 2005 NEC. That would have 700.9(D) ending with the phrase "...business and mercantile."
Substantiation: The statement: "It [fire protection of the emergency system wiring] is common practice in hospital design", which is included in the substantiation for 13-121, is not true - at least, not on a wide spread basis. Additionally, Proposal 13-121, as accepted by CMP-13, would apply to significantly more of the overall health care electrical system - the entire EES - than is the case for other occupancies covered by 700.9(D). 517.26, as modified in Proposal 15-43, properly invokes the requirements of Article 700 for the life safety branch of the emergency system, rather than the entire EES. Proposal 13-121 should be rejected.

This comment was balloted through CMP-15 with the following ballot results:

17 Eligible to Vote
12 Affirmative
5 Not Returned (T. Dunn, D. Marshall, H. Nash, B. Shelly & M. Skinner)

Mr. E. Morgan voted affirmatively stating: "A similar proposal, 15-51 (Log #3025) was rejected by CMP-15. This Proposal 13-121 should also be rejected."

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-161.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

HORNBERGER, B.: This comment from CMP-15 should be accepted. Essential Electrical System requirements for the Health Care industry are the responsibility of Panel 15. Panel 15 should have the authority to reference 700.9(D) in 517 if these systems require fire protection. The comment submitted by Panel 15 indicted that this requirement is not appropriate for hospital and health care Essential Electrical Systems.

RAPPAPORT, E.: The Proposal 13-121 goes beyond the scope of Article 700 by including additional wiring in "hospitals and health care facilities" that are not considered "emergency" circuits. It should be noted that the term "health care facilities" is inclusive of hospitals, nursing homes, limited care facilities, clinics, medial and dental offices, and ambulatory care centers and CMP 15, properly, has jurisdiction over those facilities. Essential electrical systems, included in the proposal, are defined in Section 517.30 to include Life Safety Branch and Critical Branch. Only the Life Safety Branch is intended, by CMP 15, to meet the requirements of Article 700 (see 517.2). There is no substantiation for the Critical Branch to meet Article 700. There is also no need for this change to Section 700.9(D) since it is already clearly coveted in Article 517. CMP 15 properly invoked the requirements of Article 700 for the Life Safety branch in Proposal 15-43. The requirements for emergency systems in all health care facilities should remain with Panel 15.

13-161 Log #1941 NEC-P13 **Final Action: Reject (700.9(D))**

TCC Action: Based on the Technical Correlating Committee action on Comment 13-160, the Technical Correlating Committee directs that this comment be reported as Reject.
Submitter: Barry F. O'Connell, Tyco Thermal Controls
Comment on Proposal No: 13-121
Recommendation: I agree with this Proposal as amended by the Panel Action.
Substantiation: In response to the negatives, a parallel proposal to Panel 15 on Article 517 was Rejected as being more appropriate for this panel, as follows:

CMP 15 Statement: "Fire protection is primarily a function of the Building Code and Life Safety Code. If incorporated into the wiring requirements for an emergency system, it should be done through expanding the occupancy classes listed in 700.9(D).

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

HORNBERGER, B.: This comment should be rejected. Essential Electrical System requirements for the Health Care industry are the responsibility of Panel 15. The comment submitted by Panel 15 indicted that this requirement is not appropriate for hospital and health care Essential Electrical Systems.

RAPPAPORT, E.: See my explanation of negative vote on Comment 13-160.

13-162 Log #2179 NEC-P13 **Final Action: Hold**
(700.9(D))

Submitter: Edward Walton, Draka Cableteq
Comment on Proposal No: 13-123
Recommendation: Add new text to 700.9(D) as follows:
(3) Branch Circuit Wiring. Branch circuits that originate in a location remote from the area being served shall meet one of the following conditions:
(1) Be installed in spaces or areas that are fully protected by an approved automatic fire suppression system
(2) Be a listed electrical circuit protective system with a minimum 1-hr fire rating
(3) Be protected by a listed thermal barrier system for electrical system components
(4) Be protected by a fire-rated assembly listed to achieve a minimum fire rating of 1 hr
(5) Be embedded in not less than 50 mm (2 in.) of concrete
(6) Be a cable listed to maintain circuit integrity for not less than 1 hr when installed in accordance with the listing requirements.
Revise reference in 700.9(D) to read:
700.9(D)(1), (D)(2
), and (D)(3)
Optional. Add FPN as follows:
FPN: A remote location is defined as an area separate from the Emergency System Circuit load such as a different floor in a multistory building or a different fire zone in a place of assembly or stadium.
Substantiation: This proposal has been modified to resolve the panel's concern that this "level of protection" is not warranted for all branch circuits. The branch circuit for which this protection is required is now defined as a remotely located branch circuit.
5-a. Even though a fire caused circuit failure would be more catastrophic for the feeder cable, the remotely located branch circuit is far more vulnerable if it is run through the protected premises before connected to the load.
5-b. Presently the emergency branch circuit panel could be located in the basement of a multistory building (7 stories or higher) or on the opposite side of an assembly hall or stadium far from the emergency circuit load and without the required fire protection of 700.9(D).
5-c. One code user misinterpretation is that the feeder-circuit wiring terminates at the transfer switch and anything beyond that does not require fire protection. Adopting this proposal would help clarify this misinterpretation.
I have included an optional FPN if the panel feels it needs to define remote location.
This proposal could be located in Section IV if the panel believes this is a more proper location.
Panel Meeting Action: Hold
Panel Statement: This comment was held because it would introduce a concept that has not had public review by being included in a related proposal as published in the Report on Proposals. This action is to hold the comment only.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-163 Log #1989 NEC-P13 **Final Action: Accept in Principle**
(700.9(D)(1) (2) FPN)

TCC Action: The Technical Correlating Committee directs that this comment be reported as Accept in Principle based on the panel action on Comment.
13-164.
Submitter: Robert Konnik, Rockbestos-Surprenant
Comment on Proposal No: 13-125
Recommendation: Add a fine print note to 700.9(D)(1)(2) as follows:
FPN: UL guide information for electrical protection systems (FHIT) contains information on proper installation requirements to maintain the fire rating.
Substantiation: Reworded this to be the same as accepted in the panel action on Proposal 13-101.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-164 Log #1978 NEC-P13 **Final Action: Accept**
(700.9(D)(1)(2), FPN)

Submitter: Elliot Rappaport, Electro Technology Consultants
Comment on Proposal No: 13-125
Recommendation: Accept the panel action on Proposal 13-101 as a FPN to this section.
Substantiation: The panel action on this proposal does nothing to add the FPN to this article.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-165 Log #111 NEC-P13 **Final Action: Accept**
(700.9(D)(1)(4))

TCC Action: The Technical Correlating Committee directs that the panel action be revised to read as follows to comply with the NEC Style Manual:
"(4) Be protected by a listed fire-rated assembly that has a minimum fire rating of 1 hour and contains only emergency wiring circuits."
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-124
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal so that the text is in accordance with the NEC Style Manual. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise the text of 700.9(D)(1)(4) to read as follows:
(4) Be protected by a listed fire-rated assembly that contains only emergency wiring circuits. This assembly shall have a minimum fire rating of 1 hour.
Panel Statement: The panel accepts the direction of the TCC to clarify the statement and comply with the NEC Style Manual.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-166.

13-166 Log #1976 NEC-P13 **Final Action: Reject**
(700.9(D)(1)(4))

Submitter: Elliot Rappaport, Electro Technology Consultants
Comment on Proposal No: 13-124
Recommendation: Reject the proposal.
Substantiation: The proposal mixes the need to maintain electrical separation with the need for physical separation. There is no substantiation that a one hour rated enclosure containing both normal and emergency systems is more susceptible to fire.
Panel Meeting Action: Reject
Panel Statement: The panel believes that there is a need to physically separate normal and emergency circuits.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: Section 700.9(D)(1) provides for fire protection for feeder circuit wiring by any one of 6 methods. The presence of normal circuit feeders in the same fire rated assembly does not increase the susceptibility of the emergency conductors to damage from fire and no substantiation to that effect has been provided. Section 700.9(B), cited in the proposal substantiation, refers to keeping entirely independent with respect to same "raceway, cable box, or cabinet." There is no reference to maintaining any physical separation of raceways. If a normal circuit raceway or cable located adjacent to an emergency feeder raceway or cable presents increased susceptibility to fire damage, as yet unsubstantiated by test or field experience, then it should apply to all of 700.9(D)(1) not only 700.9(D)(1)(4).

13-167 Log #1302 NEC-P13 **Final Action: Reject**
(700.12(A))

Submitter: David Sroka, Turner Falls, MA
Comment on Proposal No: 1-54
Recommendation: Add a sentence as follows:
"The short-circuit current rating shall be included on the nameplate for battery inverters."
Substantiation: This data is hard to obtain after the original installation. It is important information. The nameplate is the best place for the equipment's rating. Circuit breaker, fuse or transfer switch rating can mistakenly be taken as the unit's rating. Lastly, it is safest to read the nameplate to get this information rather than physical removal of covers.
Panel Meeting Action: Reject
Panel Statement: This language is more appropriate for a product standard.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-168 Log #2116 NEC-P13 **Final Action: Accept in Principle**
(700.12(B)(6))

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 13-131
Recommendation: Accept the Proposal.
Substantiation: The new FPN was not intended to identify that the disconnecting means which is the subject of 700.12(B)(6) must disconnect the "service." The FPN is necessary to identify to users of the NEC that this disconnecting means must be rated as "suitable for use as service equipment." As described in Article 100, conductors supplying a building or other structure

from a generator are "feeder" conductors. Seeing that the generator is outdoors, the conductors are "outside feeder conductors" and, therefore, they are included in the scope of Article 225. Section 225.31 requires that a disconnecting means be provided to disconnect all conductors that supply or pass through a building or structure. Section 700.12(B)(6) amends the requirements of 225.32 to locate the disconnecting means required by 225.31 at the building or structure served however, it does not amend the requirements of 225.36 for it to be "suitable for use as service equipment." This requirement is often overlooked and the proposed FPN would go a long way towards identifying that there is another requirement in 225.36 that must be considered.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-169.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-169 Log #2117 NEC-P13 **Final Action: Accept in Principle (700.12(B)(6))**

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 13-131
Recommendation: Accept the Proposal in Principle and revise 700.12(B)(6) to read:
(6) Outdoor Generator Sets. Where an outdoor housed generator set is equipped with a readily accessible disconnecting means that meets the requirements of 225.36 and is located within sight of the building or structure supplied, an additional disconnecting means shall not be required where ungrounded conductors serve or pass through the building or structure.
Substantiation: The new FPN was not intended to identify that the disconnecting means which is the subject of 700.12(B)(6) must disconnect the "service." This comment is being submitted as an alternative to adding a new FPN. The new text will identify to users of the NEC that this disconnecting means must be rated as "suitable for use as service equipment." As described in Article 100, conductors supplying a building or other structure from a generator are "feeder" conductors. Seeing that the generator is outdoors, the conductors are "outside feeder conductors" and, therefore, they are included in the scope of Article 225. Section 225.31 requires that a disconnecting means be provided to disconnect all conductors that supply or pass through a building or structure. Section 700.12(B)(6) amends the requirements of 225.32 to locate the disconnecting means required by 225.31 at the building or structure served, however, it does not amend the requirements of 225.36 for it to be "suitable for use as service equipment." This requirement is often overlooked and the proposed new text would go a long way towards identifying that there is another requirement in 225.36 that must be considered.
Panel Meeting Action: Accept in Principle
Accept the proposal in principle and revise 700.12(B)(6) to read:
(6) Outdoor Generator Sets. Where an outdoor housed generator set is equipped with a readily accessible disconnecting means located within sight of the building or structure supplied, an additional disconnecting means shall not be required where ungrounded conductors serve or pass through the building or structure. The disconnecting means shall meet the requirements of 225.36.
Panel Statement: The added sentence clarifies that the disconnecting means must comply with 225.36.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-170 Log #2178 NEC-P13 **Final Action: Reject (700.12(B)(6), FPN (New))**

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 13-130
Recommendation: Accept the Proposal.
Substantiation: This proposal should be accepted as the purpose of the FPN is to direct readers of this section to a requirement that is not obvious. The grounding and bonding conditions when the disconnecting means is remote from the building or other structure it is supplying are often misunderstood and, therefore, this would be an appropriate location for a FPN providing direction to the location of the requirement. In the ROP stage, Panel 5 accepted a proposal to 250.32(D) to include a reference to 700.12(B)(6) to identify that the requirements of that section apply to the condition of 700.12(B)(6). It would be prudent to locate a FPN here to reference 250.32(D).
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Proposal 13-130. The panel believes that the addition of the FPN is unnecessary.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-171 Log #2263 NEC-P13 **Final Action: Reject (700.12(D))**

Submitter: Aden Lunden, Diversified Electric Services
Comment on Proposal No: 13-131a
Recommendation: I agree with code panel. The word Accepted cannot be changed to Approved by the Panel. The reason that the comment in the recommendation cannot be changed is Accepted and Approved are two different definitions. One cannot be substituted for the other.
Substantiation: I recommend that Acceptable should be a new definition in the Code book. Acceptable defined will resolve any confusion to what is Approved compared to what is Allowable or Acceptable.
Panel Meeting Action: Reject
Panel Statement: This comment does not comply with 4.4.5 of the NFPA Regulations Governing Committee Projects in that it does not provide text of the comment, including the wording to be added, revised (and how revised), or deleted.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-172 Log #112 NEC-P13 **Final Action: Accept (700.16)**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-133
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal so that the text is in accordance with the NEC Style Manual. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the statement in accordance with the NEC Style Manual. See panel action and statement on Comment 13-173.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-173 Log #347 NEC-P13 **Final Action: Hold (700.16)**

TCC Action: The Technical Correlating Committee directs that comment 13-173 be reported as "Hold" consistent with Section 4.6.2.2 of the NFPA Regulations Governing Committee Projects since the addition of the words "component" and "ballast" constitutes new material that has not had public review.
Submitter: Samuel Goble, Department of General Services / Rep. Commonwealth of Virginia
Comment on Proposal No: 13-133
Recommendation: Revise text to read:
"...failure of any individual lighting ~~element~~ component such as the burning out of a ~~light bulb~~ lamp or ballast, cannot...".
Substantiation: The term "element" is often confused for a "filament". Using an example can often confuse the intent of the code section, such as in this example. Replacing the word "element" with "component" does not change the intent or meaning of this code section and replaces a layman's term such as the "element" often misused as the filament of a lamp. Using the term "component" covers all parts of all types of luminaries.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-174 Log #1880 NEC-P13 **Final Action: Accept (700.16)**

TCC Action: The Technical Correlating Committee directs that Comment 13-174 be reported as Accept to correlate with the panel action on Proposal 13-133 to change "light bulb" to "lamp".
Submitter: Mike Holt, Mike Holt Enterprises, Inc.
Comment on Proposal No: 13-133
Recommendation: Continue to accept, with the following change:
"...failure of any individual lighting element such as the burning out of a ~~light bulb~~ lamp, cannot... ".
Substantiation: The proponent is correct that "lamp" should be used instead of "light bulb", but the phrase "burning out of" should remain, as it helps detail the intent of this section.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-173.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-176 Log #113 NEC-P13 **Final Action: Accept**
(700.23 (New))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-134
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal so that the text is in accordance with the NEC Style Manual. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Revise the text of Proposal 13-134 to read as follows:

700.23 Dimmer Systems. A dimmer system containing more than one dimmer and listed for use in emergency systems shall be permitted to be used as a control device for energizing emergency lighting circuits. Upon failure of normal power, the dimmer system shall be permitted to selectively energize only those branch circuits required to provide minimum emergency illumination. All the branch circuits supplied by the dimmer system cabinet shall comply with the wiring methods of Article 700.

Panel Statement: The panel accepts the direction of the TCC to clarify the panel action on this proposal in accordance with the NEC Style Manual.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-177 Log #1340 NEC-P13 **Final Action: Reject**
(700.25 and 700.27)

Submitter: John J. MacDonald, TMP Consulting Engineers, Inc.
Comment on Proposal No: 13-135
Recommendation: Frederick P. Hartwell Recommendation

I. 700.25 Add a fine print note as follows:

FPN: Fuses and circuit breakers for emergency circuit overcurrent protection, where coordinated to ensure selective clearing of fault currents, increase overall reliability of the system.

II. 700-27 Delete this section.

Proposal 13-135 should be accepted in principle

Substantiation: The Electrical Consultants that I know are conscientious individuals who know they must obey the rules of the NEC first and foremost. If they do not, they can be sued. They have been raised on the principle that the NEC is not a design manual. However, it would appear that in recent years the NEC is becoming a design manual with its apparent concerns over lack of coordination with MCCB's which have performed admirably for dozens of years and with no major problems. Admittedly, MCCB's have one weakness in the instantaneous region which apparently was exploited by fuse manufacturers in the 2005 NEC. But where is the history of loss experience and where is the benefit to the public in this new requirement?

CMP-13 says that selective coordination increases the reliability of the emergency system, but is that true? If fuses are the only means of meeting this code requirement, then there is a problem, because fuses require replacement to restore the circuit. The use of fuses to achieve selective coordination could result in other problems that only MCCB's can solve. Maintenance people will be replacing fuses in emergency lighting panels not only for faulted conditions but for overloads as well. This has led to numerous problems in the past when replacement fuses are not available. Hence the need to keep issues such as these with the design community. NFPA 110 takes a much better stance with the wording in 6.5.1 where it requires the overcurrent protective devices to be coordinated to optimize selective tripping during a short circuit condition. This requirement should be adequate without the NEC adding more restrictions onto it.

Realistically, 700.27 is addressing a bolted branch circuit fault not a feeder fault. A bolted fault in a branch circuit might happen when the building is under construction when it is being wired by a licensed electrician, who if he should make such a mistake, would fix it immediately, long before the space or building was occupied. Once the building is occupied, such an event is extremely rare.

If this is a safety issue, should this not be made retroactive so that the many thousands of installations around the country can be made safer? If CMP-13 feels that "selective coordination is achievable with the equipment available now" as they state in rejecting Proposal 13-135, maybe they could let the design community in on their secret, because right now the alternatives are fuses or fuses! However, even the new fuse panel offered by one fuse manufacturer does not work for larger downtown network systems where fault currents on a 277 V emergency lighting panel could exceed the published 100K A/C rating of the fuse panel, then you have a Code requirement that cannot be met with either a fuse or an MCCB.

Specifying power air breakers for commercial office buildings with their high cost and space requirements as some have suggested is an absurd solution. Also, there are many owners of large facilities who have spent considerable time and effort to rid themselves of troublesome fuse problems, only to now have their consultants design them back in again.

It is admirable that some of the members of CMP-13 have changed their opinion on this since the 2005 Code and have now voted against it. Let's hope that others will see the light and reverse their vote as well and give design back to the engineering community where it belongs.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-204.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 9 Negative: 4
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

ELKINS, D.: The panel action to reaffirm the requirement for selective coordination of emergency systems' overcurrent devices with all supply side overcurrent protective devices provides no exception for installations where the ability to rapidly restore power may be more critical than selective coordination. This may be only achievable in certain installations with fuses which may not be available to restore power after a fuse operation. An exception should be provided to permit flexibility in the design where speed of restoration of power is judged to be more important than a brief outage.

NASBY, J.: See NEMA Explanation of Negative on 13-204.

RAPPAPORT, E.: The suggested FPN provides adequate guidance to the qualified design personnel of the importance of selective coordination along with permitting other considerations essential for safety to human life.

ZGONENA, T.: See My Explanation of Negative on 13-175.

13-178 Log #2048 NEC-P13 **Final Action: Accept**
(700.26)

Submitter: Hugh O. Nash, Jr., Nash Lipsey Burch
Comment on Proposal No: 13-136
Recommendation: Continue to reject 13-136 which applies to 700.26 Ground-Fault Protection of Equipment.
Substantiation: Regardless of the size of the alternate source, ground-fault interruption of the alternate source overcurrent device can cause interruption of the alternate source feed to critical equipment. This is of particular concern to healthcare facilities. The panel statement (reason for reject) states: "Automatic disconnecting may be provided but is not required". In healthcare facilitie,s automatic disconnecting may not be provided under any circumstances. 517.17(B) states, "The additional levels of ground-fault protection shall not be installed as follows: (1) On the load side of the essential electrical system transfer switch, (2) Between the onsite generating unit (as) described in 517.35(B) and the essential electrical system transfer switch(es)". For many years, 517.17 warned the user against placing GFP interruption between the alternate source and the transfer switch(es). This warning has now become a prohibition. There are documented instances where GFP interrupted the normal source and the alternate source, leaving critical care areas without normal or alternate power.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

WHITTALL, H.: I would like to vote against the panel action. Selective coordination is a good idea, but mandatory selective coordination in all cases is not. The exception agreed to by Panel 13 in Comments 13-185 and 13-238 is a start. A better change would be for selective coordination for faults over 0.1 second duration.

13-179 Log #491 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Richard Schneider, Joslyn Clark Controls LLC, Inc.
Comment on Proposal No: 13-137
Recommendation: This comment is merely to add support to the panel action which was to reject the proposal.
Substantiation: Overcurrent conditions (Locked Rotor and/or Short Circuit) in the Fire Pump Room are to be cleared, and be resettable, in the pump room (which, per clause 5.12 of NFPA 20 is required to be "separated or protected by fire-rated construction) and not at some electrically upstream OCPD which may be inaccessible during a fire and possibly disable other emergency loads/ systems.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).

NASBY, J.: See NEMA Explanation of Negative on 13-204.

RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.

WHITTALL, H.: See my explanation of negative vote on Comment 13-178.

WOOD, T.: See My Explanation of Negative on Comment 13-204.

ZGONENA, T.: See My Explanation of Negative on 13-175.

13-180 Log #561 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Russell M. Anderson, Metron Inc.
Comment on Proposal No: 13-137
Recommendation: This Comment is to provide additional support to the panel action which was to REJECT the proposal.
Substantiation: Should an overcurrent condition occur in the fire pump motor, the circuit breaker in the fire pump controller should be the device to trip, not some upstream device installed in the feeder to the fire pump. This device may not be readily available or its location known and, therefore, unavailable for immediate resetting to get the fire pump motor back online.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-181 Log #564 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Daniel Gendebien, Torna Tech Inc.
Comment on Proposal No: 13-137
Recommendation: Torna Tech supports the panel action which was to REJECT the proposal.
Substantiation: It is important that faults are to be cleared in the pump room. If not, those OCPD may be inaccessible during a fire and possibly disable other emergency loads.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-182 Log #806 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Kevin J. Lippert, Eaton Corporation
Comment on Proposal No: 13-137
Recommendation: I disagree with the Panel Action. Accept Proposal 13-137 as written.
Substantiation: The Panel statements during the 2005 revision cycle, and as stated in the 2008 ROP, indicate that CMP-13's intent for these circuits is to mandate selective coordination of ALL overcurrent devices, across ALL current ranges. This initially appears to support CMP-13's stated goal of increasing safety and reliability of the electrical system. However, an in-depth analysis reveals that it is not ALWAYS the case! There are circumstances where overcurrent devices (both fuses and circuit breakers) selected specifically to comply with the 2005 NEC mandate, will have the unwanted consequence of substantially increasing the hazardous arc flash energy with corresponding increased equipment damage and potential fire initiation with associated decreased reliability, and extended downtime before service restoration. This mandate also eliminates the Professional Engineer's expertise and judgment from determining the optimum design for each specific facility by balancing design, safety and operating requirements. Furthermore, selective coordination is a system design issue, not a Code issue.

Eaton strongly supports selective coordination as a valuable safety asset in the current range where overloads most often occur. However, Eaton does not support the mandate for Selective Coordination for ALL current ranges because safety and reliability can actually be diminished.

Alternatively, CMP-13 could choose to make this a FPN, similar to the 2002 NEC FPN to 700.25, and advising that selective coordination MAY increase overall reliability of the system.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-204.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.
Comment on Affirmative:
SCHAMEL, D.: IEC supports the concept of selective coordination, but feels that more clarity is required on this issue. Other design considerations such as personnel safety, system complexity and current limitations including arch flash need to be considered by the design professional when designing electrical systems. Code Sections 700.27 and 701.18 should be reviewed by the Technical Correlating Committee. It also may be appropriate that another NFPA Code, perhaps NFPA 101, have ownership of this issue in that it is a design and not an installation concern.

13-183 Log #953 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: John Cool, PowerPlus Engineering Inc
Comment on Proposal No: 13-137
Recommendation: The Technical Panel should continue to reject this proposal.
Substantiation: The present selective requirement for emergency systems is important for life safety reasons. It is one more requirement that helps ensure power to important loads during times of emergency. During this time, the building may be on fire or physically damaged which can in itself create faults in the system. Article 700 has other similar requirements with the intent of keeping emergency loads powered as long as possible. For instance, for fire pumps there is no overload protection for the pump motor; the concept is to keep the water flowing as long as possible, even to the point of ruining the motor. Selective coordination is another requirement that provides loads power for the maximum time. Without selective coordination, a branch or feeder fault may unnecessarily take out the entire system or a major portion of the system. This could unnecessarily imperil lives. The present requirement is not in conflict with NFPA 110. However, the scope of NFPA 70 is more comprehensive than NFPA 110. NFPA 110 covers from the emergency power source to the transfer switch and NFPA 70 has the entire system. We have designed many facilities and can engineer the system for selective coordination. There definitely are issues that must be analyzed, but with proper analysis and specification flexibility this selective coordination requirement is achievable. We have found that systems can be designed using fusible or circuit breaker equipment.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-184 Log #1189 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Athanasios Papademos, Albert Kahn Associates, Inc.
Comment on Proposal No: 13-137
Recommendation: I disagree with the panel action. Accept Proposal 13-137 as written.
Substantiation: The addition of 700.27 in the 2005 NEC was instituted without the substantiation of any real-world problem. It resulted in an immediate uproar from the electrical industry with regards to its effect on equipment withstand ratings, increased energy to feed arc flash events, and properly engineered coordination. The "substantiation" provided in Proposal 13-137 correctly identifies the concerns with and the undesirable results of full compliance with 700.27. No less than 12 proposals (13-135 and 13-137 through 13-147) have been submitted by individuals such as contractors, manufacturers, consulting engineers, and code and Technical Committee members requesting its revision. It seems that Panel 13 has summarily dismissed all comments from the industry on a section of the code whose creation was based on something other than needs dictated by the real world. As stated in many of the referenced proposals, electrical coordination is a design issue; the NEC is not a design

instrument, but 700.27 dictates it be used as such. The contradictions of the intent of 700.27 with other industry standards PLUS the lack of any standard for determining when a system is totally selectively coordinated should, as a minimum, result in delaying the implementation of 700.27 until such time that the industry's concerns are addressed.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-204.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-185 Log #1278 NEC-P13 **Final Action: Accept in Principle (700.27)**

Submitter: Camilo Martinez-Angulo, AmpSafe, LLC
Comment on Proposal No: 13-135
Recommendation: Proposal 13-135 should continue to be rejected by the Panel. The Panel should continue to require selective coordination for emergency systems.
Substantiation: I am a consulting engineer with considerable experience dealing with overcurrent protection and selective coordination. It has been my experience that selective coordination is almost always achievable with relays, circuit breakers, current limiting fuses, or combinations of these devices. Depending upon the type of system and the available short circuit current, I may specify adjustable instantaneous trips, electronic trips and/or short time delay. Whenever the short time delay causes the arc-flash energy to get out-of-hand, I specify zone selective interlocking to minimize the hazard. I will typically specify two levels of ground fault protection whenever the feeder devices are larger than about 200 amperes, so selectively coordinating with ground fault protection has not really been a problem. I find that the main purpose of Articles 700 and 701 is to maximize continuity of service so I find it so very odd that users are trying to figure out ways to eliminate the requirements from the NEC. To me, this requirement for selective coordination is an absolute necessity when it comes to emergency systems and legally required standby systems. It takes work and engineering knowledge/ experience to selectively coordinate an electrical distribution system without compromising safety and protection, and that's what we've been able to do.
Panel Meeting Action: Accept in Principle
Add an exception to read as follows:
Exception: Selective coordination shall not be required in (1) or (2):
(1) Between transformer primary and secondary overcurrent protective devices, where only one overcurrent protective device or set of overcurrent protective devices exist(s) on the transformer secondary,
(2) Between overcurrent protective devices of the same size (ampere rating) in series.
Panel Statement: The exception was added to provide relief for series coordination issues.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
WOOD, T.: See My Explanation of Negative on Comment 13-204.
Comment on Affirmative:
STAFFORD, T.: The Panel action was correct and this member agrees with the panel action. The exception(s) allow for the installation of a selectively coordinated system without compromising coordination requirements. Not requiring selective coordination between the primary and secondary overcurrent protective devices of the same transformer and not requiring selective coordination between series overcurrent protective devices of the same ampere rating does not decrease the safety of the system. This panel member understands through reading the comments submitted during the ROC period that selective coordination is required in some instances through local codes and that selective coordination should be required for all systems. Numerous comments submitted stated the effectiveness of selective coordination and numerous comments addressed their respective understanding as to how to achieve the selective coordination required.
ZGONENA, T.: The committee is to be commended for acknowledging that there are conditions where selective coordination does not add any additional reliabilty or safety for the system. The exceptions that were added provide some relief for series coordination issues, and are certainely more desirable than leaving the existing text with no exceptions. There may still be some conditions under which total selective coordination is not the optimum condition with respect to safety and reliability as noted in our comment on 13-175.

13-186 Log #1301 NEC-P13 **Final Action: Reject (700.27)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: James Harvey, University of Michigan Hospitals and Health Centers
Comment on Proposal No: 13-135
Recommendation: I disagree with the Panel Action. Accept related Proposal 13-135, (and 13-137) as written. These two proposals are to delete section 700.27 (now in 70-2005), from the 70-2008 edition.
Substantiation: Currently we are operating under NEC 70-2002, and will soon adopt 70-2005 - but with a deletion of the requirement for adhering to section 700.27.
The emergency power systems encountered at our larger facilities (and some of the smaller facilities) are very complex. The current code section removes the option for using engineering judgment, as the deciding factor on how our emergency power systems are to be coordinated. This loss of professional judgment would be detrimental (in certain cases) to the safety of our patients, our staff, and the property themselves. In all of our new facilities, and in existing facilities undergoing major renovation, the design is done by a registered professional engineer, and is also reviewed by a staff registered engineer.
On occasion, we need to select devices that are not completely coordinated over the entire fault range in order to lower arc-flash energies to protect staff. Also, on occasion we need to put two devices in series (but not coordinated with each other), one at source, one at load (when these are separated by large distances). In these cases, the lack of coordination between the devices causes no problem since the same downstream loads are loss regardless of which ones operates.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-204.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-187 Log #1317 NEC-P13 **Final Action: Reject (700.27 (New))**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Greg Batie, Sparling / Rep. Electric League of the Pacific Northwest - Code Committee
Comment on Proposal No: 13-146
Recommendation: Revise text as follows:
700.27 Coordination. Emergency system(s) overcurrent devices shall be selectively coordinated with all supply side overcurrent protective devices <u>for faults with a duration of 0.1 seconds and longer.</u>
Substantiation: This proposal recognizes the panel's desire to improve the reliability of emergency power systems through selective coordination. The addition of the 0.1 second criterion permits engineers and AHJs to use readily available and published time current curves to determine if a system is selectively coordinated to a substantial degree. It negates the need to rely on unregulated manufacturer testing to determine if devices selectively coordinate in the instantaneous range.
Most faults have enough resistance to limit the amount of current that results in overcurrent device operation in the instantaneous range. It's not that instantaneous faults are less important, but the requirement to design a system to fully coordinate under those circumstances requires burdensome evaluations and cost, with a very small chance of return on the investment.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-204.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 6 Negative: 7
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
HATTAWAY, B.: I am concerned with the selected fault current coordination when the generator and the service equipment are of different manufacturers. I am in favor of the 1/10 second delay in the coordination as stated in Comment 13-187; therefore, I am voting negative to support the 1/10 second delay.
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-188 Log #1350 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Bruce W. Blouin, Power Analysis Associates Inc
Comment on Proposal No: 13-137
Recommendation: The Panel should continue to reject this Proposal.
Substantiation: New York City has had a requirement for Selective Coordination for decades. The NEC has also required selective coordination for ground faults in health care facilities for decades. Requirements for selectively coordinated overcurrent protective devices in elevator circuits have existed in the NEC since the 1993 edition. Beginning with the 2005 NEC, requirements were added for selective coordination of emergency circuits and legally required standby systems. We've found design solutions to meet these requirements, with both circuit breakers and fused switches, without compromising safety or reliability, and wonder what all the fuss is about.

We are a consulting engineering firm that specializes in short-circuit and coordination studies, so we are intimately familiar with what it takes to selectively coordinate both fuses and circuit breakers. It does take sharp engineering skills to design both a selectively coordinated system and at the same time to minimize arc-flash energies and equipment short-circuit damage, but that is precisely what's needed for critical circuits such as are found in elevator, emergency systems, and legally required standby systems. But, it can be and is achieved on a regular basis. Requiring total selectivity does not tie our hands when it comes to multiple emergency generators. We can design in transfer switches. We've heard of complaints about two devices in series of the same size not coordinating. Simply making the downstream disconnecting means a non-fused switch solves that problem. There is enough latitude in 450.3 to choose the overcurrent protective devices on the line side and load side of a transformer so that they will selectively coordinate. We also do not see any issues with violations of other NFPA Standards that call out for "optimized" selective coordination. To us, optimized means the very best that you can do, and total selectivity is certainly the very best that you can do. Finally, there are arguments that there needn't be a requirement to selectively coordinate in the short-circuit range because short-circuits rarely happen. If that were the case, we don't need Sections 110.9 and 110.10 in the NEC. Nor do we need the new requirements for marked short-circuit current ratings on industrial machinery or industrial control panels. Do you insure your home for just $5,000 because most claims are under that amount? Or, do you insure it for the full value, just in case it does burn to the ground or get blown away in a storm? Of course you insure it for the full value, even though a total loss may be an unusual event. Needless to say, we believe the Panel should continue to support the requirement for selective coordination in elevator circuits.
Panel Meeting Action: Accept
Panel Statement:
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-189 Log #1399 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Merrell Young, Herzig Engineering
Comment on Proposal No: 13-135
Recommendation: Panel 13 needs to continue to Reject this and similar proposals that remove the requirement for selective coordination of emergency circuits.
Substantiation: I would consider our consulting firm as experts on arc-flash, short-circuit, and coordination studies. As such, we have been able to meet the selective coordination requirements found in 700.27, 701.18, and 620.62, while at the same time, minimizing arc-flash hazards and improving reliability and continuity of service. We are able to obtain selective coordination for both overload and short-circuit conditions by utilizing various design techniques. For example, we can specify zone selective interlocking with short-time delay on the upstream circuit breaker so that upstream and downstream circuit breakers will coordinate in both the overload zone and the short-circuit zone, and provide for instantaneous reaction time for short circuits (including arcing faults), between the circuit breakers, which keeps arc-flash hazards to a minimum. Where our customers want fuses, we specify current-limiting fuses that can both selectively coordinate and minimize arc-flash hazards. We are able to design with transfer switches and different relaying schemes in order to utilize multiple emergency generators in parallel, for the greatest reliability. As far as ground faults are concerned, we sometimes add an additional layer of ground fault protection in order to selectively coordinate under phase to ground faults, utilizing the same approach as is already required for health care facilities. In short, we don't have to compromise to meet the selective coordination requirements, minimize personnel hazards, and protect equipment. It does take time and requires a thorough understanding of the entire electrical system, and that's what consulting engineers get paid to do.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-190 Log #1477 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: James E. Degnan, Sparling Electrical Engineering & Technology Consulting
Comment on Proposal No: 13-135
Recommendation: Code Panel 13 should accept the proposal to delete 700.27.
Substantiation: While selective coordination may initially sound like a good idea, the problems associated with implementing it outweigh any likely benefits. I've written an article in the September 2006 issue of Consulting Specifying Engineer describing the negative consequences of Sections 700.27 and 701.18, a copy is provided. (Please excuse the transposed section reference in the opening paragraph.) The article points out that selective coordination; is without an independent industry standard, requires engineers to rely on inconsistent manufacturer data, will likely result in a loss of competition, will adversely affect other aspects of electrical design, and will increase the cost of construction. Since the article was published, I've been asked to substantiate my claim that 99.9999% of today's systems are not selectively coordinated. I have provided two simple time current coordination studies for 20 amp circuit breakers with upstream 225 amp circuit breakers, one for a 120 volt system and one for a 277 volt system. If the fault current is above a level as modest as 1000 amperes, the curves show that these two pairs of circuit breakers will not selectively coordinate. The curves do not substantially change with manufacturer or varieties of molded case circuit breakers. The curves are representative of every installation that relies on 15 or 20 amp circuit breakers and upstream circuit breakers rated 225 amps or less. Using an egress lighting load of 0.1 watts/sf. a 277 volt, 3 phase system with a 225 amp feeder can support the egress lighting load in a building with up to 1.2 million square feet. For a 120 volt system, the 225 amp breaker is representative of any building step down transformer rated 75 kVA or less. The 225 amp breaker (or smaller) size with a downstream 20 or 15 amp circuit breaker also represents the electrical system of just about every home, apartment, or condominium in the country. Additional coordination studies will reveal that whenever two molded case circuit breakers are in series the chances are excellent that they will not selectively coordinate. Furthermore, if any 20 amp circuit breaker is downstream of a fuse rated 225 amps or less, the system will not selectively coordinate. At this point, I can leave it up to the reader to argue the exact number of "9s" used in the percentage. The systems that we live in every day are not selectively coordinated, yet when the branch breaker trips we don't have a problem. Why? Because the point where the fault occurs has some resistance and even a very small resistance, say 0.25 ohm, will limit the fault current to a value that is less than 1000 amps, and result in operation of the downstream overcurrent protective device prior to the upstream device. If this was not valid, we all would have some negative experience with non-selectively coordinated systems and the NEC would have addressed it a long time ago.

There are key design issues surrounding selective coordination. I have provided a curve showing that a 20 amp circuit breaker will not coordinate with an upstream 400 amp circuit breaker that has ground fault. Is it intended that the minimum egress circuit size be 600 amps when ground fault is in use?

The circuit breaker coordination tables published this year by Cutler Hammer and Square D generally do not help engineers design a selectively coordinated system. The tables substantially require the fault current at the downstream circuit breaker to be less than the instantaneous region of the upstream circuit breaker. In real world applications, these breakers are in close proximity and they will both see very nearly the same fault current. The upstream circuit breaker has instantaneous trips at 8 to 12 times the rating of the circuit breaker. If a typical 5 percent system impedance is assumed, the available fault current is 20 times the rating of the circuit breaker and the tables do not apply.

Selectively coordinating circuit breakers on a 480 volt system often requires low voltage power circuit breaker (LVPCB) construction, with the circuit breaker's instantaneous trips disabled. On high fault current systems, disabling the instantaneous trips on cascaded LVPCBs results in delays greater than 3 cycles which is beyond the certifications specified for busway and automatic transfer switches. Each LVPCB costs more than $25000. the substantiation for

adding section 700.27 to the 2005 code noted that selective coordination could be achieved with fuses or circuit breakers and while true it implies a level playing field that doesn't exist.

Note: Supporting Material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-204.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).

NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-191 Log #1485 NEC-P13 **Final Action: Reject (700.27)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Christopher E. Buckner, Vanderbilt University Medical Center
Comment on Proposal No: 13-137
Recommendation: Disagree with the panel action. Accept Proposal 13-137 as written.
Substantiation: Total selective coordination does not always result in the highest reliability and safety for an emergency system in all occupancy types; thus, selective coordination is a decision that should be made by the design engineer. As the lead engineer for a large and nationally respected hospital facility, I have a responsibility to balance the selective operation of our distribution system with the safety of our maintenance personnel and the safety of our equipment. Mandating selective coordination will subject our maintenance personnel to much higher Arc Flash potentials. Additionally, total selective coordination will lead to higher levels of equipment damage which will greatly increase downtime and jeopardize patient safety. In order to have total selective coordination, overcurrent devices will have to stay closed longer. This increases arc flash hazards. In order to minimize arc flash hazards, you must sometimes sacrifice 100 percent selectivity. This is where engineering reason comes in and optimizes the system for patient, personnel and equipment safety on a case-by-case basis. Unfortunately, engineering reason is removed by the 2005 code mandate for total selective coordination. Selective coordination is just one of many considerations for optimizing the design of an emergency distribution system. The NFPA 110 requirement for "optimized selective tripping" is the design approach that has been used for years at our facility with NO incidents of fatalities, injuries, or excessive outages due to a lack of complete selective coordination. It is this code Panel's responsibility to recognize and respect the fact that it is not practical for the code to address all occupancy types with a blanket mandate for total selective coordination since different occupancy types have different needs and priorities for their emergency systems. This is especially true of the healthcare occupancies where patient safety is priority one. Being forced to utilize fuses in lieu of circuit breakers will no doubt increase the duration of outages to an emergency system and will lead to loss of life unnecessarily. This additional liability should not be forced on the design engineers or the facilities. Since total selective coordination does not ALWAYS result in the optimum system design, it should be removed as a code mandate. Let the design engineers do their jobs and not simply be mindless minions to the code. Without this, we have stripped away our intelligence, which is the very thing that makes our profession a service to society. Jeopardizing patient safety is not for the greater good, and as a minimum, healthcare occupancies should be exempt from these requirements.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-204.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).

NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-192 Log #1489 NEC-P13 **Final Action: Reject (700.27)**

The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-137
Recommendation: Continue to REJECT this proposal.
Substantiation: This clearly appears to be a manufacturer's battle between different types of over current protection. Each and every emergency system in a building or facility is vital to personnel life safety and/or property protection. These include, among others: 1) Fire Alarm Systems, to notify the fire department; 2) Building Annunciator Systems, to notify tennants and occupants; 3) Smoke Evacuation Fans or Blowers; 4) Air Pressurization Fans or Blowers, to provide positive pressure fresh air to stair wells; 5) Elevators; 6) Fire Pumps; 7) Emergency Lighting for evacuation. There is no good reason nor necessity for one emergency load to pose a threat to any other such loads. At least one large city has required this coordination for a number of years. No universally compelling evidence has been offered to warrant deleting or weakening this requirement.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).

NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-193 Log #1490 NEC-P13 **Final Action: Reject (700.27)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-139
Recommendation: Continue to REJECT this proposal.
Substantiation: The short time coordination is vital to preserving power to other emergency loads.
During a fire, if normal power is lost, which is likely, all emergency loads are dependent on emergency power.
There is no need nor rationale for allowing a short or fault in one emergency load to take out any others. The situation can be tenuous enough without the unnecessary loss of other emergency loads.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).

NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-194 Log #1491 NEC-P13 **Final Action: Reject (700.27)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-140
Recommendation: Continue to REJECT this proposal.
Substantiation: The proposer states that molded case circuit breakers can not be selectively coordinated in the instantaneous range.
I believe that molded case circuit breakers are available that can achieve this result.
At least one large city requires this coordination. Unnecessary loss of emergency serviced during a high rise fire makes no sense.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:

ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).

NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-195 Log #1492 NEC-P13 **Final Action: Reject (700.27)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.

Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-141
Recommendation: Continue to REJECT this proposal.
Substantiation: The proposer submitted curves for the seven circuit breakers listed in the substantiation. However, the curves, which range from 20 amps thru 3,000 amps are all drawn on the same plot without regard to wiring impedance or circuit breaker impedance. My calculations show that at 15,000 amperes, 12 inches of #14 AWG wire will drop 60 volts.
The curves on the plot lead me to assume that all seven devices are wired right next to one another.
Also, I believe that there are circuit breakers which can be adjusted and coordinated in all three time ranges (long time, medium time and short time).
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Re
turned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-196 Log #1493 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-142
Recommendation: Continue to REJECT this proposal.
Substantiation: The submitter of this comment gives general reasons why selective coordination can not be achieved. However, it is common for normal electrical service in buildings to be so coordinated. A short in a hair dryer or toaster oven usually does not disrupt power to an entire building.
If there are specific areas of particular difficulty in selective coordination of emergency circuits, these should be brought to the attention of the Panel via Public Proposals or Public Comments. Absent specific instances needing attention, it makes no sense to toss out the entire concept of selective coordination of emergency power.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-197 Log #1494 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 3-143
Recommendation: Continue to REJECT this proposal.
Substantiation: This submitter also seek relief from short term short circuits of three or fewer line cycles. This is 50 milliseconds at 60 Hz.
The same seven circuit breakers and the same curve are offered as in Proposal 13-141.
I believe that short circuit studies typically include a number of factors besides the characteristics of the over current devices.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-198 Log #1495 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-144
Recommendation: Continue to REJECT this proposal.
Substantiation: The submitter proposes that the coordination by "optimized" and that interruptions to the electrical system due to overload or short circuits be "minimized".
Plan approval agencies and inspectors won't be able to enforce any real coordination since these term are relative and are often construed to include cost.
This text would effectively negate the requirement for selective coordination of emergency power.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-199 Log #1496 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-145
Recommendation: Continue to REJECT this proposal._____
Substantiation: The submitter proposes that the coordination to "optimized" selective tripping of over current protective devices.
Plan approval agencies and inspectors won't be able to enforce any real coordination since these term are relative and are often construed to include cost.
This text would effectively negate the requirement for selective coordination of emergency power.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-200 Log #1497 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-146
Recommendation: Continue to REJECT this proposal.
Substantiation: The submitter proposes a FPN to indicate that the selective coordination does not apply to events shorter than 0.1 seconds. This is six line cycles at 60 Hz.
To exempt short time coordination would pose a treat to any other, if not all, emergency loads in the event of a short circuit in any one. Wiring for some emergency loads transits the entire height of a high rise building, such as with elevators and smoke or pressurization fans. Others are pervasive throughout the building, such as with emergency lighting. This is far too large a risk absent specifics as to why this can not be achieved.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).

NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-201 Log #1609 NEC-P13 **Final Action: Reject (700.27)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Marcelo Valdes, GE
Comment on Proposal No: 13-137
Recommendation: Delete 700.27. Reinstate FPN from the 2002 NEC.
Substantiation: Comment in support of proposals 13-137, Log #1950 NEC-P13. This comment is in support of the proposal comment to delete 700.27 as written in NEC 2005.

Reasons to support the proposal to delete 700.27

1) Conflict with NFPA 110 recommendations1 and, consequently, conflict with IBC requirements, chapter 27.

2) Conflict with generally adopted electrical design guidelines such as IEEE Recommended practices commonly known as the "Color Books". IEEE standard 242 "Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems". These conflicts put the selectivity requirement in the NEC in conflict with OSHA regulations2.

3) Maximum reliability for any system is not a matter of simply providing selective tripping. Maximum reliability must take into account minimizing the effect of any abnormal conditions based on the probability of the conditions considered, the immediate effect of the event and the time to remedy the condition and restore needed power to the loads affected by the abnormal event. An industry reference for evaluating the reliability, normally expressed as availability, of power distribution system is IEEE standard 493-1997, "Recommended Practice for Design of Reliable Industrial and Commercial Power Systems". At the highest level, system reliability is dependant on load interruption frequency and expected duration of load interruption events.3 If selectivity is achieved by increasing the size of protective elements or slowing the protection these elements could otherwise provide equipment and conductor damage may be increased and hence the repair time, or down time caused will be increased. This can lower the reliability of system. Good design practice should attempt to take this into consideration. The code requirement as currently written does not allow a designer to make these decisions.

4) Complete selectivity is impossible in most systems when all faults are considered. Specifically low to high magnitude single or three phase faults and zero sequence faults (ground faults), regardless whether circuit breakers or fuses are used.

a. This is due, in part, to the well-supported requirement for ground fault protection in critical power distribution systems of substantial size. This point is further elaborated in attachment A.

b. Also due to the need for transformer primary and secondary protection as defined in the NEC and good engineering practice. The line side main and low side main are similar overcurrent devices that need to handle similar current it is near impossible to make them selective without over-sizing one or under-sizing the other. Furthermore, whether one trips, the other trips, or both trip the impact on the system is exactly the same. Over-sizing the line side device to drive selectivity, however, can decrease the protection afforded to the transformer increasing damage and increasing arc flash energy in the case of an event.

1NFPA 110, Annex A.6.5.1.
"It is important that the various overcurrent devices be coordinated, as far as practicable, to isolate faulted circuits and to protect against cascading operation on short circuit faults. In many systems, however, full coordination is not practicable without using equipment that could be prohibitively costly or undesirable for other reasons. Primary consideration also should be given to prevent overloading of equipment by limiting the possibilities of large current inrushes due to instantaneous reestablishment of connections to heavy loads."

2General Duty Clause (GDC). It is Section 5(a)(1) of the Occupational Safety and Health Act.
"Each employer shall finish to each of his (sic) employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees..."

3IEEE standard 493-1997, Chapter 2, Section 2.1.4, "System reliability indexes.

c. Due to size ratios of circuits used in normal power distribution design. Improving selectivity will normally require devices to have specific size ratios between each other. Fuses for example normally require a ratio of 2 between devices of the same class and manufacturer, greater ratio if the fuses are different class and allowances are made for all fuses that may be installed in a switch. Circuit breakers may need greater ratios. This can make the design of system impractical, larger than necessary with consequential effect on cost, size and protection afforded.

d. Due to considerations for the different fault characteristics of utility versus generator sources. Different configurations of sources create different selectivity and design constraints. As an example, in a double-ended substation that may use closed transitions to maintain system continuity a system may have twice the short circuit rating for a few seconds of each year. How much consideration should be given towards maintaining selectivity during that time? How much cost and building space should be allocated towards these seconds of selectivity?

5) Complete selectivity has no impact on system reliability for some circuit configurations such as when to similarly sized overcurrent protective devices are connected in series with no loads in between. This is the situation with transformer protection on the primary and secondary side of a transformer. Whether fuses or circuit breakers both devices are the same size once the transformer ratio is considered, hence, both devices see the exact same fault current for three phase faults and both may trip in similar time non-selectively. This has the same effect on loads whether one OCPD clears, the other, or both.

6) Safety for electrical personnel and any other personnel near electrical equipment or conductors. The attempt to achieve selectivity for maximum theoretical value of bolted faults will cause the devices to be insensitive or slow for lower value faults that are much more probable and widely acknowledge as being more dangerous. References to this risk, known as "Arc Flash Hazard" are included in the NEC, NFPA 70E and IEEE 1584. Ignoring this risk and the recommendations of NFPA 70E and IEEE 1584 is contrary to the requirements of OSHA. Hence forcing a user to choose selectivity in lieu of following recommendations set forth in widely accepted engineering practices puts the user in a position of either obeying the NEC or OSHA, he cannot do both. This is not a position the NEC should force any user or designer to be in. Attachment B further elaborates on this point and provides an example of this situation.

7) Designing a system that is completely selective, if possible at all, will often require devices to be larger than otherwise needed driving equipment cost, installation space and allotted building space. In many cases to achieve selectivity that is not needed due to the low probability of a fault ever occurring that requires that level of selectivity. Bolted faults are widely acknowledged to be very rare, yet trying to accommodate them in selectivity considerations will drive up cost and size, essentially unnecessarily.

I have submitted Attachment (s) A and B that are more detailed discussions of two of the points listed above. The difficulty caused by ground fault protection and one example of the impact of the selectivity requirement on a simple system with respect to arc flash protection. Many of the other points have been amply described in other comments and supporting documentation provided to this panel regarding this issue.

1NFPA 70, Article 110.16, Flash Protection
2NFPA 70E, "Standard for Electrical Safety in the Workplace"
3IEEE 1584, "Guide for Arc Flash Hazard Calculations

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-204.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 8 Negative: 5
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
ZGONENA, T.: See My Explanation of Negative on 13-175.

13-202 Log #1786 NEC-P13 **Final Action: Reject (700.27)**

Submitter: Joseph A. Hertel, Safety and Buildings
Comment on Proposal No: 8-95
Recommendation: I agree with the proposal and the CMP should reconsider their actions.
Substantiation: The CMP rejected the proposal and should reconsider in the comments. Panel comments indicate that selective coordination is a design consideration and they should be reminded that the NEC is not a design manual. We have seen facilities where it is not possible to comply with the NEC requirement for selective coordination. As an AHJ we have allowed installers, designers and owners to comply "to the extent possible" with available equipment. While I can agree selective coordination is an ideal installation it is not at this time practical for all installations.
Panel Meeting Action: Reject
Panel Statement: The committee is unsure as to which proposal the submitter is providing this comment.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
NASBY, J.: See NEMA Explanation of Negative on 13-204.
Comment on Affirmative:
ZGONENA, T.: Since the comment refers to an incorrect proposal number, the committee was justified in rejecting the comment, however, it is obvious the comment was with respect to selective coordination, and we agree with the comment itself if considered with respect to section 700.27 - see comment on 13-175.

13-203 Log #1992 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Ed Larsen, Square D Company
Comment on Proposal No: 13-137
Recommendation: Reconsider and accept Proposal 13-137 to delete NEC 700.27.

~~700.27 Coordination. Emergency system(s) overcurrent devices shall be selectivity coordinated with all supply side overcurrent protective devices.~~
Substantiation: Based on the panel statement which references 13-135, the substantiation of this proposal was not recognized by the panel as there is no panel statement that refutes the submitter's concerns or technical merit. The panel statement states that selectivity increases the reliability of an emergency system with no technical response to the NEMA substantiation with references to IEEE standards examples that are in direct opposition to the panel's statement. The panel did not address or comment on the conflicting NFPA documents where the technical committee for NFPA 110 Emergency and Standby Power Systems does not require all devices to be selective. The Panel did not comment on the additional restriction in NEC 700.27 that requires all devices to be selective as compared to the definition in Article 100 that provides the engineer the necessary latitude to choose the appropriate overcurrent devices and system configuration. Requiring all overcurrent devices to be selective is an over design for the system, which is recognized by the IEEE examples presented in the substantiation. This results in an increase in the size of equipment conductors and raceways, leading to unnecessary equipment cost and size increases, higher available short circuit currents and increased arc flash hazard for the installation. A review of the numerous public proposals to delete and revise NEC 700.27 along with the comments from the voting members of CMP 13 are recognizing that selectivity is not an independent technical solution as it impacts reliability, personnel safety from arc-flash hazard increases, and the removal of isolation devices such as circuit breakers in the electrical system.

I have assisted in the selective coordination of a number of facilities across the country and all of the following points have entered into the discussion at some point. The points discussed below are independent of applying fuses or circuit breakers; as a matter of fact the overcurrent devices in the switchboard and the generator are based on the manufacturer dependent 2:1 fuse ratios. Consider the diagram I have provided and the challenges with selective coordination.

NEC 700.27 must be deleted, leaving selectivity to the engineering community in order to ensure that the most reliable and safest system is installed. Many other technical performance issues are left to the engineering community such as:

1) Voltage drop, where you have an NEC compliant installation that is selectively coordinated and the lights dim and drop out computer systems.

2) Sizing motor overcurrent devices for selectivity, where the motors are unable to start but they are NEC compliant, permitting exhaust fans in the legally required standby system to be code compliant even if they are unable to start.

3) Ground-fault protection, where none is required on the emergency system source but may be found on the normal source. Hence a small ground fault can take down the normal source which is often more reliable than the alternate source. Once again a performance issue that is ignored in the NEC but the engineer addresses the issue in design.

These few examples illustrate reliability issues that are left to the engineer to address. Why is selectivity more important than these examples that are not addressed by the NEC for enhanced safety and reliability?

The panel's action not to revise or delete NEC 700.27 is making a statement that selectivity is more important than reliability and personnel safety from arc-flash and simply ignores the unnecessary increase in the size of equipment and materials that are unnecessary and is ignoring the amendments that are utilized in the industry to address some of these issues:

1) The State of Washington has amended the Selectivity requirement in the 2005 NEC.

2) The healthcare industry in the State of Florida recognizes the challenges of selective coordination and permits overcurrent devices to overlap where no additional isolation is gained in the system. The 2005 NEC fails to address this issue.

3) The inspection community in plan review has recognized this challenge as we have engaged in numerous conversations between engineers and inspectors that are working together to optimize selectivity per NFPA 110. They are recognizing that the 2005 NEC is more restrictive than necessary and are having to address designs through 90.4 by getting permission from the AHJ to permit appropriate latitude to comply with NFPA 110 even though they are not compliant with NEC 700.27. There is no safety or performance compromised and it is easy to recognize enhancements in performance and reliability with enhanced safety as a by-product of a reduction in the size of the overcurrent devices.

The panel should reconsider the action taken on this proposal and the numerous others looking for relief in this section to provide the safest and most reliable system to the facility they are designing. Delete NEC 700.27 and leave the performance issues to the engineer as is done with numerous other aspects of the electrical system.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-204.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-204 Log #2124 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)
Comment on Proposal No: 13-137
Recommendation: I disagree with the panel action. Accept Proposal 13-137 as written.
Substantiation: NEMA strongly supports selective coordination as a valuable safety asset in the current range where overloads most often occur. However, NEMA does not support the mandate for Selective Coordination for ALL current ranges and ALL overcurrent devices because safety and reliability can both actually be diminished. This is due to increased hazardous arc flash energy with increased equipment damage and potential fire initiation, decreased reliability, and extended downtime before service restoration. Mandates for selective coordination for ALL current ranges and ALL overcurrent devices will not always provide the optimum safety solution or optimum reliability. Such a solution requires the expertise and judgment of a Professional Engineer who can balance the design, safety and operating requirements in order to determine the optimum design for each specific facility.

Selective coordination is a system design issue, not a Code issue.

The wording of this section states the ALL overcurrent devices selectively coordinate, but this is not what the definition Article 100 implies. The definition deals with localization of an overcurrent and, in many cases, selective coordination for ALL overcurrent devices serves no useful localization purpose such as when: 1) Overcurrent devices are located on the primary and secondary sides of a low voltage transformer with no loads in between. 2) A feeder overcurrent device is connected in series with the main overcurrent device in a downstream panelboard with no loads in between. 3) An overcurrent device on a generator is in series with an overcurrent device in a switchboard with no leads in between. In these instances, requiring both devices to be selectively coordinated does not add to the reliability of the system, which is the stated objective of the CMP.

When overcurrent devices are located on the primary and secondary sides of a low voltage transformer, sized to meet the NEC transformer protection requirements, it is almost impossible to also meet the requirement for selective coordination of this section, regardless of the type of overcurrent protective device chosen.

In many instances, it may not be possible to meet the requirements for generator protection provided by an overcurrent device located on or near the generator and provide selective coordination with downstream overcurrent devices. Further, the generator protection functions provided within the engine-generator controller by the manufacturer might not be able to selectively coordinate with downstream overcurrent devices.

The paralleling of generators is often done to enhance system reliability, which is the stated objective of the CMP, however, in order to meet the requirement for selective coordination each generator overcurrent device and controller must selectively coordinate with all downstream overcurrent devices. This may not be possible if the generators are of unequal size.

The upgrade or expansion of an existing building may require the replacement of existing upstream equipment so that it will selectively coordinate with the new downstream equipment it must feed. The State of Washington has recognized the significant economic burden this is placing on building owners and businesses and has issued an emergency order exempting existing buildings from meeting the selective coordination requirements of the 2005 NEC.

Systems are normally designed for selective coordination in the overload region of the overcurrent device time-current curves. If this were not so, they would not operate under normal conditions, so what is really being called for in this requirement is overload and short circuit selective coordination. In order to achieve total short circuit selective coordination, the size of upstream overcurrent protective devices may need to be increased and/or time delay trip characteristics increased, thereby possibly increasing the arc flash hazard. In other words, by forcing selective coordination for an event that most likely will never occur, namely a bolted fault, the hazards involved in performing tasks which most likely will occur, namely system maintenance, may be increased. This is another reason why system designers need the flexibility to optimize the design of a system, which the current requirement does not allow.

Further, as stated in the original NEMA substantiation to delete this text in proposal 13-137, we wish to once again point out the following:

1. The need for the flexibility to optimize the design of a system is recognized in IEEE Standard 242-2001 (The Buff Book). Section 15.1 states, "In applying protective devices, it is occasionally necessary to compromise between protection and selectivity. While experience may suggest one alternative over another, the preferred approach is to favor protection over selectivity. Which choice is made, however, is dependent on the equipment damage and the affect on the process."

2. The need for the flexibility to optimize the design of a system is also recognized in NFPA 110-2005, Standard for Emergency and Standby Power Systems. Section 6.5.1 states, "The overcurrent protective devices in the EPSS shall be coordinated to optimize selective tripping of the circuit overcurrent protective devices when a short circuit occurs. A further explanation of this statement is given in Annex A section A.6.5.1, "It is important that the various overcurrent devices be coordinated, as far as practicable, to isolate faulted circuits and to protect against cascading operation on short circuit faults. In many systems, however, full coordination is not practicable without using equipment that could be prohibitively costly or undesirable for other reasons."

3. This NEC text conflicts with Chapter 27 of the International Building Code that specifically requires compliance with NFPA 110 for emergency systems. This presents a conundrum for the system designer and the AHJ. Which code takes precedence, the IBC or the NEC?

In summary, NEMA strongly supports selective coordination as a valuable safety asset in the current range where overloads most often occur. However, NEMA does not support the mandate for Selective Coordination for ALL current ranges and ALL overcurrent devices because safety and reliability can both actually be diminished, thus the section should be deleted.

Panel Meeting Action: Reject

Panel Statement: The overriding theme of Articles 700 and 701 is to keep the power on throughout an emergency situation, for life safety. Selective coordination increases the reliability of the emergency system. Selective coordination is essential for the continuity of service required in emergency and legally required standby circuits.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 7 Negative: 6

Ballot Not Returned: 1 Gustafson, R.

Explanation of Negative:

ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).

NASBY, J.: NEMA disagrees with the Panel action. NEMA supports "sensible" selective coordination, in the range where overloads most often occur. In this range, selective coordination is associated with increased safety without negative consequences. However, as documented in several presentations given to the Panel, there are circumstances where the mandates for total selective coordination across all current ranges can actually result in decreased safety and reliability. The duration time of 0.1 seconds as proposed in Comments 13-187 and 13-233 seems to be a "compromise" position that would have addressed several of the identified safety concerns, while maintaining a mandatory requirement as suggested by CMP-13. NEMA strongly urges reconsideration and acceptance of Comments 13-187 and 13-233. The Panel also discussed adding a statement that selective coordination applies only to the emergency source. For some reason, this did not get into the final text but it should also be reconsidered.

RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.

WHITTALL, H.: See my explanation of negative vote on Comment 13-178.

WOOD, T.: Proposal 13-137 should have been accepted. The substantiation provided by the submitter of Proposal 13-137 is well founded. Selective coordination is a design consideration. While selectivity may be desirable in some cases, it has not been shown that the lack of coordination has been responsible for the loss of life, injury to persons, or damage to property.

If the Code Making Panel believes that selectivity is sometimes a design consideration, it should be in the Code as a FPN and not as mandatory language that is likely not to be enforced. The use of mandatory language in the Code makes the installer contractually liable for its implementation when this should be a "design-engineering" responsibility.

In all cases, the Proposers and the Commenters advocating the removal of both 700.27 and 701.18 have provided well-documented substantiation for their removal.

ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-205 Log #2171 NEC-P13 **Final Action: Reject (700.27)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.

Submitter: Douglas Stephens, ASCO Power Technologies

Comment on Proposal No: 13-137

Recommendation: This Comment is merely to add support to the Panel action which was to Reject this Proposal.

Substantiation: Overcurrent conditions (Locked Rotor and/or Short Circuit) in the Fire Pump Room are to be cleared, and be resettable, in the pump room (which, per clause 5.12 of NFPA 20 is required to be "separated or protected by fire-rated construction") and not at some electrically upstream OCPD which may be inaccessible during a fire and possibly disable other emergency loads/ systems.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 7 Negative: 6

Ballot Not Returned: 1 Gustafson, R.

Explanation of Negative:

ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).

NASBY, J.: See NEMA Explanation of Negative on 13-204.

RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.

WHITTALL, H.: See my explanation of negative vote on Comment 13-178.

WOOD, T.: See My Explanation of Negative on Comment 13-204.

ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-206 Log #2194 NEC-P13 **Final Action: Reject (700.27)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.

Submitter: Peter R. Walsh, Peter R. Walsh, P.E. & Associates

Comment on Proposal No: 13-137

Recommendation: The Panel should continue to Reject this Proposal.

Substantiation: The NEC has required selective coordination for elevator circuits for years without major problems. The recent expansion of requirements makes good sense for the users of the buildings. Who wants to suffer from a blackout as a result of non-selective coordination? Engineers have software programs, like Easy Power Version 8.0 that can automate selective coordination.

With Zone Selective Coordination trips, almost anything can be coordinated. Arc flash can be adjusted by proper trips. The code making panel should require reliable power through selective coordination of emergency circuits.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 7 Negative: 6

Ballot Not Returned: 1 Gustafson, R.

Explanation of Negative:

ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).

NASBY, J.: See NEMA Explanation of Negative on 13-204.

RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.

WHITTALL, H.: See my explanation of negative vote on Comment 13-178.

WOOD, T.: See My Explanation of Negative on Comment 13-204.

ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-207 Log #2242 NEC-P13 **Final Action: Reject (700.27)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.

Submitter: Charles Fuellgraf, Fuellgraf Electric Company

Comment on Proposal No: 13-137

Recommendation: We respectfully wish to comment and express our support for Proposal 13-137 and Proposal 13-159 which would reestablish the requirements for Selective Coordination.

Substantiation: We absolutely support selective coordination in lower current ranges. This is essentially where all faults and overloads occur, and the system design engineers practice selective coordination to protect for any such occurrences.

Going to a "total" system coordination can bypass the expertise and judgment of the knowledgeable engineer and contribute to escalated dangers from the various hazards of high energy levels. This can lead to increased risks to operating personnel, plus additional costs of equipment and associated labor.

Thank you for the opportunity to make these remarks which we feel are in the best interests of our industry and those exposed to it.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 13-204.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 7 Negative: 6

Ballot Not Returned: 1 Gustafson, R.

Explanation of Negative:

ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).

NASBY, J.: See NEMA Explanation of Negative on 13-204.

RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.

WHITTALL, H.: See my explanation of negative vote on Comment 13-178.

WOOD, T.: See My Explanation of Negative on Comment 13-204.

ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-208 Log #2310 NEC-P13 **Final Action: Reject (700.27)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.

Submitter: David Beach, Gresham, OR

Comment on Proposal No: 13-137

Recommendation: The proposal should have been Accepted.

Substantiation: This requirement was added in 2005 without technical substantiation and is a design issue, not a safety issue. The proposal was an

attempt by a fuse manufacturer to mandate the use of fuses in applications where circuit breakers are more appropriate for most installations. I would always include selective coordination in things desired of an electrical system design, but in many cases foregoing selective coordination can make for an installation that more clearly meets the safety objectives of the code. In many cases the use of fuses in these systems will dramatically increase the arc flash hazard; is that truly in the interest of safety?
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-204.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-209 Log #2311 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: David Beach, Gresham, OR
Comment on Proposal No: 13-138
Recommendation: The proposal should continue to be rejected; however the panel statement is in error.
Substantiation: Series rated combinations are inherently NOT selectively coordinated for all current magnitudes up to and including the maximum rating of the combination. Fully rated combinations are a necessary, but not sufficient, condition of achieving selective coordination.
Panel Meeting Action: Accept in Part
Panel Statement: The panel reaffirms that the panel statement is correct.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 8 Negative: 5
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.

13-210 Log #2312 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: David Beach, Gresham, OR
Comment on Proposal No: 13-141
Recommendation: The proposal should have been Accepted.
Substantiation: This requirement was added in 2005 without technical substantiation and is a design issue, not a safety issue. The proposal was an attempt by a fuse manufacturer to mandate the use of fuses in applications where circuit breakers are more appropriate for most installations. I would always include selective coordination in things desired of an electrical system design, but in many cases foregoing selective coordination can make for an installation that more clearly meets the safety objectives of the code. In many cases the use of fuses in these systems will dramatically increase the arc flash hazard; is that truly in the interest of safety?
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-204.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-211 Log #2313 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: David Beach, Gresham, OR
Comment on Proposal No: 13-142
Recommendation: The proposal should have been Accepted.
Substantiation: This requirement was added in 2005 without technical substantiation and is a design issue, not a safety issue. The proposal was an attempt by a fuse manufacturer to mandate the use of fuses in applications where circuit breakers are more appropriate for most installations. I would always include selective coordination in things desired of an electrical system design, but in many cases foregoing selective coordination can make for an installation that more clearly meets the safety objectives of the code. In many cases the use of fuses in these systems will dramatically increase the arc flash hazard; is that truly in the interest of safety?
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-204.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-212 Log #2341 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Alan Manche, Square D Company
Comment on Proposal No: 13-137
Recommendation: Reconsider and accept in principle proposal 13-137. Delete the present text and replace with revised language as noted in proposal 13-137 that parallels NFPA 110.
~~700.27 Coordination. Emergency system(s) overcurrent devices shall be selectivity coordinated with all supply side overcurrent protective devices.~~
700.27 Coordination. The overcurrent protective devices in the emergency system shall be selected to optimize selective coordination.
Substantiation: Square D continues to support the deletion of NEC 700.27, however, if the panel is reluctant to address the safety, reliability and performance issues by deleting it, it would be prudent for the panel to revise the text to address many of the concerns addressed in not only in this proposal but the many other proposals that were submitted to the panel.
As a member of the NFPA 110 technical committee, the committee has recognized these challenges. Utilizing similar language to that found in NFPA 110 would permit some latitude to address many of these issues found in the proposals that were submitted and would remove the conflicting language and requirements.
This comment simply requests the panel to reconsider the action taken on the numerous proposals to revise NEC 700.27 in order to address the technical issues so the electrical industry can ensure the most reliable and safest system is in place for our communities. The present language does not support our communities in this manner. The proposed language in this comment moves closer to that goal and aligns with NFPA 110.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-204.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-214 Log #1498 NEC-P13 **Final Action: Accept**
(700.27)

Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-147
Recommendation: Continue to REJECT this proposal.
Substantiation: The submitter seeks an exception to allow the use of molded case circuit breakers. The presumption must be drawn that molded case circuit breakers are not capable of selective coordination.
I believe that molded case circuit breakers are available which will allow said coordination.
I believe that normal power distribution schemes often make use of molded case circuit breakers and that such systems are typically coordinated.

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 9 Negative: 4
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-250 Log #898 NEC-P13 **Final Action: Reject**
(700.27)

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Surender Singal, USACOE
Comment on Proposal No: 13-137
Recommendation: I disagree with the panel action. Accept Proposal 13-137 as written.
Substantiation: Instead of mandating. Please clearly state your objective in NEC -- which will act as a guide for the designer to consider. There are simply too many different systems requiring different design approach. It becomes more difficult to pick up one manufacturer in the government where one has to be fair in awarding contracts.
Or, otherwise, show your requirements graphically instead of verbiage in NEC. Purpose should be to provide accurate guidance rather than ambiguous interpretations.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 8 Negative: 5
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-213 Log #2230 NEC-P13 **Final Action: Reject**
(700.27 Exception (New))

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Terry Macalady, Consulting Engineer, LLC
Comment on Proposal No: 13-147
Recommendation: Continue Rejecting this Proposal.
Substantiation: I have worked for manufactures of circuit breakers, fuses and electrical utilities. Now, I am a consultant working with industrial and large commercial accounts. I have been involved in development and testing of CBs and fuses and in the field. I work with electrical engineers and maintenance people. This proposal is based on the premise that circuit breaker systems can be safely restored to power faster than fusible systems and, therefore, the selective coordination requirement should be ignored for molded case circuit breakers. This premise should not be accepted for several reasons including:
1. Since the 2005 NEC, the circuit breaker manufacturers have published selective coordination charts for molded case circuit breakers and numerous application materials on how to achieve selective coordination.
2. A selectively coordinated system reduces the amount of circuits that have to be restored. If a system is selectively coordinated, only the closest upstream overcurrent protective device will open for any overcurrent. There is not an issue about speed of restoration of power for the non-affected portions of the system because selective coordination *prevented* unnecessary outages. In time of emergency, there is great value to not have unnecessary outages; peoples' lives may depend upon it. Also, restoration of power will occur quicker since the electrician does not have to spend a large amount of time troubleshooting and restoring circuits that were unnecessarily disrupted.
3. For the portion of the system that does rightfully get interrupted by the opening of the nearest upstream overcurrent protective device, there is an electrical reason for the opening of this circuit. Proper work practices are required for investigating the cause, rectifying/repairing the circuit, and restoration of the power. To ignore proper work procedures can imperil electrical workers as well as building safety. In specific situations, fuses may permit faster restoration of power and in some cases, circuit breakers may permit faster restoration of power. For instance, it is against the federal law per OSHA regulation 1910.334(b)(2) to merely reset a circuit breaker or replace fuses *"until it has been determined that the equipment and circuit can be safely reenergized. The repetitive manual closing of circuit breakers or reenergizing circuits through replaced fuses is prohibited."* Also, circuit breaker manufacturer's operational manuals advise against merely resetting circuit breakers that have interrupted a fault at or near a circuit breaker's interrupting rating. NFPA 70E requirement 225.3 *"Circuit Breaker Testing. Circuit breakers that interrupt faults approaching their ratings shall be inspected and tested in accordance with the manufacturer's instructions." Of special note! A phase to ground fault (which is the most common beginning of a electrical fault) of 8,000 to 10,000 ampere, the UL listed phase to ground test listing on many commonly used molded case breakers, may seriously damage a three pole breaker with a three phase fault rating of 65,000 ampere rendering the breaker unsafe for further operation.*
The lower level phase to ground fault is more difficult to visually detect and should be the first on site investigation in addition to overload. The accepted procedures would be to take this breaker out of service and send it back to the manufacturer for testing and try to find a replacement.
4. Rejection Style Fuses are devices that when they open, will be replaced by the same rejection case size and interrupting capacity to restore power. Proper ampere spare fuses normally are stored on site, but these rejection style fuses are a common stock item in local electrical distribution inventory and are readily available. This is not the case for most 480 volt breakers of mid to high interrupting capacity. Rarely are these breakers available except from the manufacturer which can cause excessive down time. Ensuring proper spare fuses on site is an important responsibility for the facilities management. Fuse specifiers typically prefer fuses because of their inherent reliability and knowledge that when the circuit protection is restored, the protection level is as originally specified. On the other hand, it cannot be assumed that circuit breakers translate to faster power restoration just because they are resettable. Circuit breakers that have interrupted a circuit should be inspected, tested and possibly replaced. This occurrence depends on the ongoing circuit breaker maintenance practices, history/condition of the circuit breaker, and level of fault interrupted. Molded case breakers are not routinely inspected and maintained in institutional, industrial or governmental installations.
5. Branch circuit over currents typically are overloads or faults (which includes ground faults). My experience is that feeder and main overcurrent protective devices most often open because of phase to ground faults. When an overcurrent protective device opens because of a fault, then the circuit has to be investigated and the fault cause found and remedied. Rarely will this be a fast (matter of a couple of minutes) process.
6. Molded case circuit breakers are not fault current rejection by frame size as well as in some cases voltage rejection by frame size. My recent and past experience is this is a serious problem when there is either breaker failure replacement or additional breaker circuit additions in the field. I have seen critical circuits on new hospital facilities field installed breakers with fault capacity less than available fault values and in one case a 208 volt rated breaker on a 480 volt system causing a major Arc Fault and hospital shut down. In the last few months, site visits on new electrical industrial facilities and additions at a large data center disclosed breakers with less interrupting capacity than the available fault were mixed in with the proper capacity breakers from the factory. Field changes allowed non-rejection fault interrupting breakers that are interchangeable, which other than the fine print, to become a potential serious problem to the installed equipment, down time and possible injury to the electrical worker.
7. Molded case breakers and fuses may be engineered to provide selective coordination if the engineering work is accomplished at the time of design or before purchase of critical circuit electrical equipment. Selective coordination is fault isolation at the point of fault without negatively affecting the rest of the system. To rely on the resetting of an overcurrent device as a procedural process is against standard safe work procedures per OSHA, NFPA 70E, overcurrent manufactures recommendations and common sense. I am not aware of one breaker or fuse manufacturer that will recommend this procedure in writing without a number of exceptions that would keep them out of litigation.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 8 Negative: 5
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-177 (Log #1340).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-204.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

ARTICLE 701 — LEGALLY REQUIRED STANDBY SYSTEMS

13-215 Log #948 NEC-P13 **Final Action: Reject**
(701.7(C))

Submitter: Steven R. Terry, Electronic Theatre Controls Inc.
Comment on Proposal No: 13-150
Recommendation: Change proposed wording to be added as a last sentence of 701.7(C) as follows, including an FPN:
Automatic Transfer Switches, rated at 600 VAC and below and utilized to transfer feeders or branch circuits between two separate, non-synchronized power sources, shall be listed for legally required standby system use.
FPN: The standard for listed Automatic Transfer Switches in ANSI/UL 1008, Standard for Safety for Transfer Switch Equipment.
Substantiation: The submitter of this proposal is precisely correct in his substantiation, but the proposal does not go far enough in helping to prevent misapplication of inappropriate devices as transfer switches. The original proposal asked that Automatic Transfer Switches be listed "for legally required

standby system use". Unfortunately, recent experience has shown that stand-alone Load Control Relays that have a perfectly valid emergency listing under UL 924, (Emergency Lighting and Power Equipment), are being misapplied as branch circuit Automatic Transfer Switches, where UL 1008 devices should in fact be used. These misapplied Load Control Relays are being used to transfer a load between two non-synchronous power sources, but they are not subject to any of the stringent requirements of UL 1008 that are needed for this application, such as fault current testing and mechanical interlock to prevent inadvertent connection of the two power sources. Thus, "listed for legally required standby system use" does not adequately clarify the listing requirements for transfer switches.

The misapplication of non-UL 1008 devices is happening for the following reasons:

A. The NEC is silent in Article 701 on what equipment is required to transfer a branch circuit between two non-synchronous power sources. NFPA 110 is similarly silent on this issue. Automatic Transfer Switches are most commonly used as feeder-level devices. Therefore, installers and engineers are often unaware that devices used to transfer branch circuits are subject to similar switching phenomena, and thus similar risk concerns, as feeder circuit transfer devices. This can lead them to incorrectly assume that devices used to transfer branch circuits need not be UL 1008 listed Transfer Switches.

B. Branch Circuit Automatic Transfer Switches listed under UL 1008 are relatively new devices, as is the concept of transferring single or multiple branch circuits between utility and alternate standby power sources. Previously, this type of transfer was almost always handled by an upstream feeder-level UL 1008 transfer switch.

C. Stand-alone Load Control Relays (LCRs) listed under UL 924 have recently become available. These are typically double-pole, double-throw devices, but single-pole, double-throw and single-pole, single-throw devices also exist. They are intended only for load energization during loss of utility power, that is accomplished by performing a bypass of the wall switch or dimmer controlling the branch circuit. In this case, an upstream UL 1008 transfer switch is doing the actual transfer from normal to alternate standby power. However, engineers and installers often incorrectly assume that these UL 924 devices can be used to actually transfer the branch circuit load between normal and alternate standby power.

This situation is not helped by the fact that some manufacturers of these devices have produced data sheets that can be misleading, and do not specifically prohibit this type of transfer. Presumably, this is because no standard, including the NEC, speaks directly to the requirements of this relatively new branch circuit transfer application. UL has publicly asserted that UL 924 Load Control Relays are not to be used to transfer a load between two non-synchronous power sources, and that only a UL 1008 device is suitable for this application. In the Spring 2005 issue of "The Code Authority" (UL's newsletter on Code issues), the article "Focus on Emergency Lighting Equipment" appears on page 3. That article states:

"An important issue to recognize is that an LCR does not switch the load between the normal and emergency supplies. Load switching of this type should only be performed by a transfer switch listed in accordance with UL 1008, Standard for Safety for Transfer Switch Equipment."

This statement by UL also applies to legally required standby systems, because the application of transferring between two non-synchronous power sources is the same for emergency and legally required standby systems. The proposed revised wording above would accomplish the following:

1. Require all Automatic Transfer Switches to be listed.
2. Clarify that a listed ATS is required when it is applied either in feeders or in branch circuits, if the application is transferring a load between two non-synchronous power sources.
3. Provide an informative FPN to point the reader to the applicable standard for Automatic Transfer Switches.

Panel Meeting Action: Reject
Panel Statement: The additional text "... and utilized to transfer..." would add confusion. The FPN is already covered in Annex A. Listed transfer switches are required according to the action on Proposal 13-150.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-155.
Comment on Affirmative:
ZGONENA, T.: See my Explanation of Affirmative Vote on Comment 13-154.

13-216 Log #2340 NEC-P13 **Final Action: Reject**
(701.7(C)(1))

Submitter: Alan Manche, Square D Company
Comment on Proposal No: 13-150
Recommendation: Reconsider and Reject Proposal 13-150.
Substantiation: There has been no substantiation presented that equipment failure is an issue where appropriately rated and installed electrical equipment is used. The proposed text only requires a transfer switch to listed, which is only one of many solutions for transferring power to alternate sources. Multiple switchboards from multiple manufacturers are often employed in large facilities to control the power from multiple power sources. It is not reasonable to require such an installation to have equipment that is specifically listed for the transfer or paralleling of sources.

Let's specifically review the submitter's substantiation:

1) "When the two power sources are not synchronized, as much as twice rated voltage may be seen across the transfer switch contacts." This particular issue does not exist where the transfer equipment or transfer switch is constructed to be a break-before-make configuration. A simple delay between breaking on source and closing on the other addresses this issue. So this substantiation simply inaccurately restricts existing products and technology that is safely used today.

2) "Unless listed, a problem of uncoordinated overcurrent protection may exist should the transfer switch close into a short circuit." This particular test is found in almost all product standards for equipment, however, we still do not require a switchboard, panelboard or circuit breaker to be listed which is just as critical and where this condition is more likely to encounter in the electrical system. Where is the substantiation that a safety issue exists today? Why is the panel moving to potentially exclude product and system solutions that are safely being used today with no reported incidents?

3) "The recognized national standard for testing Automatic Transfer Switch Equipment is ANSI/UL 1008." The panel should also note that number of other product standards address the issues above including UL 67, UL 98, ad UL 891 to name a few. It should be noted that automatic transfer functionality is often embedded in panelboards and switchboards as a secondary function and may not be specifically listed to UL 1008 and still perform safely.

4) "This proposed requirement as placed under 701.7(C) would specifically apply only to automatic transfer switches. The intent is to not rule out other types of transfer system transfer equipment identified for emergency system use and acceptable to the AHJ under 700.6(A)." If the intent of the committee is to place this restriction only on transfer switches and not require listing on other viable options that are currently safely in use today, then a second sentence should be included to clarify that point. "This listing requirement is specific to transfer switches and is not intended to exclude other approved transfer equipment configurations."

The panel should reconsider the lack of substantiation and consider the broader applications of products that control the electrical system. The panel must consider the restriction being placed on the user by requiring listing which inherently will exclude safe product solutions and unnecessarily added cost to products without any substantiation that safety will be enhanced by requiring listing. Proposal 13-150 should be rejected.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-215.
Number
Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-155.

13-217 Log #1304 NEC-P13 **Final Action: Reject**
(701.11(A))

Submitter: David Sroka, Turner Falls, MA
Comment on Proposal No: 1-54
Recommendation: Add a sentence as follows:
"The short-circuit current rating shall be included on the nameplate for battery inverters."
Substantiation: This data is hard to obtain after the original installation. It is important information. The nameplate is the best place for the equipment's rating. Circuit breaker, fuse or transfer switch rating can mistakenly be taken as the unit's rating. Lastly, it is safest to read the nameplate to get this information rather than physical removal of covers.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-167.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-218 Log #2118 NEC-P13 **Final Action: Accept in Principle**
(701.11(B)(5) (New))

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 13-155
Recommendation: Accept the Proposal.
Substantiation: The new FPN was not intended to identify that the disconnecting means which is the subject of 701.11(B)(5) must disconnect the "service." The FPN is necessary to identify to users of the NEC that this disconnecting means must be rated as "suitable for use as service equipment." As described in Article 100, conductors supplying a building or other structure from a generator are "feeder" conductors. Seeing that the generator is outdoors,

the conductors are "outside feeder conductors" and, therefore, they are included in the scope of Article 225. Section 225.31 requires that a disconnecting means be provided to disconnect all conductors that supply or pass through a building or structure. Section 701.11(B)(5) amends the requirements of 225.32 to locate the disconnecting means required by 225.31 at the building or structure served, however, it does not amend the requirements of 225.36 for it to be "suitable for use as service equipment." This requirement is often overlooked and the proposed FPN would go a long way towards identifying that there is another requirement in 225.36 that must be considered.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-219.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-219.

13-219 Log #2119 NEC-P13 **Final Action: Accept in Principle (701.11(B)(5) (New))**

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 13-155
Recommendation: Accept the Proposal in Principle and revise 701.11(B)(5) to read:
(5) Outdoor Generator Sets. Where an outdoor housed generator set is equipped with a readily accessible disconnecting means that meets the requirements of 225.36 and is located within sight of the building or structure supplied, an additional disconnecting means shall not be required where ungrounded conductors serve or pass through the building or structure.
Substantiation: The new FPN was not intended to identify that the disconnecting means which is the subject of 701.11(B)(5) must disconnect the "service." This comment is being submitted as an alternative to adding a new FPN. The new text will identify to users of the NEC that this disconnecting means must be rated as "suitable for use as service equipment." As described in Article 100, conductors supplying a building or other structure from a generator are "feeder" conductors. Seeing that the generator is outdoors, the conductors are "outside feeder conductors" and, therefore, they are included in the scope of Article 225. Section 225.31 requires that a disconnecting means be provided to disconnect all conductors that supply or pass through a building or structure. Section 701.11(B)(5) amends the requirements of 225.32 to locate the disconnecting means required by 225.31 at the building or structure served, however, it does not amend the requirements of 225.36 for it to be "suitable for use as service equipment." This requirement is often overlooked and the proposed new text would go a long way towards identifying that there is another requirement in 225.36 that must be considered.
Panel Meeting Action: Accept in Principle
Accept the proposal in principle and revise 701.11(B)(5) to read:
(5) Outdoor Generator Sets. Where an outdoor housed generator set is equipped with a readily accessible disconnecting means located within sight of the building or structure supplied, an additional disconnecting means shall not be required where ungrounded conductors serve or pass through the building or structure. The disconnecting means shall meet the requirements of 225.36.
Panel Statement: The added sentence clarifies that the disconnecting means must comply with 225.36.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: The comment, as written is clear. The relocation of the requirement to comply with 225.36 is confusing as it is not clear whether it applies to the generator set disconnecting means or the additional disconnect that is not required.

13-220 Log #2177 NEC-P13 **Final Action: Reject (701.11(B)(5), FPN (New))**

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 13-154
Recommendation: Accept the Proposal.
Substantiation: This proposal should be accepted as the purpose of the FPN is to direct readers of this section to a requirement that is not obvious. The grounding and bonding conditions when the disconnecting means is remote from the building or other structure it is supplying are often misunderstood and, therefore, this would be an appropriate location for a FPN providing direction to the location of the requirement. In the ROP stage, Panel 5 accepted a proposal to 250.32(D) to include a reference to 701.11(B)(5) to identify that the requirements of that section apply to the condition of 701.11(B)(5). It would be prudent to locate a FPN here to reference 250.32(D).
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms their statement on Proposals 13-154 and 13-130. The panel believes that the addition of the FPN is unnecessary.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-221 Log #462 NEC-P13 **Final Action: Reject (701.11(E))**

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 13-157
Recommendation: Accept proposal revised:
Except at the point of supply ~~The~~ the legally required standby service shall be sufficiently separated from ~~the normal~~ any other service to ~~prevent~~ minimize simultaneous interruption of supply.
Substantiation: "Normal" is not defined. If a structure is served by a single-phase and three-phase service, which is normal, one or both? Service is defined as including conductors and standby service conductors connected to "normal" service conductors are not "separated." Simultaneous interruption cannot be prevented. Only minimized, as specified in (D) and 695.3(A)(1) and 700.12(D)(2). Separation should be required from any other service since whether "normal" or not an occurrence could also affect the legally required standby service if not separated.
Panel Meeting Action: Reject
Panel Statement: The panel believes that the current wording is clear and the proposed wording will add confusion.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-222 Log #2049 NEC-P13 **Final Action: Accept (701.17)**

TCC Action: The Technical Correlating Committee understands that the comment recommendation was to continue to reject Proposal 13-158, but actually addressed the text in 701.17 and not 700.17 as indicated in the comment.
Submitter: Hugh O. Nash, Jr., Nash Lipsey Burch
Comment on Proposal No: 13-158
Recommendation: Continue to reject 13-158 which applies to 700.17 Ground-Fault Protection.
Substantiation: Regardless of the size of the alternate source, ground-fault interruption of the alternate source overcurrent device can cause interruption of the alternate source feed to critical equipment. This is of particular concern to healthcare facilities. The panel statement (reason for reject) states: "Automatic disconnecting may be provided but is not required". In healthcare facilities, automatic disconnecting may not be provided under any circumstances. 517.17(B) states, "The additional levels of ground-fault protection shall not be installed as follows: (1) on the load side of the essential electrical system transfer switch. (2) Between the onsite generating unit (as) described in 517.35(B) and the essential electrical system transfer switch(es)". For many year,s the NEC warned the user against placing GFP interruption between the alternate source and the transfer switch(es). This warning has now become a prohibition. There are documented instances where GFP interrupted the normal source and the alternate source, leaving critical care areas without normal or alternate power.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-175 Log #2314 NEC-P13 **Final Action: Reject (701.18)**

TCC Action: The Technical Correlating Committee does not agree with the panel statement. The submitter of the comment did correctly identify the proposal number and the paragraph of the document to which the comment was directed.
Submitter: David Beach, Gresham, OR
Comment on Proposal No: 13-159
Recommendation: The proposal should have been Accepted.
Substantiation: This requirement was added in 2005 without technical substantiation and is a design issue, not a safety issue. The proposal was an attempt by a fuse manufacturer to mandate the use of fuses in applications where circuit breakers are more appropriate for most installations. I would always include selective coordination in things desired of an electrical system design, but in many cases foregoing selective coordination can make for an installation that more clearly meets the safety objectives of the code. In many cases the use of fuses in these systems will dramatically increase the arc flash hazard; is that truly in the interest of safety?
Panel Meeting Action: Reject
Panel Statement: This comment does not comply with 4.4.5 of the NFPA Regulations Governing Committee Projects in that it does not identify the document proposal number to which the comment is directed and the paragraph of the document to which the comment is directed.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 10 Negative: 3
Ballot Not Returned: 1 Gustafson, R.

Explanation of Negative:
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: The panel statement is not correct. The comment meets the requirements of the NFPA Regulations since it did identify the specific proposal to which the comment is directed. See my explanation of negative vote on Comment 13-177.
ZGONENA, T.: When implemented properly, selective coordination will normally enhance a power system's ability to maintain power to critical loads. Selective coordination is appropriate for specifically determined critical areas and loads. Selective coordination is desirable in order to localize overcurrent conditions, and to limit circuit interruption to the circuits in which the overcurrent is occurring. While selective coordination with all overcurrent protective devices under all overcurrent conditions will provide such localization, there are some conditions under which this coordination may not be desirable from a safety or reliability standpoint. Requiring selective coordination of all overcurrent protective devices under all possible overcurrent conditions will require a selective coordination study be conducted, but does not allow for relaxation of this requirement where such coordination is not necessary. Where a selective coordination study reveals that complete selective coordination introduces safety concerns which are greater than those encountered if the system is not entirely coordinated, a relaxation of the requirement may be appropriate, but the current wording will not allow such a relaxation under any condition. Additional guidance needs to be provided within the code to better define where and how selective coordination is to be implemented.

13-223 Log #2315 NEC-P13 **Final Action: Accept in Part**
(701.18)

Submitter: David Beach, Gresham, OR
Comment on Proposal No: 13-160
Recommendation: The proposal should continue to be rejected; however the panel statement is in error.
Substantiation: Series rated combinations are inherently NOT selectively coordinated for all current magnitudes up to and including the maximum rating of the combination. Fully rated combinations are a necessary, but not sufficient, condition of achieving selective coordination.
Panel Meeting Action: Accept in Part
Panel Statement: The panel continues to reject the proposal but believes that the statement is correct.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
NASBY, J.: See NEMA Explanation of Negative on 13-204.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.

13-224 Log #492 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Richard Schneider, Joslyn Clark Controls LLC, Inc. / Rep.
Comment on Proposal No: 13-159
Recommendation: This comment is merely to add support to the panel action which was to Reject the proposal.
Substantiation: Overcurrent conditions (Locked Rotor and/or Short Circuit) in the Fire Pump Room are to be cleared, and be resettable in, the pump room (which, per clause 5.12 of NFPA 20 is required to be "separated or protected by fire-rated construction) and not at some electrically upstream OCPD which may be inaccessible during a fire and possibly cause the disabling of other legally required standby systems.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: The panel action to reaffirm the requirement for selective coordination of legally required standby systems' overcurrent devices with all supply side overcurrent protective devices provides no exception for installations where the ability to rapidly restore power may be more critical than selective coordination. This may be only achievable in certain installations with fuses which may not be available to restore power after a fuse operation. An exception should be provided to permit flexibility in the design where speed of restoration of power is judged to be more important than a brief outage.
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-225 Log #562 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Russell M. Anderson, Metron Inc.
Comment on Proposal No: 13-159
Recommendation: This Comment is to provide additional support to the panel action which was to REJECT the proposal.
Substantiation: Motor overcurrent conditions such as Locked Rotor and/or Short Circuit in the Fire Pump Room are to be cleared, and be reset in, the pump room (which per clause 5.12 of NFPA 20 is required to be "separated or protected by fire-rated construction") and not at some upstream overcurrent device which may be inaccessible during a fire and possibly cause the disabling of other emergency standby systems.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-226 Log #565 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Daniel Gendebien, Torna Tech Inc.
Comment on Proposal No: 13-139
Recommendation: Torna Tech supports the panel action which was to REJECT the proposal.
Substantiation: It is important that faults are to be cleared in the pump room. If not, those OCPD may be inaccessible during a fire and possibly disable other emergency loads.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-227 Log #807 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Kevin J. Lippert, Eaton Corporation
Comment on Proposal No: 13-159
Recommendation: I disagree with the Panel Action. Accept Proposal 13-159 as written.
Substantiation: The Panel statements during the 2005 revision cycle, and as stated in the 2008 ROP, indicate that CMP-13's intent for these circuits is to mandate selective coordination of ALL overcurrent devices, across ALL current ranges. This initially appears to support CMP-13's stated goal of increasing safety and reliability of the electrical system. However, an in-depth analysis reveals that it is not ALWAYS the case! There are circumstances where overcurrent devices (both fuses and circuit breakers) selected specifically to comply with the 2005 NEC mandate, will have the unwanted consequence of substantially increasing the hazardous arc flash energy with corresponding increased equipment damage and potential fire initiation with associated decreased reliability, and extended downtime before service restoration. This mandate also eliminates the Professional Engineer's expertise and judgment from determining the optimum design for each specific facility by balancing design, safety and operating requirements. Furthermore, selective coordination is a system design issue, not a Code issue.
Eaton strongly supports selective coordination as a valuable safety asset in the current range where overloads most often occur. However, Eaton does not support the mandate for Selective Coordination for ALL current ranges because safety and reliability can actually be diminished.
Alternatively, CMP-13 could choose to make this a FPN, similar to the 2002 NEC FPN to 700.25, and advising that selective coordination MAY increase overall reliability of the system.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.

Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-228 Log #952 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: John Cool, PowerPlus Engineering Inc
Comment on Proposal No: 13-159
Recommendation: The Technical Panel should continue to reject this proposal.
Substantiation: The present selective requirement for legally required standby systems is important for life safety and maintaining power to important loads upon the loss of the normal power source. Selective coordination is an achievable requirement that provides loads power for the maximum time. Without selective coordination, a branch or feeder fault may unnecessarily take out the entire system or a major portion of the system. This could unnecessarily imperil lives. The present requirement is not in conflict with NFPA 110. However, the scope of NFPA 70 is more comprehensive than NFPA 110. NFPA 110 covers from the emergency power source to the transfer switch and NFPA 70 has the entire system. We have designed many facilities and can engineer the system for selective coordination. There definitely are issues that must be analyzed, but with proper analysis and specification flexibility this selective coordination requirement is achievable. We have found that systems can be designed using fusible or circuit breakers equipment.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-229 Log #1158 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Robert Gustin, Eaton Corporation
Comment on Proposal No: 13-159
Recommendation: Disagree with the panel action. Accept Proposal 13-159 as written.
Substantiation: For over a hundred years, power system engineers have been trained to understand and design power systems balancing the need for protection with continuity of service (coordination). In one stroke, requirement has legislated a mandate to ignore any protection involved in emergency circuits. Since the NFPA sponsors the NEC as a fire protection document, it is beyond belief that this requirement has been mandated since its definitive results are:

longer arc fault burning times
higher heats of release from burning copper and metal
higher possibility of building burn downs
higher possibility of danger to human life

Beyond that, this requirement ignores real life designs that would in many cases make its compliance impossible. For example, today's manufacturer's of ATSs comply mostly with UL standards for withstand ratings of 3 cycles. Any breaker or fuse feeding an ATS in an emergency circuit would have to trip in less than 3 cycles. For breakers, that is tantamount to requiring an instantaneous trip. That instantaneous tripping would end coordination t 10X of breaker rating - so a 600 amp breaker would have no coordination for currents in excess of 6000 amps. For any major building in America, that is a fraction of the available fault current - therefore you cannot achieve both the protection required for the ATS and full coordination.

This is just one of many examples of applications this requirement simply ignores. There are ground fault issues; double ended substation issues whereby this requirement would make the normal loads' main breakers dramatically increase their tripping times resulting in much higher arc flash values and burn times and many others. This issue and its ramifications needs careful study and analysis before any such requirement should be made.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-230 Log #1177 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Athanasios Papademos, Albert Kahn Associates, Inc.
Comment on Proposal No: 13-159
Recommendation: I disagree with the panel action. Accept Proposal 13-159 as written.
Substantiation: The addition of 701.18 in the 2005 NEC was instituted without the substantiation of any real world problem. It resulted in an immediate uproar from the electrical industry with regards to its effect on equipment withstand ratings, increased energy to feed arc flash events, and properly engineered coordination. The "substantiation" provided in Proposal 13-159 correctly identifies the concern with and the undesirable results of full compliance with 701.18. No less than 9 proposals (13-159 through 13-167) have been submitted by individuals such as contractors, manufacturers, consulting engineers, and code and Technical Committee members requesting its revision. It seems that Panel 13 has summarily dismissed all comments from the industry on a section of the code whose creation was based on something other than needs dictated by the real world. As stated in many of the referenced proposals, electrical coordination is a design issue; the NEC is not a design instrument, but 701.18 dictates it be used as such. The contradictions of the intent of 701.18 with other industry standards PLUS the lack of any standard for determining when a system is totally selectively coordinated should, as a minimum, result in delaying the implementation of 701.18 until such time that the industry's concerns are addressed.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-231 Log #1277 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Camilo Martinez-Angulo, AmpSafe, LLC
Comment on Proposal No: 13-159
Recommendation: Proposal 13-159 should continue to be rejected by the Panel. The Panel should continue to require selective coordination for legally required standby systems.
Substantiation: I am a consulting engineer with considerable experience dealing with overcurrent protection and selective coordination. It has been my experience that selective coordination is almost always achievable with relays, circuit breakers, current limiting fuses, or combinations of these devices. Depending upon the type of system and the available short circuit current, I may specify adjustable instantaneous trips, electronic trips and/or short time delay. Whenever the short time delay causes the arc-flash energy to get out-of-hand, I specify zone selective interlocking to minimize the hazard. I will typically specify two levels of ground fault protection whenever the feeder devices are larger than about 200 amperes, so selectively coordinating with ground fault protection has not really been a problem. I find that the main purpose of Articles 700 and 701 is to maximize continuity of service so I find it so very odd that users are trying to figure out ways to eliminate the requirement from the NEC. To me, this requirement for selective coordination is an absolute necessity when it comes to emergency systems and legally required standby systems. It takes work and engineering knowledge/experience to selectively coordinate an electrical distribution system without compromising safety and protection, and that's what we've been able to do.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).

NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-232 Log #1279 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Paul A. Kempf, University of Notre Dame
Comment on Proposal No: 13-159
Recommendation: Disagree with the Panel Action. Accept Proposal 13-159 as written.
Substantiation: Selective coordination for low current magnitudes will in most cases provide the required selective coordination without sacrificing the best possible protection. The decision as to when total protection is required should be left up to the design Professional Engineer based on the type facility and detailed analysis of the electrical system emergency system. Additionally, such total coordination will have a potential to: decrease safety due to increased arc flash hazard, decrease overall system reliability, increase downtime, increase equipment sizing and increase equipment cost. Further, the rare nature of large current faults would render the need for total coordination seldom of value. Selective Coordination of low current devices will provide optimum protection and its application should be left to Professional Engineers to apply while determining the optimum solution of a given legally required standby system application.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-233 Log #1318 NEC-P13 **Final Action: Reject**
(701.18 (New))

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Greg Batie, Sparling / Rep. Electric League of the Pacific Northwest - Code Committee
Comment on Proposal No: 13-163
Recommendation: Revise text as follows:
700.18 Coordination. Legally required standby system(s) overcurrent devices shall be selectively coordinated with all supply side overcurrent protective devices <u>for faults with a duration of 0.1 seconds and longer.</u>
Substantiation: This proposal recognizes the panel's desire to improve the reliability of emergency power systems through selective coordination. The addition of the 0.1 second criterion permits engineers and AHJs to use readily available and published time current curves to determine if a system is selectively coordinated to a substantial degree. It negates the need to rely on unregulated manufacturer testing to determine if devices selectively coordinate in the instantaneous range.
Most faults have enough resistance to limit the amount of current that results in overcurrent device operation in the instantaneous range. It's not that instantaneous faults are less important, but the requirement to design a system to fully coordinate under those circumstances requires burdensome evaluations and cost, with a very small chance of return on the investment.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 6 Negative: 7
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
HATTAWAY, B.: See my explanation of negative vote on Comment 13-187.
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-234 Log #1351 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Bruce W. Blouin, Power Analysis Associates Inc
Comment on Proposal No: 13-159
Recommendation: The Panel should continue to reject this Proposal.
Substantiation: New York City has had a requirement for Selective Coordination for decades. The NEC has also required selective coordination for ground faults in health care facilities for decades. Requirements for selectively coordinated overcurrent protective devices in elevator circuits have existed in the NEC since the 1993 edition. Beginning with the 2005 NEC, requirements were added for selective coordination of emergency circuits and legally required standby systems. We've found design solutions to meet these requirements, with both circuit breakers and fused switches, without compromising safety or reliability, and wonder what all the fuss is about.
We are a consulting engineering firm that specializes in short-circuit and coordination studies, so we are intimately familiar with what it takes to selectively coordinate both fuses and circuit breakers. It does take sharp engineering skills to design both a selectively coordinated system and at the same time to minimize arc-flash energies and equipment short-circuit damage, but that is precisely what's needed for critical circuits such as are found in elevator, emergency systems, and legally required standby systems. But, it can be and is achieved on a regular basis. Requiring total selectivity does not tie our hands when it comes to multiple emergency generators. We can design in transfer switches. We've heard of complaints about two devices in series of the same size not coordinating. Simply making the downstream disconnecting means a non-fused switch solves that problem. There is enough latitude in 450.3 to choose the overcurrent protective devices on the line side and load side of a transformer so that they will selectively coordinate. We also do not see any issues with violations of other NFPA Standards that call out for "optimized" selective coordination. To us, optimized means the very best that you can do, and total selectivity is certainly the very best that you can do. Finally, there are arguments that there needn't be a requirement to selectively coordinate in the short-circuit range because short-circuits rarely happen. If that were the case, we don't need Sections 110.9 and 110.10 in the NEC. Nor do we need the new requirements for marked short-circuit current ratings on industrial machinery or industrial control panels. Do you insure your home for just $5,000 because most claims are under that amount? Or, do you insure it for the full value, just in case it does burn to the ground or get blown away in a storm? Of course you insure it for the full value, even though a total loss may be an unusual event. Needless to say, we believe the Panel should continue to support the requirement for selective coordination in elevator circuits.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-235 Log #1400 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Merrell Young, Herzig Engineering
Comment on Proposal No: 13-159
Recommendation: Panel 13 needs to continue to Reject this and similar proposals that remove the requirement for selective coordination of legally required standby systems.
Substantiation: I would consider our consulting firm as experts on arc-flash, short-circuit, and coordination studies. As such, we have been able to meet the selective coordination requirements found in 700.27, 701.18, and 620.62, while at the same time, minimizing arc-flash hazards and improving reliability and continuity of service. We are able to obtain selective coordination for both overload and short-circuit conditions by utilizing various design techniques. For example, we can specify zone selective interlocking with short-time delay on the upstream circuit breaker so that upstream and downstream circuit breakers will coordinate in both the overload zone and the short-circuit zone, and provide for instantaneous reaction time for short circuits (including arcing faults), between the circuit breakers, which keeps arc-flash hazards to a minimum. Where our customers want fuses, we specify current-limiting fuses that can both selectively coordinate and minimize arc-flash hazards. We are able to design with transfer switches and various relaying schemes in order to utilize multiple emergency generators in parallel, for the greatest reliability. As far as ground faults are concerned, we sometimes add an additional layer of ground fault protection in order to selectively coordinate under phase to ground faults, utilizing the same approach as is already required for health

care facilities. In short, we don't have to compromise to meet the selective coordination requirements, minimize personnel hazards, and protect equipment. It does take time and requires a thorough understanding of the entire electrical system, and that's what consulting engineers get paid to do.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-236 Log #1486 NEC-P13 **Final Action: Reject (701.18)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Christopher E. Buckner, Vanderbilt University Medical Center
Comment on Proposal No: 13-159
Recommendation: Disagree with panel action. Accept Proposal 13-159 as written.
Substantiation: Total selective coordination does not always result in the highest reliability and safety for an emergency system in all occupancy types; thus, selective coordination is a decision that should be made by the design engineer. As the lead engineer for a large and nationally respected hospital facility, I have a responsibility to balance the selective operation of our distribution system with the safety of our maintenance personnel and the safety of our equipment. Mandating selective coordination will subject our maintenance personnel to much higher Arc Flash potentials. Additionally, total selective coordination will lead to higher levels of equipment damage which will greatly increase downtime and jeopardize patient safety. In order to have total selective coordination, overcurrent devices will have to stay closed longer. This increases arc flash hazards. In order to minimize arc flash hazards, you must sometimes sacrifice 100 percent selectivity. This is where engineering reason comes in and optimizes the system for patient, personnel and equipment safety on a case by case basis. Unfortunately, engineering reason is removed by the 2005 code mandate for total selective coordination. Selective coordination is just one of many considerations for optimizing the design of an emergency distribution system. The NFPA 110 requirement for "optimized selective tripping" is the design approach that has been used for years at our facility with NO incidents of fatalities, injuries, or excessive outages due to a lack of complete selective coordination. It is this code Panel's responsibility to recognize and respect the fact that it is not practical for the code to address all occupancy types with a blanket mandate for total selective coordination since different occupancy types have different needs and priorities for their emergency systems. This is especially true of the healthcare occupancies where patient safety is priority one. Being forced to utilize fuses in lieu of circuit breakers will no doubt increase the duration of outages to an emergency system and will lead to loss of life unnecessarily. This additional liability should not be forced on the design engineers or the facilities. Since total selective coordination does not ALWAYS result in the optimum system design, it should be removed as a code mandate. Let the design engineers do their jobs and not simply be mindless minions to the code. Without this, we have stripped away our intelligence, which is the very thing that makes our profession a service to society. Jeopardizing patient safety is not for the greater good, and as a minimum, healthcare occupancies should be exempt from these requirements.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-237 Log #1499 NEC-P13 **Final Action: Reject (701.18)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-159
Recommendation: Continue to REJECT this proposal.
Substantiation: The submitter seeks to completely eliminate the clause requiring selective coordination.
No universally compelling evidence has been offered to warrant deleting or weakening this requirement.
Absent any specifics as to particular instances or problems, life safety and property protection dictate that disruption of emergency services (loads) is unwise. In high rise buildings external fire fighting can be and, based on actual losses, is not possible or effective. Modern high rise buildings rely more on these loads, particularly fire pumps, in lieu of the concept of compartmentalization and non-combustible typical of construction of the past. This places a lot of reliance of these emergency loads for preservation of life and property. There are more than ample examples of substantial loss that can occur when said loads are interrupted. One example is the One Meridan Plaza fire which resulted in loss of life and a total loss of the building. This is not the only such example.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-238 Log #1500 NEC-P13 **Final Action: Accept in Principle (701.18)**

Submitter: James S. Nasby, Master Control Systems, Inc.
Comment on Proposal No: 13-161
Recommendation: Continue to REJECT this proposal.
Substantiation: This proposal should be rejected for the reasons given in my comments on Proposals on clause 700.27 which seek to eliminate or weaken the requirement.
The same applies for the other such proposals on clause 701.18.
Panel Meeting Action: Accept in Principle
Add an exception to read as follows:
Exception: Selective coordination shall not be required in (1) or (2):
(1) Between transformer primary and secondary overcurrent protective devices, where only one overcurrent protective device or set of overcurrent protective devices exist(s) on the transformer secondary,
(2) Between overcurrent protective devices of the same size (ampere rating) in series.
Panel Statement: The exception was added to provide relief for series coordination issues.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-223.
Comment on Affirmative:
STAFFORD, T.: The Panel action was correct and this member agrees with the panel action. The exception(s) allow for the installation of a selectively coordinated system without compromising coordination requirements. Not requiring selective coordination between the primary and secondary overcurrent protective devices of the same transformer and not requiring selective coordination between series overcurrent protective devices of the same ampere rating does not decrease the safety of the system. This panel member understands through reading the comments submitted during the ROC period that selective coordination is required in some instances through local codes and that selective coordination should be required for all systems. Numerous comments submitted stated the effectiveness of selective coordination and numerous comments addressed their respective understanding as to how achieve the selective coordination required.
ZGONENA, T.: The committee is to be commended for acknowledging that there are conditions where selective coordination does not add any additional reliability or safety for the system. The exceptions that were added provide some relief for series coordination issues, and are certainly more desirable than leaving the existing text with no exceptions. There may still be some conditions under which total selective coordination is not the optimum condition with respect to safety and reliability as noted in our comment on 13-175.

13-239 Log #1610 NEC-P13 **Final Action: Reject (701.18)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Marcelo Valdes, GE
Comment on Proposal No: 13-159
Recommendation: Delete 701.18. Reinstate FPN from the 2002 NEC.
Substantiation: Comment in support of proposals 13-159, Log #1946 NEC-P13. This comment is in support of the proposal comment to delete 701.18 as written in NEC2005.
Reasons to support the proposal to delete 701.18
1) Conflict with NFPA 110 recommendations1 and, consequently, conflict with IBC requirements, chapter 27.

2) Conflict with generally adopted electrical design guidelines such as IEEE Recommended practices commonly known as the "Color Books". IEEE standard 242 "Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems". These conflicts put the selectivity requirement in the NEC in conflict with OSHA regulations2.

3) Maximum reliability for any system is not a matter of simply providing selective tripping. Maximum reliability must take into account minimizing the effect of any abnormal conditions based on the probability of the conditions considered, the immediate effect of the event and the time to remedy the condition and restore needed power to the loads affected by the abnormal event. An industry reference for evaluating the reliability, normally expressed as availability, of power distribution system is IEEE standard 493-1997, "Recommended Practice for Design of Reliable Industrial and Commercial Power Systems". At the highest level, system reliability is dependant on load interruption frequency and expected duration of load interruption events.3 If selectivity is achieved by increasing the size of protective elements or slowing the protection these elements could otherwise provide equipment and conductor damage may be increased and hence the repair time, or down time caused will be increased. This can lower the reliability of system. Good design practice should attempt to take this into consideration. The code requirement as currently written does not allow a designer to make these decisions.

4) Complete selectivity is impossible in most systems when all faults are considered. Specifically low to high magnitude single or three phase faults and zero sequence faults (ground faults), regardless whether circuit breakers or fuses are used.

a. This is due, in part, to the well-supported requirement for ground fault protection in critical power distribution systems of substantial size. This point is further elaborated in attachment A.

b. Also due to the need for transformer primary and secondary protection as defined in the NEC and good engineering practice. The line side main and low side main are similar overcurrent devices that need to handle similar current it is near impossible to make them selective without over-sizing one or under-sizing the other. Furthermore, whether one trips, the other trips, or both trip the impact on the system is exactly the same. Over-sizing the line side device to drive selectivity, however, can decrease the protection afforded to the transformer increasing damage and increasing arc flash energy in the case of an event.

1NFPA 110, Annex A.6.5.1.

"It is important that the various overcurrent devices be coordinated, as far as practicable, to isolate faulted circuits and to protect against cascading operation on short circuit faults. In many systems, however, full coordination is not practicable without using equipment that could be prohibitively costly or undesirable for other reasons. Primary consideration also should be given to prevent overloading of equipment by limiting the possibilities of large current inrushes due to instantaneous reestablishment of connections to heavy loads."

2General Duty Clause (GDC). It is Section 5(a)(1) of the Occupational Safety and Health Act.

"Each employer shall finish to each of his (sic) employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees..."

3IEEE standard 493-1997, Chapter 2, Section 2.1.4, "System reliability indexes.

c. Due to size ratios of circuits used in normal power distribution design. Improving selectivity will normally require devices to have specific size ratios between each other. Fuses for example normally require a ratio of 2 between devices of the same class and manufacturer, greater ratio if the fuses are different class and allowances are made for all fuses that may be installed in a switch. Circuit breakers may need greater ratios. This can make the design of system impractical, larger than necessary with consequential effect on cost, size and protection afforded.

d. Due to considerations for the different fault characteristics of utility versus generator sources. Different configurations of sources create different selectivity and design constraints. As an example, in a double-ended substation that may use closed transitions to maintain system continuity a system may have twice the short circuit rating for a few seconds of each year. How much consideration should be given towards maintaining selectivity during that time? How much cost and building space should be allocated towards these seconds of selectivity?

5) Complete selectivity has no impact on system reliability for some circuit configurations such as when to similarly sized overcurrent protective devices are connected in series with no loads in between. This is the situation with transformer protection on the primary and secondary side of a transformer. Whether fuses or circuit breakers both devices are the same size once the transformer ratio is considered, hence, both devices see the exact same fault current for three phase faults and both may trip in similar time non-selectively. This has the same effect on loads whether one OCPD clears, the other, or both.

6) Safety for electrical personnel and any other personnel near electrical equipment or conductors. The attempt to achieve selectivity for maximum theoretical value of bolted faults will cause the devices to be insensitive or slow for lower value faults that are much more probable and widely acknowledge as being more dangerous. References to this risk, known as "Arc Flash Hazard" are included in the NEC, NFPA 70E and IEEE 1584. Ignoring this risk and the recommendations of NFPA 70E and IEEE 1584 is contrary to the requirements of OSHA. Hence forcing a user to choose selectivity in lieu of following recommendations set forth in widely accepted engineering practices puts the user in a position of either obeying the NEC or OSHA, he cannot do both. This is not a position the NEC should force any user or designer to be in. Attachment B further elaborates on this point and provides an example of this situation.

7) Designing a system that is completely selective, if possible at all, will often require devices to be larger than otherwise needed driving equipment cost, installation space and allotted building space. In many cases to achieve selectivity that is not needed due to the low probability of a fault ever occurring that requires that level of selectivity. Bolted faults are widely acknowledged to be very rare, yet trying to accommodate them in selectivity considerations will drive up cost and size, essentially unnecessarily.

I have submitted Attachment (s) A and B that are more detailed discussions of two of the points listed above. The difficulty caused by ground fault protection and one example of the impact of the selectivity requirement on a simple system with respect to arc flash protection. Many of the other points have been amply described in other comments and supporting documentation provided to this panel regarding this issue.

1NFPA 70, Article 110.16, Flash Protection

2NFPA 70E, "Standard for Electrical Safety in the Workplace"

3IEEE 1584, "Guide for Arc Flash Hazard Calculations

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 13-242.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 8 Negative: 5

Ballot Not Returned: 1 Gustafson, R.

Explanation of Negative:

ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).

NASBY, J.: See NEMA Explanation of Negative on 13-204.

RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.

WHITTALL, H.: See my explanation of negative vote on Comment 13-178.

ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-240 Log #1698 NEC-P13 **Final Action: Reject (701.18)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.

Submitter: Elmer G. Paine, Westlake Reed Leskosky

Comment on Proposal No: 13-159

Recommendation: Disagree with the panel action. Accept Proposal 13-159 as written.

Substantiation: None.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 13-242.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 7 Negative: 6

Ballot Not Returned: 1 Gustafson, R.

Explanation of Negative:

ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).

NASBY, J.: See NEMA Explanation of Negative on 13-204.

RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177

WHITTALL, H.: See my explanation of negative vote on Comment 13-178.

WOOD, T.: See My Explanation of Negative on Comment 13-242.

ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-241 Log #1993 NEC-P13 **Final Action: Reject (701.18)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.

Submitter: Ed Larsen, Square D Company

Comment on Proposal No: 13-159

Recommendation: Reconsider and accept Proposal 13-159 to delete NEC 701.18.

~~701.18 Coordination. Legally required standby system(s) overcurrent devices shall be selectively coordinated with all supply side overcurrent protective devices.~~

Substantiation: Based on the panel statement which references 13-135, the substantiation of this proposal was not recognized by the panel as there is no panel statement that refutes the submitter's concerns or technical merit. The panel statement states that selectivity increases the reliability of an emergency system with no technical response to the NEMA substantiation with references to IEEE standards examples that are in direct opposition to the panel's statement. The panel did not address or comment on the conflicting NFPA documents where the technical committee for NFPA 110 Emergency and Standby Power Systems does not require all devices to be selective. The Panel did not comment on the additional restriction in NEC 701.18 that requires all devices to be selective as compared to the definition in Article 100 that provides the engineer the necessary latitude to choose the appropriate overcurrent devices and system configuration. Requiring all overcurrent devices to be selective is an over design for the system, which is recognized by the IEEE examples presented in the substantiation. This results in an increase in the size of equipment conductors and raceways, leading to unnecessary equipment cost and size increases, higher available short circuit currents and increased arc flash hazard for the installation. A review of the numerous public proposals to delete and revise NEC 701.18 along with the comments

from the voting members of CMP 13 are recognizing that selectivity is not an independent technical solution as it impacts reliability, personnel safety from arc-flash hazard increases, and the removal of isolation devices such as circuit breakers in the electrical system.

I have assisted in the selective coordination of a number of facilities across the country and all of the following points have entered into the discussion at some point. The points discussed below are independent of applying fuses or circuit breakers; as a matter of fact, the overcurrent devices in the switchboard and the generator are based on the manufacturer dependent 2:1 fuse ratios. Consider the diagram I have provided and the challenges with selective coordination.

NEC 701.18 must be deleted, leaving selectivity to the engineering community in order to ensure that the most reliable and safest system is installed. Many other technical performance issues are left to the engineering community such as:

1) Voltage drop, where you have an NEC compliant installation that is selectively coordinated and the lights dim and drop out computer systems.

2) Sizing motor overcurrent devices for selectivity, where the motors are unable to start but they are NEC compliant, permitting exhaust fans in the legally required standby system to be code compliant even if they are unable to start.

3) Ground-fault protection, where none is required on the emergency system source but may be found on the normal source. Hence a small ground fault can take down the normal source which is often more reliable than the alternate source. Once again a performance issue that is ignored in the NEC but the engineer addresses the issue in design.

These few examples illustrate reliability issues that are left to the engineer to address. Why is selectivity more important than these examples that are not addressed by the NEC for enhanced safety and reliability?

The panel's action not to revise or delete NEC 701.18 is making a statement that selectivity is more important than reliability and personnel safety from arc-flash and simply ignores the unnecessary increase in the size of equipment and materials that are unnecessary and is ignoring the amendments that are utilized in the industry to address some of these issues:

1) The State of Washington has amended the Selectivity requirement in the 2005 NEC.

2) The healthcare industry in the State of Florida recognizes the challenges of selective coordination and permits overcurrent devices to overlap where no additional isolation is gained in the system. The 2005 NEC fails to address this issue.

3) The inspection community in plan review has recognized this challenge as we have engaged in numerous conversations between engineers and inspectors that are working together to optimize selectivity per NFPA 110. They are recognizing that the 2005 NEC is more restrictive than necessary and are having to address designs through 90.4 by getting permission from the AHJ to permit appropriate latitude to comply with NFPA 110 even though they are not compliant with NEC 701.18. There is no safety or performance compromised and it is easy to recognize enhancements in performance and reliability with enhanced safety as a by-product of a reduction in the size of the overcurrent devices.

The panel should reconsider the action taken on this proposal and the numerous others looking for relief in this section to provide the safest and most reliable system to the facility they are designing. Delete NEC 701.18 and leave the performance issues to the engineer as is done with numerous other aspects of the electrical system.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 13-242.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 7 Negative: 6

Ballot Not Returned: 1 Gustafson, R.

Explanation of Negative:

ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).

NASBY, J.: See NEMA Explanation of Negative on 13-204.

RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.

WHITTALL, H.: See my explanation of negative vote on Comment 13-178.

WOOD, T.: See My Explanation of Negative on Comment 13-242.

ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-242 Log #2125 NEC-P13 **Final Action: Reject (701.18)**

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)

Comment on Proposal No: 13-159

Recommendation: I disagree with the panel action. Accept Proposal 13-159 as written.

Substantiation: NEMA strongly supports selective coordination as a valuable safety asset in the current range where overloads most often occur. However, NEMA does not support the mandate for Selective Coordination for ALL current ranges and ALL overcurrent devices because safety and reliability can both actually be diminished. This is due to increased hazardous arc flash energy with increased equipment damage and potential fire initiation, decreased reliability, and extended downtime before service restoration. Mandates for selective coordination for ALL current ranges and ALL overcurrent devices will not always provide the optimum safety solution or optimum reliability. Such a solution requires the expertise and judgment of a Professional Engineer who can balan
ce the design, safety and operating requirements in order to determine the optimum design for each specific facility.

Selective coordination is a system design issue, not a Code issue.

The wording of this section states the ALL overcurrent devices selectively coordinate, but this is not what the definition Article 100 implies. The definition deals with localization of an overcurrent and, in many cases, selective coordination for ALL overcurrent devices serves no useful localization purpose such as when: 1) Overcurrent devices are located on the primary and secondary sides of a low voltage transformer with no loads in between. 2) A feeder overcurrent device is connected in series with the main overcurrent device in a downstream panelboard with no loads in between. 3) An overcurrent device on a generator is in series with an overcurrent device in a switchboard with no leads in between. In these instances, requiring both devices to be selectively coordinated does not add to the reliability of the system, which is the stated objective of the CMP.

When overcurrent devices are located on the primary and secondary sides of a low voltage transformer, sized to meet the NEC transformer protection requirements, it is almost impossible to also meet the requirement for selective coordination of this section, regardless of the type of overcurrent protective device chosen.

In many instances, it may not be possible to meet the requirements for generator protection provided by an overcurrent device located on or near the generator and provide selective coordination with downstream overcurrent devices. Further, the generator protection functions provided within the engine-generator controller by the manufacturer might not be able to selectively coordinate with downstream overcurrent devices.

The paralleling of generators is often done to enhance system reliability, which is the stated objective of the CMP, however, in order to meet the requirement for selective coordination each generator overcurrent device and controller must selectively coordinate with all downstream overcurrent devices. This may not be possible if the generators are of unequal size.

The upgrade or expansion of an existing building may require the replacement of existing upstream equipment so that it will selectively coordinate with the new downstream equipment it must feed. The State of Washington has recognized the significant economic burden this is placing on building owners and businesses and has issued an emergency order exempting existing buildings from meeting the selective coordination requirements of the 2005 NEC.

Systems are normally designed for selective coordination in the overload region of the overcurrent device time-current curves. If this were not so, they would not operate under normal conditions, so what is really being called for in this requirement is overload and short circuit selective coordination. In order to achieve total short circuit selective coordination, the size of upstream overcurrent protective devices may need to be increased and/or time delay trip characteristics increased, thereby possibly increasing the arc flash hazard. In other words, by forcing selective coordination for an event that most likely will never occur, namely a bolted fault, the hazards involved in performing tasks which most likely will occur, namely system maintenance, may be increased. This is another reason why system designers need the flexibility to optimize the design of a system, which the current requirement does not allow.

Further, as stated in the original NEMA substantiation to delete this text in proposal 13-137, we wish to once again point out the following:

1. The need for the flexibility to optimize the design of a system is recognized in IEEE Standard 242-2001 (The Buff Book). Section 15.1 states, "In applying protective devices, it is occasionally necessary to compromise between protection and selectivity. While experience may suggest one alternative over another, the preferred approach is to favor protection over selectivity. Which choice is made, however, is dependent on the equipment damage and the affect on the process."

2. The need for the flexibility to optimize the design of a system is also recognized in NFPA 110-2005, Standard for Emergency and Standby Power Systems. Section 6.5.1 states, "The overcurrent protective devices in the EPSS shall be coordinated to optimize selective tripping of the circuit overcurrent protective devices when a short circuit occurs. A further explanation of this statement is given in Annex A section A.6.5.1, "It is important that the various overcurrent devices be coordinated, as far as practicable, to isolate faulted circuits and to protect against cascading operation on short circuit faults. In many systems, however, full coordination is not practicable without using equipment that could be prohibitively costly or undesirable for other reasons."

3. This NEC text conflicts with Chapter 27 of the International Building Code that specifically requires compliance with NFPA 110 for emergency systems. This presents a conundrum for the system designer and the AHJ. Which code takes precedence, the IBC or the NEC?

In summary, NEMA strongly supports selective coordination as a valuable safety asset in the current range where overloads most often occur. However, NEMA does not support the mandate for Selective Coordination for ALL current ranges and ALL overcurrent devices because safety and reliability can both actually be diminished, thus the section should be deleted.

Panel Meeting Action: Reject
Panel Statement: The overriding theme of Articles 700 and 701 is to keep the power on throughout an emergency situation, for life safety. Selective coordination increases the reliability of the emergency system. Selective coordination is essential for the continuity of service required in emergency and legally required standby circuits.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: Proposal 13-159 should have been accepted. The substantiation provided by the submitter of Proposal 13-159 is well founded. Selective coordination is a design consideration. While selectivity may be desirable in some cases, it has not been shown that the lack of coordination has been responsible for the loss of life, injury to persons, or damage to property.
If the Code Making Panel believes that selectivity is sometimes a design consideration, it should be in the Code as a FPN and not as mandatory language that is likely not to be enforced. The use of mandatory language in the Code makes the installer contractually liable for its implementation when this should be a "design-engineering" responsibility.
In all cases, the Proposers and the Commenters advocating the removal of both 700.27 and 701.18 have provided well-documented substantiation for their removal.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-243 Log #2161 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Hugh Pace, Brown and Caldwell Engineers
Comment on Proposal No: 13-159
Recommendation: I disagree with the Panel Action. Accept Proposal 13-159 as written.
Substantiation: "Total" coordination requirement is a mistake.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-244 Log #2172 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Douglas Stephens, ASCO Power Technologies
Comment on Proposal No: 13-159
Recommendation: This Comment is merely to add support to the Panel action which was to Reject the Proposal.
Substantiation: Overcurrent conditions (Locked Rotor and/or Short Circuit) in the Fire Pump Room are to be cleared, and be resettable, in the pump room (which, per clause 5.12 of NFPA 20 is required to be "separated or protected by fire-rated construction") and not at some electrically upstream OCPD which may be inaccessible during a fire and possibly cause the disabling of other Legally Required Standby Systems.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-245 Log #2193 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Peter R. Walsh, Peter R. Walsh, P.E. & Associates
Comment on Proposal No: 13-159
Recommendation: The Panel should continue to Reject this Proposal.
Substantiation: The NEC has required selective coordination for elevator circuits for years without major problems. The recent expansion of requirements makes good sense for the users of the buildings. Who wants to suffer from a blackout as a result of non-selective coordination? Engineers have software programs, like Easy Power Version 8.0 that can automate selective coordination.
With Zone Selective Coordination trips, almost anything can be coordinated. Arc flash can be adjusted by proper trips. The code making panel should require reliable power through selective coordination of legally required standby systems.
Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: While zone selective interlocking is one tool that can be used for selective coordination, but is not available on all overcurrent protective devices. The commenter also seems to imply that arc flash hazards can be mitigated by changing trip settings, which is not the case in many situations. Also, see comment on 13-175.

13-246 Log #2316 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: David Beach, Gresham, OR
Comment on Proposal No: 13-162
Recommendation: The proposal should have been Accepted.
Substantiation: This requirement was added in 2005 without technical substantiation and is a design issue, not a safety issue. The proposal was an attempt by a fuse manufacturer to mandate the use of fuses in applications where circuit breakers are more appropriate for most installations. I would always include selective coordination in things desired of an electrical system design, but in many cases foregoing selective coordination can make for an installation that more clearly meets the safety objectives of the code. In many cases the use of fuses in these systems will dramatically increase the arc flash hazard; is that truly in the interest of safety?
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-247 Log #2317 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: David Beach, Gresham, OR
Comment on Proposal No: 13-164
Recommendation: The proposal should have been Accepted.
Substantiation: This requirement was added in 2005 without technical substantiation and is a design issue, not a safety issue. The proposal was an attempt by a fuse manufacturer to mandate the use of fuses in applications where circuit breakers are more appropriate for most installations. I would always include selective coordination in things desired of an electrical system design, but in many cases foregoing selective coordination can make for an installation that more clearly meets the safety objectives of the code. In many cases the use of fuses in these systems will dramatically increase the arc flash hazard; is that truly in the interest of safety?

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-248 Log #2318 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: David Beach, Gresham, OR
Comment on Proposal No: 13-165
Recommendation: The proposal should have been Accepted.
Substantiation: This requirement was added in 2005 without technical substantiation and is a design issue, not a safety issue. The proposal was an attempt by a fuse manufacturer to mandate the use of fuses in applications where circuit breakers are more appropriate for most installations. I would always include selective coordination in things desired of an electrical system design, but in many cases foregoing selective coordination can make for an installation that more clearly meets the safety objectives of the code. In many cases the use of fuses in these systems will dramatically increase the arc flash hazard; is that truly in the interest of safety?
Panel Meeting Action: Reject
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-249 Log #2338 NEC-P13 **Final Action: Reject**
(701.18)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
The Technical Correlating Committee understands that the comment recommendation refers to 700.27, but the comment actually addresses 701.18 with the appropriate substantiation to address 701.18.
Submitter: Alan Manche, Square D Company
Comment on Proposal No: 13-159
Recommendation: Reconsider and accept in principle proposal 13-159. Delete the present text and replace with revised language as noted in proposal 13-159 that parallels NFPA 110.
~~700.27 Coordination. Emergency system(s) overcurrent devices shall be selectivity coordinated with all supply side overcurrent protective devices.~~
700.27 Coordination. The overcurrent protective devices in the emergency system shall be selected to optimize selective coordination.
Substantiation: Square D continues to support the deletion of NEC 701.18, however, if the panel is reluctant to address the safety, reliability and performance issues by deleting it, it would be prudent for the panel to revise the text to address many of the concerns addressed in not only in this proposal but the many other proposals that were submitted to the panel.
As a member of the NFPA 110 technical committee, the committee has recognized these challenges. Utilizing similar language to that found in NFPA 110 would permit some latitude to address many of these issues found in the proposals that were submitted and would remove the conflicting language and requirements.
This comment simply requests the panel to reconsider the action taken on the numerous proposals to revise NEC 701.18 in order to address the technical issues so the electrical industry can ensure the most reliable and safest system is in place for our communities. The present language does not support our communities in this manner. The proposed language in this comment moves closer to that goal and aligns with NFPA 110.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 7 Negative: 6
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: See my Explanation of Negative on Comment 13-224 (Log #492).
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-178.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-251 Log #1280 NEC-P13 **Final Action: Reject**
(701.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Paul A. Kempf, University of Notre Dame
Comment on Proposal No: 13-137
Recommendation: Disagree with the Panel Action. Accept Proposal 13-137 as written.
Substantiation: Selective coordination for low current magnitudes will in most cases provide the required selective coordination without sacrificing the best possible protection. The decision as to when total protection is required should be left up to the design Professional Engineer based on the type facility and detailed analysis of the electrical system emergency system. Additionally, such total coordination will have a potential to: decrease safety due to increased arc flash hazard, decrease overall system reliability, increase downtime, increase equipment sizing and increase equipment cost. Further, the rare nature of large current faults would render the need for total coordination seldom of value. Selective Coordination of low current devices will provide optimum protection and its application should be left to Professional Engineers to apply while determining the optimum solution of a given legally required standby system application.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 8 Negative: 5
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-223.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-252 Log #1303 NEC-P13 **Final Action: Reject**
(701.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects
Submitter: James Harvey, University of Michigan Hospitals and Health Centers
Comment on Proposal No: 13-159
Recommendation: I disagree with the Panel Action. Accept related Proposal 13-159, (and 13-135) as written. These two proposals are to delete section 701.27 (now in 70-2005), from the 70-2008 editon.
Substantiation: Currently we are operating under NEC 70-2002, and will soon adopt 70-2005 - but with a deletion of the requirement for adhering to section 700.27.
The emergency power systems encountered at our larger facilities (and some of the smaller facilities) are very complex. The current code section removes the option for using engineering judgment, as the deciding factor on how our emergency power systems are to be coordinated. This loss of professional judgment would be detrimental (in certain cases) to the safety of our patients, our staff, and the property themselves. In all of our new facilities, and in existing facilities undergoing major renovation, the design is done by a registered professional engineer, and is also reviewed by a staff registered engineer.
On occasion, we need to select devices that are not completely coordinated over the entire fault range in order to lower arc-flash energies to protect staff. Also, on occasion we need to put two devices in series (but not coordinated with each other), one at source, one at load (when these are separated by large distances). In these cases, the lack of coordination between the devices causes no problem since the same downstream loads are loss regardless of which ones operates.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 8 Negative: 5
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-223.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-253 Log #1699 NEC-P13 **Final Action: Reject**
(701.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Elmer G. Paine, Westlake Reed Leskosky
Comment on Proposal No: 13-137
Recommendation: Disagree with panel action. Accept Proposal 13-137 as written.
Substantiation: None.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 8 Negative: 5
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-223.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

13-254 Log #2162 NEC-P13 **Final Action: Reject**
(701.27)

TCC Action: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative as required in 4.4.6.4 of the NFPA Regulations Governing Committee Projects.
Submitter: Hugh Pace, Brown and Caldwell Engineers
Comment on Proposal No: 13-137
Recommendation: I disagree with the Panel Action. Accept Proposal 13-137 as written.
Substantiation: "Total" coordination requirement is a mistake.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 13-242.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 8 Negative: 5
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
NASBY, J.: See NEMA Explanation of Negative on 13-204.
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-177.
WHITTALL, H.: See my explanation of negative vote on Comment 13-223.
WOOD, T.: See My Explanation of Negative on Comment 13-242.
ZGONENA, T.: See My Explanation of Negative on Comment 13-175.

ARTICLE 702 — OPTIONAL STANDBY SYSTEMS

13-255 Log #114 NEC-P13 **Final Action: Accept**
(702.5)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-168
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comment expressed in the voting and "with a or b" should be revised to read "with (a) or (b)".
The Technical Correlating Committee directs that the Action on this Proposal be rewritten to comply with 4.1.1 of the NEC Style Manual.
These actions will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
In 702.5(B)(2), change to read as follows:
(2) Automatic Transfer Equipment. Where automatic transfer equipment is used, an optional standby system shall comply with (a) or (b).
Panel Statement: The panel accepts the direction of the TCC to comply with the NEC Style manual as shown in this panel action.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-256 Log #618 NEC-P13 **Final Action: Accept**
(702.6)

Submitter: Neil A. Czarnecki, Reliance Controls Corporation
Comment on Proposal No: 13-175
Recommendation: Proposal 13-175 should be rejected.
Substantiation: In the 1980's, a number of manufacturers introduced manual transfer equipment for residential portable-generator applications based on a design that placed transfer switching apparatus on the load side of the branch circuit protection. The result of this design was that, when a switch was in the "utility" position, the branch circuit was protected by the branch circuit protector in the panelboard. However, when the switch was placed in the "generator" position, the branch circuit was protected by a supplementary overcurrent protector in the transfer equipment. The rationale for allowing this configuration was that the supplemental protector was capable of interrupting the short circuit current a portable generator could deliver.
There was confusion as to whether these products were code compliant. Some time after the 1990 Code, in an effort to clarify the issue, a change was approved to 702.6, which added the phrase:
"Transfer equipment located on the load side of branch circuit protection shall be permitted to contain supplementary overcurrent protection having an interrupting rating sufficient for the available fault current that the generator can deliver."
Some folks, however, continued to express the position that supplementary overcurrent protection of branch circuits was not acceptable even under the conditions anticipated by Article 702. For the 2002 Code, the Code-Making Panel approved a change, which added the additional phrase:
"The supplementary overcurrent devices shall be part of a listed transfer equipment."
This move effectively eliminated the ability to use supplemental protectors in load-side transfer equipment unless it could be verified by a Listing agency that the supplemental protectors were being applied in a safe and code-compliant manner.
Proposal 13-175 is to remove BOTH sentences from 702.6, resulting in neither specifically allowing nor specifically disallowing the use of supplementary overcurrent devices, and also removing the Listing requirement for such products. As 702.6 stands now, it is clear that a transfer switch that uses supplemental protectors and is not a listed product is unquestionably non-code compliant. Implementation of this change will throw the code compliance of such products back into a state of confusion, and open the door for manufacturers to take advantage of the naïveté of some customers, to the detriment of those customers' safety.
Therefore, proposal 13-175 should be rejected.
Panel Meeting Action: Accept
Panel Statement: Action taken by the panel (accepting the original proposal) was in error. Further review of the proposal shows that it essentially allows the use of supplemental protectors in transfer equipment with no requirement that they be located on the load side of branch circuit protectors. It also would allow the use of supplemental protectors in non-listed equipment. The original language should be reinstated.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

13-257 Log #1186 NEC-P13 **Final Action: Reject**
(702.6 Exception)

TCC Action: The Technical Correlating Committee directs that Comment 13-257 be reported as "Reject" to correlate with the panel action to Reject Comment 3-90 and Proposal 3-131 by Code-Making Panel 3.
Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 13-178
Recommendation: Accept Proposal 13-178.
Substantiation: Requirements of Article 702 apply to the installation of optional standby systems that are permanently installed in their entirety and not for temporary installations. The specific requirements for temporary installations in 590.2, 590.3, and 590.4 should cover the temporary connection of portable generators.
The proposed addition of 590.8, in Proposal 3-131, properly deals with the "temporary connection of portable generators", and has additional requirements that are not covered under the provisions of Article 702.
Panel Meeting Action: Accept
Panel Statement: The comment substantiation was sufficient for the panel to reverse the action on Proposal 13-178.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 11 Negative: 2
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
ELKINS, D.: Panel action on this comment was predicated on Panel 3 accepting Comment 3-90 on Proposal 3-131 which would have moved an exception from Article 702 to Article 590. Panel 3 rejected this proposal. Therefore, this Panel 13 comment should be rejected to leave this exception covering temporary connection of portable generators in place in Article 702.
ZGONENA, T.: The use of portable generators is indeed anticipated in Optional Standby Systems, as indicated in the scope (702.1). The scope specifically states "...and those that are arranged for a connection to a premises wiring system from a portable alternate power supply." Changing the exception to refer to Article 590 removes the control of this particular application from CMP 13, which is not appropriate.

13-258 Log #2120 NEC-P13 **Final Action: Accept in Principle (702.11 (New))**

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 13-181
Recommendation: Accept the Proposal.
Substantiation: The new FPN was not intended to identify that the disconnecting means which is the subject of 702.11 must disconnect the "service." The FPN is necessary to identify to users of the NEC that this disconnecting means must be rated as "suitable for use as service equipment." As described in Article 100, conductors supplying a building or other structure from a generator are "feeder" conductors. Seeing that the generator is outdoors, the conductors are "outside feeder conductors" and, therefore, they are included in the scope of Article 225. Section 225.31 requires that a disconnecting means be provided to disconnect all conductors that supply or pass through a building or structure. Section 702.11 amends the requirements of 225.32 to locate the disconnecting means required by 225.31 at the building or structure served, however, it does not amend the requirements of 225.36 for it to be "suitable for use as service equipment." This requirement is often overlooked and the proposed FPN would go a long way towards identifying that there is another requirement in 225.36 that must be considered.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-259.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-219.

13-259 Log #2122 NEC-P13 **Final Action: Accept in Principle (702.11)**

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 13-181
Recommendation: Accept the Proposal in Principle and revise 702.11 to read:
Outdoor Generator Sets. Where an outdoor housed generator set is equipped with a readily accessible disconnecting means that meets the requirements of 225.36 and is located within sight of the building or structure supplied, an additional disconnecting means shall not be required where ungrounded conductors serve or pass through the building or structure.
Substantiation: The new FPN was not intended to identify that the disconnecting means, which is the subject of 702.11, must disconnect the "service." This comment is being submitted as an alternative to adding a new FPN. The new text will identify to users of the NEC that this disconnecting means must be rated as "suitable for use as service equipment." As described in Article 100, conductors supplying a building or other structure from a generator are "feeder" conductors. Seeing that the generator is outdoors, the conductors are "outside feeder conductors" and therefore, they are included in the scope of Article 225. 225.31 requires that a disconnecting means be provided to disconnect all conductors that supply or pass through a building or structure. 702.11 amends the requirements of 225.32 to locate the disconnecting means required by 225.31 at the building or structure served, however, it does not amend the requirements of 225.36 for it to be "suitable for use as service equipment." This requirement is often overlooked and the proposed new text would go a long way towards identifying that there is another requirement in 225.36 that must be considered.
Panel Meeting Action: Accept in Principle
Accept the proposal in principle and revise 702.11 to read:
Outdoor Generator Sets. Where an outdoor housed generator set is equipped with a readily accessible disconnecting means located within sight of the building or structure supplied, an additional disconnecting means shall not be required where ungrounded conductors serve or pass through the building or structure. The disconnecting means shall meet the requirements of 225.36.
Panel Statement: The added sentence clarifies that the disconnecting means must comply with 225.36.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 12 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
RAPPAPORT, E.: See my explanation of negative vote on Comment 13-219.

13-260 Log #2176 NEC-P13 **Final Action: Reject (702.11, FPN (New))**

Submitter: Mark R. Hilbert, Wolfeboro, NH
Comment on Proposal No: 13-180
Recommendation: Accept the Proposal.
Substantiation: This proposal should be accepted as the purpose of the FPN is to direct readers of this section to a requirement that is not obvious. The grounding and bonding conditions when the disconnecting means is remote from the building or other structure it is supplying are often misunderstood and, therefore, this would be an appropriate location for a FPN providing direction to the location of the requirement. In the ROP stage, Panel 5 accepted a proposal to 250.32(D) to include a reference to 702.11 to identify that the requirements of that section apply to the condition of 702.11. It would be prudent to locate a FPN here to reference 250.32(D).
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its statement on Proposals 13-154 and 13-130. The panel believes that the addition of the FPN is unnecessary.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Gustafson, R.

ARTICLE 705 — INTERCONNECTED ELECTRIC POWER PRODUCTION SOURCES

13-261 Log #115 NEC-P13 **Final Action: Accept (705)**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 13-184
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting.
The Technical Correlating Committee directs that the Action on this Proposal be rewritten to comply with the NEC Style Manual.
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Gustafson, R.

13-262 Log #687 NEC-P13 **Final Action: Accept in Principle in Part (705)**

Submitter: Timothy M. Croushore, Allegheny Power
Comment on Proposal No: 13-184
Recommendation: Code Making Panel 13 is to be commended for the fine job in the rewrite of Article 705 as it appears in the NEC 2008 Draft. This comment is intended to clarify and correct a few minor issues as published in the NEC 2008 Draft. These issues are as follows:
1. In 705.2 Definitions. The definition of Point of Common Coupling was inadvertently tacked onto the end of the definition for Utility-Interactive Inverter Output Circuit. The definition of Point of Common Coupling should be its own definition and the third definition in 705.2 Definitions.
2. In the Table 705.3 Other Articles. Please list Solar Photovoltaic Systems — Article 690 and Fuel Cell Systems - Article 692 in the table between the existing row Generators — Article 445 and the existing row Emergency systems — Article 700. Once these new row items are added into the table, please delete Exception No. 1 and Exception No. 2 shown below the table in the 2008 NEC Draft.
3. In 705.4 Equipment Approval. Please delete the second sentence. The first sentence should remain.
4. In 705.12 Point of Connection, please revise the text of this section that is published in the 2008 NEC Draft to the text as shown in Mr. Hornberger's affirmative ballot comment for the same section. Mr. Hornberger's text for 705.12 is published in the Report on Proposals for Proposal 13-184.
5. In 705.22 Disconnect Device, please add a new (6) Capable of being locked in the open (off) position after the existing (5) as shown in the 2008 NEC Draft.
6. In 705.30 Overcurrent Protection, please add a new (D) Utility-Interactive Inverters. Utility-Interactive inverters shall be protected in accordance with 705.65.
7. In 705.30 Overcurrent Protection, please add a new (E) Generators. Generators shall be protected in accordance with 705.130.
8. In 705.40 Loss of Primary Source, please delete the word "normally" in the last sentence of this section.
9. In 705.70 Utility-Interactive Inverters Mounted in Not-Readily-Accessible Locations, please delete the phrase "The alternating-current output conductors from the inverter and" from (3) of this section. The revised (3) should read as follows: "(3) An additional alternating-current disconnecting means for the inverter shall comply with 705.22."
10. In 705.130 Overcurrent Protection, please delete the phrase "a sufficient number of" in the second sentence of the text of the section. The revised second sentence should read as follows: "Equipment and conductors connected to more than one electrical source shall have overcurrent devices located so as to provide protection from all sources."

Substantiation: The intent of this comment is to clarify and correct the issues in the rewrite based on the affirmative comments as published in the Report on Proposals. The 2008 NEC Draft was used to see the results of the editor's revisions to the work of CMP-13. Please reference the above 10 item list in the comment section above for the statement of problem and substantiation for the comment.

1. Item #1 is an editorial comment based on the printing of the panel action that is shown on the bottom left column of page 70-788 of the ROP. Apparently, the definition of Point of Common Coupling was accidentally tacked onto the end of the definition of Utility-Interactive Inverter Output Circuit.
2. Item #2 is proposed to eliminate the two exceptions (as indicated in the comment made by Mr. Stafford) by putting the information in positive language in the table.
3. Item #3 is in reference to the comment made by Mr. Swayne as published in his affirmative ballot comment in the ROP.
4. Item #4 is in reference to the comment made by Mr. Hornberger as published in his affirmative ballot comment in the ROP.
5. Item #5 is in reference to the comments made by Mr. Hornberger and Mr. Stafford regarding the ability to lock the disconnecting means in the open position.
6. Item #6 and Item #7 is in reference to a comment made by Mr. Swayne about deleting generators in 705.30(A). These two item add references for overcurrent protection of Generators and Utility-Interactive Inverters.
7. Item #8 is in reference to a comment made by Mr. Swayne about the word "normally".
8. Item #9 is in reference to a comment made by Mr. Swayne about the "alternating-current output conductors" not needing to comply with 705.22.
9. Item #10 is in reference to a comment made by Mr. Swayne about the phrase "a sufficient number of" in his positive ballot comment.

Panel Meeting Action: Accept in Principle in Part

Revise Article 705 from Proposal 13-184 to read as follows:

ARTICLE 705 Interconnected Electric Power Production Sources

I. General

705.1 Scope. This article covers installation of one or more electric power production sources operating in parallel with a primary source(s) of electricity.

FPN: Examples of the types of primary sources include a utility supply or an on-site electric power source(s).

705.2 Definitions.

Hybrid System. A system comprised of multiple power sources. These power sources could include photovoltaic, wind, micro-hydro generators, engine-driven generators, and others, but do not include electrical power production and distribution network systems. Energy storage systems such as batteries, flywheels, or superconducting magnetic storage equipment do not constitute a power source for the purpose of this definition.

Utility-Interactive Inverter Output Circuit. The conductors between the utility interactive inverter and the service equipment or another electric power production source. such as a utility. for electrical production and distribution network.

Point of Common Coupling. The point at which the power production and distribution network and the customer interface occurs in an interactive system. Typically, this is the load side of the power network meter.

705.3 Other Articles. Interconnected electric power production sources shall comply with this article and also with the applicable requirements of the articles in Table 705.3.

Table 705.3 Other Articles

Equipment/System	Article
Generators	445
Solar Photovoltaic Systems	690
Fuel Cell Systems	692
Emergency systems	700
Legally required standby system	701
Optional standby systems◦	702

Exception No.1: Installation of solar photovoltaic systems operated as interconnected power sources shall be in accordance with Article 690.

Exception No.2: Installation of fuel cell systems operated as interconnected power sources shall be in accordance with Article 692.

705.4 Equipment Approval. All equipment shall be approved for the intended use. Utility-Interactive inverters for interconnection systems shall be listed and identified for interconnection service.

705.10 Directory. A permanent plaque or directory, denoting all electrical power sources on or in the premises, shall be installed at each service equipment location and at locations of all electric power production sources capable of being interconnected. Exception: Installations with large numbers of power production sources shall be permitted to be designated by groups.

705.12 Point of Connection. The output of an interconnected electric power source shall be connected as specified in 692.65(A), (B), (C), or (D).

(A) Supply Side. ~~Any interconnected electric power source shall be permitted to be connected at the premises service disconnecting means, beyond the point of common coupling.~~ An electric power production source shall be permitted to be connected to the supply side of the service disconnecting means as permitted in 230.82(6).

(B) Integrated Electric Systems. The outputs shall be permitted to be interconnected at a point or points elsewhere on the premises where the system qualifies as an integrated electrical system and incorporates protective equipment in accordance with all applicable sections of Article 685.

(C) Greater Than 100 KW The outputs shall be permitted to be interconnected at a point or points elsewhere on the premises where all of the following conditions are met:

(1) The aggregate of non-utility sources of electricity has a capacity in excess of 100 KW, or the service is above 1,000 volts.

(2) The conditions of maintenance and supervision ensure that qualified persons service and operate the system.

(3) Safeguards, documented procedures, and protective equipment are established and maintained.

(D) Utility Interactive Inverters. The output of a utility-interactive inverter shall be permitted to be connected to the load side of the service disconnecting means of the other source(s) at any distribution equipment on the premises. Where distribution equipment including switchboards and panelboards is fed simultaneously by a primary source(s) of electricity and one or more utility-interactive inverters, and where this distribution equipment is capable of supplying multiple branch circuits or feeders or both, the interconnecting provisions for the utility-interactive inverter(s) shall comply with (1) through (7).

(1) Dedicated Overcurrent and Disconnect. Each source interconnection shall be made at a dedicated circuit breaker or fusible disconnecting means.

(2) Bus or Conductor Rating. The sum of the ampere ratings of overcurrent devices in circuits supplying power to a busbar or conductor shall not exceed 120 percent of the rating of the busbar or conductor.

(3) Ground Fault Protection. The interconnection point shall be on the line side of all ground-fault protection equipment.

Exception: Connection shall be permitted to be made to the load side of ground-fault protection, provided that there is ground-fault protection for equipment from all ground-fault current sources. Ground-fault protection devices used with supplies connected to the load-side terminals shall be identified and listed as suitable for backfeeding.

(4) Marking. Equipment containing overcurrent devices in circuits supplying power to a busbar or conductor supplied from multiple sources shall be marked to indicate the presence of all sources.

(5) Suitable for Back Feed. Circuit breakers, if backfed, shall be suitable for such operation.

FPN: Circuit breakers that are marked "Line" and "Load" have been evaluated only in the direction marked. Circuit breakers without "Line" and "Load" have been evaluated in both directions.

(6) Fastening. Listed plug-in type circuit breakers backfed from utility-interactive inverters that are listed and identified as interactive shall be permitted to omit the additional fastener normally required by 408.36(F) for such applications.

(7) Inverter Output Connection. Unless the panelboard is rated not less than the sum of the ampere ratings of all overcurrent devices supplying it, a connection in a panelboard shall be positioned at the opposite (load) end from the input feeder location or main circuit location. The bus or conductor rating shall have been sized for the loads connected in accordance with Article 220. A permanent warning label shall be applied to the distribution equipment with the following or equivalent wording:

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE

705.14 Output Characteristics.
The output of a generator or other electric power production source operating in parallel with an electric supply system shall be compatible with the voltage, wave shape, and frequency of the system to which it is connected.

FPN: The term compatible does not necessarily mean matching the primary source wave shape.

705.16 Interrupting and Short-Circuit Current Rating.
Consideration shall be given to the contribution of fault currents from all interconnected power sources for the interrupting and short-circuit current ratings of equipment on interactive systems.

705.20 Disconnecting Means, Sources.
Means shall be provided to disconnect all ungrounded conductors of an electric power production source(s) from all other conductors.

705.21 Disconnecting Means, Equipment. Means shall be provided to disconnect power production equipment, such as utility interactive inverters or transformers associated with a power production source, from all ungrounded conductors of all sources of supply. Equipment intended to be operated and maintained as an integral part of a power production source exceeding 1000 volts shall not be required to have a disconnecting means.
705.22 Disconnect Device. The disconnecting means for ungrounded conductors shall consist of a manually or power operable switch(es) or circuit breaker(s) with the following features:
(1) Located where readily accessible
(2) Externally operable without exposing the operator to contact with live parts and if power operable, of a type that could be opened by hand in the event of a power supply failure
(3) Plainly indicating whether in the open (or closed (on) position
(4) Having ratings not less than the load to be cared and the fault current to be interrupted

For disconnect equipment energized from both sides, a marking shall be provided to indicate that all contacts of the disconnect equipment might be energized.
FPN No. 1: In parallel generation systems, some equipment, including knife blade switches and fuses, is likely to be energized from both directions. See 240.40.
FPN No. 2: Interconnection to an off-premises primary source could require a visibly verifiable disconnecting device.
(5) Simultaneous disconnect of all ungrounded conductors of the circuit.
(6) Capable of being locked in the open (off) position.

705.30 Overcurrent Protection. Conductors shall be protected in accordance with Article 240. Equipment and conductors connected to more than one electrical source shall have a sufficient number of overcurrent devices located so as to provide protection from all sources.

(A) Solar Photovoltaic Systems. Solar photovoltaic systems shall be protected in accordance with Article 690.
(B) Transformers. Overcurrent protection for a transformer with a source(s) on each side shall be provided in accordance with 450.3 by considering first one side of the transformer, then the other side of the transformer, as the primary.
(C) Fuel Cell Systems. Fuel cell systems shall be protected in accordance with Article 692.
(D) Utility Interactive Inverters. Utility interactive inverters shall be protected in accordance with 705.65.
(E) Generators. Generators shall be protected in accordance with 705.130.

705.32 Ground-Fault Protection. Where ground-fault protection is used, the output of an interactive system shall be connected to the supply side of the ground-fault protection.

Exception: Connection shall be permitted to be made to the load side of ground-fault protection, provided that there is ground-fault protection for equipment from all ground-fault current sources.

705.40 Loss of Primary Source. Upon loss of primary source, an electric power production source shall be automatically disconnected from all ungrounded conductors of the primary source and shall not be reconnected until the primary source is restored.

Exception: A listed Utility Interactive Inverter shall be permitted to automatically cease exporting power upon loss of primary source and shall not be required to automatically disconnect all ungrounded conductors from the primary source. A listed Utility Interactive Inverter shall be permitted to automatically or manually resume exporting power to the utility once the primary source is restored.

FPN No. 1: Risks to personnel and equipment associated with the primary source could occur if an utility interactive electric power production source can operate as an intentional island. Special detection methods are required to determine that a primary source supply system outage has occurred and whether there should be automatic disconnection. When the primary source supply system is restored special detection methods can be required to limit exposure of power production sources to out-of-phase reconnection.
FPN No. 2: Induction-generating equipment on systems with significant capacitance can become self-excited upon loss of primary source and experience severe overvoltage as a result.

A utility interactive inverter shall be permitted to operate as a stand-alone system to supply loads that have been disconnected from electrical production and distribution network sources.

705.42 Loss of Three-Phase Primary Source. A 3-phase electric power production source shall be automatically disconnected from all ungrounded conductors of the interconnected systems when one of the phases of that source opens. This requirement shall not be applicable to an electric power production source providing power for an emergency or legally required standby system.
Exception: A listed utility interactive inverter shall be permitted to automatically cease exporting power when one of the phases of the source ovens and shall not be required to automatically disconnect all ungrounded conductors from the primary source. A listed utility interactive inverter shall be permitted to automatically or manually resume exporting power to the utility once all phases of the source is restored.

705.50 Grounding. Interconnected electric power production sources shall be grounded in accordance with Article 250.

Exception: For direct-current systems connected through an inverter directly to a grounded service, other methods that accomplish equivalent system protection and that utilize equipment listed and identified for the use shall be permitted.

II. Utility Interactive Inverters

705.60 Circuit Sizing and Current.
_(A) Calculation of Maximum Circuit Current. The maximum current for the specific circuit shall be calculated in accordance with 705.60(A)(1) though (A)(2).
(1) Inverter Source Circuit Currents. The maximum current shall be maximum rated input current of the inverter.
(2) Inverter Output Circuit Current. The maximum current shall be the inverter continuous output current rating.
(B) Ampacity and Overcurrent Device Ratings. Inverter system currents shall be considered to be continuous.
(1) Sizing of Conductors and Overcurrent Devices. The circuit conductors and overcurrent devices shall be sized to carry not less than 125 percent of the maximum currents as calculated in 705.60(A). The rating or setting of overcurrent devices shall be permitted in accordance with 240.4(B) and(C).

Exception: Circuits containing an assembly together with its overcurrent device(s) that is listed for continuous operation at 100 percent of its rating shall be permitted to be utilized at 100 percent of its rating.

705.65 Overcurrent Protection.
(A) Circuits and Equipment. Inverter input ~~source~~ circuits, inverter output circuit and storage battery circuit conductors and equipment shall be protected in accordance with the requirements of Article 240. Circuits connected to more than one electrical source shall have overcurrent devices located so as to provide overcurrent protection from all sources.

Exception: An overcurrent device shall not be required for circuit conductors sized in accordance with 705.60(B) and located where one of the following apply:
(a) There are no external sources such as parallel-connected source circuits, batteries. or backfeed from inverters.
(b) The short-circuit currents from all sources do not exceed the ampacity of the conductors.

FPN: Possible backfeed of current from any source of supply. including a supply through an inverter into the inverter output circuit and inverter source circuits. is a consideration in determining whether adequate overcurrent protection from all sources is provided for conductors and modules.
(B) Power Transformers. Overcurrent protection for a transformer with a source(s) on each side shall be provided in accordance with 450.3 by considering first one side of the transformer. then the other side of the transformer. as the primary.

Exception: A power transformer with a current rating on the side connected toward the inverter power source not less than the short-circuit output current rating of the inverter shall be permitted without overcurrent protection from that source.

(C) Inverter Source Circuits. Branch-circuit or supplementary-type overcurrent

devices shall be permitted to provide overcurrent protection in inverter source circuits. The overcurrent devices shall be accessible but shall not be required to be readily accessible. Standard values of supplementary overcurrent devices allowed by this section shall be in one ampere size increments. staring at one ampere up to and including 15 amperes. Higher standard values above 15 amperes for supplementary overcurrent devices shall be based on the standard sizes provided in 240.6(A).
(D) Direct-Current Rating. Overcurrent devices. either fuses or circuit breakers. used in any dc portion of a utility interactive inverter power system shall be listed for use in dc circuits and shall have the appropriate voltage, current. and interrupt ratings.
(E) Series Overcurrent Protection. In series-connected strings of two or more modules. a single overcurrent protection device shall be permitted.

705.70 Utility-Interactive Inverters Mounted in Not-Readily-Accessible Locations. Utility-interactive inverters shall be permitted to be mounted on roofs or other exterior areas that are not readily accessible. These installations shall comply with (1) through (4):
(1) A direct-current disconnecting means shall be mounted within sight of, or in the inverter.
(2) An alternating-current disconnecting means shall be mounted within sight of, or in the inverter.
(3) An additional alternating-current disconnecting means for the inverter shall comply with 705.22.
(4) A plaque shall be installed in accordance with 705.10.
705.80 Utility Interactive Power Systems Employing Energy Storage. Utility Interactive power systems employing energy storage shall also be marked with the maximum operating voltage including any equalization voltage and the polarity of the grounded circuit conductor.

705.82 Hybrid Systems. Hybrid Systems shall be permitted to be interconnected ~~at the point-of common coupling~~ with utility-interactive inverters.

705.95 Ampacity of Neutral Conductor. If a single-phase 2-wire inverter output is connected to the neutral and one ungrounded conductor (only) of a 3-wire system or of a 3-phase 4-wire wye-connected system, the maximum load connected between the neutral and anyone ungrounded conductor plus the inverter output rating shall not exceed the ampacity of the neutral conductor.

705.100 Unbalanced Interconnections.
(A) Single Phase. Single-phase inverters for hybrid systems and ac modules in interactive hybrid systems shall not be connected to 3-phase power systems unless the interconnected system is designed so that significant unbalanced voltages cannot result.
(B) Three Phase. Three-phase inverters and 3-phase ac modules in interactive systems shall have all phases automatically de-energized upon loss of. or unbalanced. voltage in one or more phases unless the interconnected system is designed so that significant unbalanced voltages will not result.

III. Generators

705.130 Overcurrent Protection.
Conductors shall be protected in accordance with Article 240. Equipment and conductors connected to more than one electrical source shall have overcurrent devices located so as to provide protection from all sources.
Generators shall be protected in accordance with 445.12.

705.143 Synchronous Generators.
Synchronous generators in a parallel system shall be provided with the necessary equipment to establish and maintain a synchronous condition.
Panel Statement: This revision incorporates cComments 3-262, 13-263, 13-265, 13-266, and 13-267.
• Typographical error - "Point of Common Coupling" definition was removed from the Utility interactive inverter Output Circuit definition.
• Listed Solar Photovoltaic Systems and Fuel Cell Systems in Table 705.3 and removed Exceptions (1) and (2) for these systems, respectively
• Deleted second sentence in 705.4, requiring interconnection system equipment to be listed.
• Revised 705.12 to reflect Hornberger Ballot Comment on proposal 13-184.
• Added requirement for a lockable disconnect in 705.22
• Added overcurrent protection reference for utility interactive inverters to 705.30
• Added overcurrent protection reference for generators to 705.30
• Deleted the word "normally" in the last sentence of 705.40
• Deleted the phrase "the alternating-current output conductors from the inverter and" from 705.70(3).
• Deleted the phrase "a sufficient number of" in the second sentence of the text for 705.130.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 14 Negative: 1
Ballot Not Returned: 1 Gustafson, R.
Explanation of Negative:
HORNBERGER, B.: I agree with the panel action, however, the panel discussed recommending that a Task Group be formed to review the redundant "Point of Connection" requirements for PV in 690, Fuel Cells in 692 and Interconnected Electric Power Sources in 705. There is no mention of this in the panel statements. The panel harmonized most of these requirements through their actions on Comments 13-77, 13-97 and 13-262. Photovoltaic and Fuel Cell systems are "Interconnected Electric Power Sources", when they operate in parallel with another supply source. Article 705 should apply. Point of connection requirements in Articles 690 and 692 should only contain "special" considerations that pertain to the specific power source technologies.
Comment on Affirmative:
BOWER, W.: These comments are primarily editorial in nature.
Under 705.2 Definitions, the term "utility interactive" should be hyphenated and the periods after source and utility should be changed to commas.
Under Table 705.3, the Other Articles should be listed with consistency by capitalizing each term in the titles.
Under 705.4, the term "Utility-Interactive Inverters" should be "Utility-interactive inverters" and I don't understand the identified for interconnection service. This should be changed to reflect UL marking requirements.
Under 705.12, the 692.65 should be deleted as it was likely a carryover from cut and paste editing.
Under 705.12(C) the term "KW" should be "kW". Additionally, the 100kW requirement that is already in 705 seems over restrictive by requiring qualified persons to operate every system above 100kW. This limit should be considered by a task group for future editions.
Under 705.12(D) the term "Utility Interactive" in the title should be "Utility-interactive".
Under 705.12(D)(3) the term "Ground Fault" should be "Ground-fault" and the exception should be italics.
Under 705.21, the term "utility interactive" should be hyphenated.
Under 705.22(4), the term "cared" should be changed to "carried". Also, I believe the numbering 1-4 should be lettered A-D.
Under 705.30(D) the term "utility interactive inverter" should be "Utility-interactive inverters" in both instances.
Under 705.40 Exception and FPNs, correct the terms to "utility-interactive inverter".
Under 705.60(B), the word "system" should be deleted and "currents" changed to "current" since inverter current is sufficient. Inverter system is undefined in the code.
Under 705.65, change the periods after supply, circuits, transformer and transformer to commas.
Under 705.65(C) change the periods after increments and breakers to commas and change the term "staring" to "starting".
Under 705.65(D) change the period after breakers to a comma.
Under 705.65(E), the language does not make sense. It is unclear what is meant by two or more modules for this generic section. It is suggested that 705.65(E) be deleted since it does not make sense and appears to be not applicable to inverters.
Under 705.70, I believe the list should be labeled A through D and not 1 through 4. Also the reference in (3) should be to both 705.21 and 705.22.
Unde
r 705.80 the term utility-interactive should be "Utility-interactive" in both instances.
Under 705.82, the second "Hybrid Systems" should be "Hybrid systems".
Under 705.100, the terms "and ac modules" and "and 3-phase ac modules" should be deleted. AC modules are covered under Article 690. Also the periods after "of" and "unbalanced" should be changed to commas.
Under the "Panel Statement", the exceptions (1) and (2) (as stated) were not removed. However, they should not have been removed since they still apply. The listing of Solar Photovoltaic Systems and Fuel Cells in the table should remain in the table.
GENERAL COMMENT ABOUT ARTICLE 705. THIS ARTICLE IS FULL OF WHOLESALE REFERENCES TO COMPLETE ARTICLES WITHIN THE CODE. IT IS RECOMMENDED THAT A TASK GROUP REVIEW AND REWRITE THE ENTIRE ARTICLE TO COMPLY WITH THE STYLE MANUAL AND TO INCLUDE COMPLETE INDUSTRY INPUTS.
KRASTINS, K.: The following comments should be considered prior to incorporation of the proposal as currently worded in the ballot.
(a) For better clarity, revise the last sentence of 705.4 to read: "Utility-interactive inverters connected in parallel with a primary source of electricity shall be listed as suitable for such applications."
(b) Add the definite article "the" after the word "be" in 705.60(A)(1).
(c) Change "output circuit" to "output circuits" in the first sentence of 705.65(A).
(d) In 705.95, change "anyone" to either "any," "any one," or "any single." Anyone refers to a person; not a conductor.
STAFFORD, T.: The Panel action was correct and this member agrees with the panel action. The increasing use of alternative power sources, other than utility supplied, increases the complexity and the safety requirements for paralleled electric power systems. By including Article 690, Solar Photovoltaic Systems, and Article 692, Fuel Cell Systems, in Article 705, there is a commonality among all power sources and their interconnection requirements with the utility distribution system.

ZGONENA, T.: This affirmative vote will allow us to benefit from the substantial work performed on this proposal. Unfortunately, this large proposal that incorporates many significant issues, was modified by the CMP 13 705 Task Group and is now addressed as a single proposal. The present proposal is not implemented in a manner that addresses all utility interconnected product types equally. One of the revision made to 705.4, deleted the requirement for all interconnection system equipment to be listed. Engine Generators like other utility interactive devices should be evaluated and Listed for utility interconnection, especially since engine generators have significantly more fault current than other DG sources.
To vote against this proposal would jeopardize the significant amount of this valuable work. The requirement for Listed Equipment will need to be addressed in the 2011 code.

13-263 Log #1187 NEC-P13 **Final Action: Accept in Principle (705)**

Submitter: Neil F. LaBrake, Jr., National Grid / Rep. Edison Electric Insitute-Electric Light & Power Group
Comment on Proposal No: 13-184
Recommendation: The Panel action rewrite of the original proposal should be revised to incorporate Mr. Hornberger's ballot comment, revising the proposed sections 705.12 and 705.22. The text from Mr. Hornberger's ballot comment is repeated here for convenience with edits underlined:
705.12 Point of Connection. The output of an interconnected electric power source shall be connected as specified in 692.65(A), (B), (C), or (D).
(A) Supply Side. Any interconnected electric power source shall be permitted to be connected at the premises service disconnecting means, beyond the point of common coupling.
(B) Integrated Electric Systems. The outputs shall be permitted to be interconnected at a point or points elsewhere on the premises where the system qualifies as an integrated electric system and incorporates protective equipment in accordance with all applicable sections of Article 685.
(C) Greater Than 100 KW The outputs shall be permitted to be interconnected at a point or points else where on the premises where all of the following conditions are met:
(1) The aggregate of non-utility sources of electricity has a capacity in excess of 100 KW, or the service is above 1,000 Volts.
(2) The conditions of maintenance and supervision ensure that qualified persons service and operate the system.
(3) Safeguards, documented procedures, and protective equipment are established and maintained.
(D) Utility Interactive Inverters rated less than 100 KW The output of a utility interactive inverter power source with a capacity of less than or equal to 100 KW shall be permitted to be connected as specified in either 705.12(D)(1) or 705.12(D)(2) or 705.12(D)(3).
(1) Load Side. A utility-interactive inverter shall be permitted to be connected to the load side of the service disconnecting means of the other source(s) at any distribution equipment on the premises, provided that all of the following conditions of 705.12(D)(1)(a) through 705.12(D)(1)(e) are met:
(a) Dedicated Overcurrent and Disconnect. Each source interconnection shall be made at a dedicated circuit breaker or fusible disconnecting means.
(b) Ground Fault Protection. The interconnection point shall be on the line side of all ground-fault protection equipment.
(c) Marking. Equipment containing overcurrent devices in circuits supplying power to a busbar or conductor shall be marked to indicate the presence of all sources.
(d) Suitable for Back Feed. Equipment such as circuit breakers, if backfed, shall be identified for such operation.
(e) Bus or Conductor Rating. The rating of the bus or conductor to which the utility-interactive inverter breaker or fusible disconnect is connected shall meet all of the conditions in 705.12(D)(1)(a)(1) or 705.12(D)(1)(a)(2)
(2) End Feed Connection. Where the utility-interactive inverter breaker or fusible disconnect is connected in the distribution equipment at the opposite (load) end from the input feeder connection or main circuit location, the bus or conductor rating shall be equal to or larger than the sum of the ampere ratings of all overcurrent devices connecting premise electric power production sources to the bus or conductor. The bus or conductor rating shall have been sized for the loads connected, in accordance with Article 220. A permanent warning label shall be applied to the distribution equipment with the following or equivalent:
WARNING
ELECTRIC POWER PRODUCTION SOURCE OUTPUT
DO NOT RELOCATE THIS OVERCURRENT DEVICE.
(3) General Connection. Where the utility-interactive inverter breaker or fusible disconnect is not end fed, the bus or
conductor rating shall be equal to or larger than the sum of the ampere ratings of overcurrent devices in circuits
supplying power to the busbar or conductor.
Exception: For a dwelling unit, the sum of the ampere ratings of the overcurrent devices shall not exceed 120 percent of the rating of the busbar or conductor.

705.22 Disconnect Device
The disconnecting means for ungrounded conductors shall consist of a manually or power operable switch or circuit breaker with the following features:
(1) Located where readily accessible
(2) Externally operable without exposing the operator to contact with live parts and if power operable, of a type that can be opened by hand in the event of a power supply failure.(3) Plainly indicating whether in the open (on) or closed (off) position
(4) Having ratings not less than the load to be carried and the fault current to be interrupted
(5) Lockable in the open position.
Substantiation: 705.12 should be reworded as shown to incorporate changes accepted in Proposals 13-61 for 690.64(B)(2) and 13-74 for 692.65(B)(2), and generalized for Utility Interactive Inverters. Also, revise 705.22, as shown, to reinstate the requirement for a "Lockable Disconnect" for the AC output circuits. This disconnect is essential to provide positive and visible confirmation that an interconnected power source has no possible method to backfeed electrical energy into a system which has been de-energized for maintenance or to meet the needs of emergency first response personnel. This requirement is necessary so qualified personnel can lockout the source of electrical current as required in many OSHA and NFPA 70E regulations.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-262.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Gustafson, R.

13-264 Log #2199 NEC-P13 **Final Action: Reject (705)**

Submitter: Kenneth Krastins, Plug Power, Inc. / Rep. US Fuel Cell Council
Comment on Proposal No: 13-184
Recommendation: Reject the proposed change.
Substantiation: The panel acknowledged the value of such a proposal and accepted this proposal in principle to permit public comment of the proposal. Comments have been received and will be reviewed further at the CMP-13 ROC meeting in November. But, feedback to this point indicates that to adequately address the concerns of a change of this magnitude and craft language that will neither omit nor introduce wording that will compromise safety for the affected industries that a working group will need to convene to provide a comprehensive proposal for the 2011 NEC. The proposal should be rejected by the panel to ensure that the changes indicated in the 2008 NEC ROP are not inadvertently included in the final publication.
Panel Meeting Action: Reject
Panel Statement: This change to Article 705 would have permitted application of utility-interactive inverter interconnections for technologies other than solar photovoltaic and fuel cells, e.g., wind, micro-hydro, combined heat and power, micro-turbines, etc. This change has had public review with few comments that have been addressed by the panel action on Comment 13-262.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Gustafson, R.

13-265 Log #2299 NEC-P13 **Final Action: Accept in Principle (705)**

Submitter: Todd Stafford, IBEW-NJATC / Rep. IBEW
Comment on Proposal No: 13-184
Recommendation: Revise wording to include the changes, if any, that are made to sections 690.64(B)(2), and 692.65(B)(2), and 705.22 as recommended by Hornberger.
Substantiation: While I agree with the panel action, the comment submitted by Hornberger needs to be addressed. The TCC recommends that additional consideration be given to the comments submitted as well.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 13-262.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Gustafson, R.

13-266 Log #2337 NEC-P13 **Final Action: Accept in Principle (705.4)**

Submitter: Alan Manche, Square D Company
Comment on Proposal No: 13-185
Recommendation: The Panel Action on 13-184 should continue to be "Accept in Principal in Part" but the Panel should reconsider and reject the entire portion of Proposal 13-185 dealing with 705.4.
Substantiation: A requirement for the system to be listed for this particular application has not been justified. And, listing of an electrical system of this

nature is not practical unless the CMP intends to exclude most of the kinds of systems that are installed and operated safely today. 705.4, as it reads in the ROP, would require the system (electrical equipment, alternate power source and controls, raceway, wire size…) to all be a documented assembly.

As accepted at the ROP stage, 705.4 will require listing of "interconnection systems." This term is not defined in the NEC, and where it is defined in standards, it is such a broad term that the ability to obtain listings for all such systems seems highly questionable. 705.4 also calls for identification for "interconnection service." This is an undefined term, and there are no standards requiring such identification.

Mr. Daley's proposed text and substantiation, in an attempt to build support for product listing, lends support to just the contrary. His substantiation "It is necessary to expand the description of what is acceptable because many interconnection systems are site specific and would be comprised of recognized components suitable for the intended use" indicates the need to use various manufacturer's equipment and various components to make the system work safely and reliable. Note his substantiation that these are very "site specific" and are each unique in construction and assembly.

The panel states that "a compilation of components would not necessarily meet the requirements for interconnection systems unless tested as a complete system. In addition, the submitter gave no technical substantiation for this part of the proposal." So if the equipment is required to be listed and Mr. Daley is explaining that it takes various components to make the system work, how does the panel believe the system can now be installed, work appropriately and comply with the NEC?

Paralleling switchgear will often include various manufacturer's sections, which are interconnected on the job, and that are not assembled in a factory location where UL could list the product assembly. Mr. Daley acknowledges the need to have provisions for field installed components that will modify the equipment in the field. As an example, consider the fact that the electrical gear will be supplied without knowing what generator manufacturer is going to be used. Generator controls will be installed in the field within the gear that are not tied to the listing of the gear. The UL Listed assembly will now have been modified.

Now let's review the UL White Book --- **"What happens to the Listing if a UL-Listed product is modified in the field?** An authorized use of the UL Mark is the manufacturer's declaration that the product was originally manufactured in accordance with the applicable requirements when it was shipped from the factory. When a UL-Listed product is modified after it leaves the factory, UL has no way to determine if the product continues to comply with the safety requirements used to certify the product without investigating the modified product. UL can neither indicate that such modifications ''void'' the UL Mark, nor that the product continues to meet UL's safety requirements, unless the field modifications have been specifically investigated by UL. It is the responsibility of the Authority Having Jurisdiction (AHJ) to determine the acceptability of the modification."

In effect the UL mark does not support modifications, such as the above, in the field unless it is field evaluated. The UL mark is a valuable mark to ensure equipment meets specific safety standards, however, in this case what benefit is the listing if the equipment is going to be modified and the third party will not (can not be expected to) stand behind that mark after the system is installed?

Understanding the safe operation of the system is a field installation issue not an equipment issue. The only method to understand if the system will operated safely is to evaluate the completed installation, which includes the assembled equipment in conjunction with the alternate source such as generators and generator controls, to ensure a safe and reliable system.

Concerns expressed in the Proposal somewhat parallel another in the NEC – ground-fault protection of equipment. There is no listing requirement for ground fault protection of equipment in NEC 230.95, even though the concern there, as in this situation, is that it will operate appropriately after the installation is complete.

There is no substantiation that Listed equipment will resolve any safety concerns expressed in the substantiation of this proposal. Based upon the present language, it will be nearly impossible to be NEC compliant due to this listing requirement, except on simple systems. And, the simply system is not what the submitter is targeting in his proposal.

It is recognized that proposed language in 13-185 was incorporated into proposal 13-184 however the comment has been made this proposal since the substantiation and panel statement for acceptance is provided in proposal 13-185.

The proposal to add 705.4 should be Rejected.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action on Comment 13-262. The requirement for listing all interconnection equipment was removed, and a requirement to list utility-interactive inverters was added. The remaining requirement for approved equipment is consistent with 110.2.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 15

Ballot Not Returned: 1 Gustafson, R.

Comment on Affirmative:

ZGONENA, T.: See My Affirmative with Comment on 13-262.

13-267 Log #315 NEC-P13 **Final Action: Accept in Part (705.12 and 705.12(B) & (C))**

TCC Action: The Technical Correlating Committee directs that the sentence added to 705.12(C)(6) from Comment 13-75 have the following corrections:

"In systems with ~~series-connected~~ panelboards connected in series, ~~panel-boards~~ or ~~sub-panels~~ the rating of the first overcurrent device directly connected to the output of a utility-interactive inverter(s) shall be used in the calculations for all busbars and conductors." The text will now read as follows:

"(6) Bus or Conductor Rating. Unless the panelboard is rated not less than the sum of the ampere ratings of all overcurrent devices supplying it. a connection in a panelboard shall be positioned at the opposite (load) end from the input feeder location or main circuit location. In systems with ~~series-connected~~ panelboards connected in series, ~~panel boards~~ or ~~sub-panels~~ the rating of the first overcurrent device directly connected to the output of a utility-interactive inverter(s) shall be used in the calculations for all busbars and conductors. A permanent warning label shall be applied to the distribution equipment with the following or equivalent wording:

WARNING
ELECTRIC POWER PRODUCTION SOURCE OUTPUT
DO NOT RELOCATE THIS OVERCURRENT DEVICE

Submitter: Code-Making Panel 9,

Comment on Proposal No: 13-184

Recommendation: Modify the panel action text in 705.12 and 705.12(B) and (C) as follows (legislative format in this comment applies to differences from the CMP-13 action text, and not in respect to the 2005 NEC):

705.12 Point of Connection. The outputs of electric power production systems shall be interconnected with a primary source(s) as specified in either (A) or (B) ~~or (C)~~. Distribution equipment fed by both primary and electric power production sources shall also comply with (C).

~~(B) Greater than 100kW Location. the outputs shall be permitted to be interconnected at a point or points elsewhere on the premises where all of the following conditions are met:~~

~~(1) The aggregate of non-utility sources of electricity has a capacity in excess of 100 kW, or the service is above 1000 volts.~~

~~(2) The conditions of maintenance and supervision ensure that qualified person service and operate the system.~~

~~(3) Safeguards, documented procedures, and protective equipment are established and maintained.~~

~~(C) Less than or equal to 100 kW.~~ The output of an interactive power source ~~with a capacity of less than or equal to 100 kW~~ shall be connected as specified in either (1) or (2):

(1) Supply Side. An electric ~~A photovoltaic~~ power production source shall be permitted to be connected to the supply side of the service disconnecting means as permitted in 230.82(6).

(2) Load Side. An electric ~~A photovoltaic~~ power production source shall be permitted to be connected to the load side of the service disconnecting means of the other source(s) at any distribution equipment on the premises, provided that all of the ~~following~~ conditions in (C) are met.

(C) Interconnection Limitations for Distribution Equipment. Where distribution equipment, including switchboards and panelboards, is fed simultaneously by a primary source(s) of electricity and one or more electric power production sources, and where this distribution equipment is capable of supplying multiple branch circuits or feeders or both, the interconnecting provisions for the electric power production sources shall comply with (1) through (6).

(1) ~~(a)~~ Dedicated Overcurrent and Disconnect. Each source interconnection shall be made at a dedicated circuit breaker or fusible disconnecting means.

(2) ~~(b)~~ The sum of the ampere ratings of overcurrent devices in circuits supplying power to a busbar or conductor shall not exceed 120 percent of the rating of the busbar or conductor.

~~Exception: For a dwelling unit, the sum of the ampere ratings of the overcurrent devices shall not exceed 120 percent of the rating of the busbar or conductor.~~

(3) ~~(c)~~ Ground Fault Protection. The interconnection point shall be on the line side of all ground-fault protection equipment.

Exception: Connection shall be permitted to be made to the load side of ground-fault protection, provided that there is ground-fault protection for equipment from all ground-fault current sources. Ground-fault protection devices used with supplies connected to the load-side terminals shall be identified and listed as suitable for backfeeding.

(4) ~~(d)~~ Marking. Equipment containing overcurrent devices in circuits supplying power to a busbar or conductor supplied from multiple sources shall be marked to indicate the presence of all sources.

~~Exception: Equipment with power supplied from a single point of connection:~~

(5) ~~(e)~~ Suitable for Back Feed. Circuit breakers, if backfed shall be identified for such operation. ~~Dedicated circuit breakers backfed from listed utility interactive inverters complying with 690.60 shall not be required to be individually clamped to the panelboard busbars. A front panel shall clamp all circuit breakers to the panelboard busbars. Main circuit breakers connected directly to energized feeders shall also be individually clamped.~~

(6) Bus or Conductor Rating. Unless the panelboard is rated not less than the sum of the ampere ratings of all overcurrent devices supplying it, a connection in a panelboard shall be positioned at the opposite (load) end from the input feeder location or main circuit location. A permanent warning label shall be applied to the distribution equipment with the following or equivalent wording:

WARNING
ELECTRIC POWER PRODUCTION SOURCE OUTPUT
DO NOT RELOCATE THIS OVERCURRENT DEVICE

Substantiation: Although the Technical Correlating Committee requested CMP-9 comment on Proposal 13-61, and the panel has done so, the technical issues raised in that and in the associated proposals apply to all systems capable of interconnection and parallel operation using multiple sources. For this reason, CMP-9 believes that the CMP-13 actions in Articles 690, 692, and 705 must be correlated in this respect, and is providing comments to the comparable proposals and panel actions in all of these articles.

CMP-9 agrees that it is possible to assure that the busbars of panelboards receiving supply current from two sources can be arranged so the busbars will not exceed their ampacity (the "opposite end" scenario accepted under Proposal 13-6, however, CMP-9 points out that such an arrangement allows for up to double the amount of load to be taken from the panel for the indefinite periods of time. Current product standards do not anticipate the effect of I2R heating losses under these conditions, which could severely impact the performance of essential components within the distribution equipment. Before the NEC recognizes this type of connection, it is essential that careful testing be carried out to determine the acceptable parameters that should be applied in these cases.

For example, if a windmill provides 100 amperes of power to a panel in an interactive system rated 100 amperes, and this panel is supplied by a normal utility supply of 100 amperes the branch circuit and feeder loads supplied by this panel could total 200 amperes. Although such a load should not exist due to required sizing rules relative to Article 220 calculations, the requirement for individual protection for panelboards (now set to apply to all panelboards by virtue of CMP-9 action in this cycle) anticipates that these load calculations are easily circumvented given the relative ease of circuit modifications.

Although the panel action on this proposal did not include the double-ended wording, nevertheless such an arrangement is possible in the current NEC and continues to lurk in the panel action text. This is because the current (and proposed) 705.12(B) allows this (in fact, there isn't even an opposite end requirement in this provision) for larger systems. CMP-9 offers this comment to address this issue, as well as a number of inconsistencies and Style Manual issues within this section as well. This comment does not apply to any wording in Article 705 other than that in 705.12. A detailed analysis follows.

This comment creates a separate subsection to address the double-feed issue, because it is common to both over and under 100 kW systems. In fact, it may be even more compelling on the larger systems. One member of CMP-9 personally wired a 120 kW cogeneration system interconnection into a remote lighting and appliance branch circuit panelboard for no reason other than it was the closest convenient connection point, and the NEC allowed it to happen. These applications are generally more likely to create the conditions for concern expressed in this comment than the relatively limited energy available from typical PV connections.

Therefore, this comment removes the PV language from the panel action text. In addition, CMP-9 points out that since the content of (C) accepted by CMP-13 only addresses PV interconnections, the entirety of (C) as drafted by CMP-13 is beyond the article's reach because 705.3 Exception No. 1 cedes control of PV systems to Article 690. This comment redraws (C) so it coves the sources generally controlled by Article 705. It also removes the language on PV inverters and the associated circuit breaker rules because this language will be in Article 690 and only confuses what should be a rule applicable to all connections unless modified per 705.3, Exception No. 1. Note also that Article 692 will have comparable rules, enforceable here through 705.3, Exception No. 2, but which are not addressed in the panel action text on this proposal. This comment avoids these pitfalls. This comment also builds the exception for single source connections into the parent rule, using positive language and avoiding the Style Manual violation of an exception that fails to use a complete sentence.

This comment removes the distinctions between the over and under 100 kW systems, because the CMP-13 actions to allow a small system interconnection downstream from the service make continuing these distinctions pointless. Under the action on this proposal, both large and small systems can use remote connections by right. It is true that the larger systems have the remote connection allowance conditioned on qualified personnel and the usual safeguards, but a large system connected at the service has the same incident energy (perhaps more since conductor impedance is proportionately lower). Therefore, if CMP-13 wants to continue these qualification and equipment safeguards, etc., it can and should do so in a different section where they would apply regardless of where the point of connection falls.

CMP-9 expresses its willingness to assign a task group to work with CMP-13 and other interested industry parties to provide a carefully substantiated global approach to double-fed distribution equipment applied in interactive settings for the 2011 NEC. This might include specially targeted allowances for equipment listings that would cover such interconnections. In the meantime, this comment does broaden the 120 percent allowance from dwellings to all occupancies. Because of the I2R relationship, an allowance for an additional 20 percent loading (one fifth) would only increase the heating losses by 4 percent (one twenty fifth), which should be tolerated by existing equipment designs even if the interconnection does not occur at the opposite end of the bus from the normal supply. This comment incorporates the opposite-end rule from the CMP-13 action on Proposal 13-74 as a tradeoff for the occupancy expansion, thereby ensuring that an overloaded busbar does not exacerbate the heating problem.

This comment has been balloted through CMP-9 with the following balloting results.

11 Eligible to Vote
10 Affirmative
1 Not Returned (H. deVega)

Panel Meeting Action: Accept in Part

The panel accepts in part as follows:

• Accept the recommendations for the supply side connection point.

• Incorporate the breaker clamping requirement and the 120% source capacity limit for sizing a panel board in the load side to be consistent with changes proposed for the interconnection requirements in 690.64 and 692.65.

• Reject eliminating interconnection requirements to Integrated Systems and General sections as eliminating these sections has not had proper public review.

• The panel requests that the TCC consider including the text from Comment 13-75 regarding series panel board, if included in Article 690 of the 2008 NEC.

Panel Statement: See panel action and statement on Comment 13-262.
Number Eligible to Vote: 16
Ballot Results: Affirmative: 15
Ballot Not Returned: 1 Gustafson, R.

ARTICLE 720 — CIRCUITS AND EQUIPMENT OPERATING AT LESS THAN 50 VOLTS

3-91 Log #1205 NEC-P03 **Final Action: Accept (720.10)**

Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 3-5
Recommendation: The NEC TCC Grounding and Bonding Task Group concurs with CMP-3 action on 720.10 since Proposal 3-136 will delete this section.
Substantiation: This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 725 — CLASS 1, CLASS 2, AND CLASS 3 REMOTE-CONTROL, SIGNALING, AND POWER-LIMITED CIRCUITS

3-92 Log #758 NEC-P03 **Final Action: Accept in Principle (725.2)**

TCC Action: The Technical Correlating Committee directs that the panel action be revised into a Fine Print Note to read as follows:
"FPN: See 725.21 for voltage and power limitations of Class 1 circuits."
This change is made to comply with 4.1.2 of the NEC Style Manual.

Submitter: David B. Wechsler, The Dow Chemical Company
Comment on Proposal No: 3-142
Recommendation: Revise as follows:

Class 1 Circuit. The portion of the wiring system between the load side of the overcurrent device or power-limited supply and the connected equipment. ~~The voltage and power limitations of the source are in accordance with 725.21.~~

Substantiation: 725.2 is a definition section for Article 725. The text shown as needing to be deleted represents a requirement. NFPA Style Manual prohibits a requirement within a definition. 725.21 contains these requirements.
Panel Meeting Action: Accept in Principle
Revise the second sentence of the existing definition as follows:
The voltage and power limitations of Class I circuits are located in 725.21.
Panel Statement: The panel has revised the second sentence so that it is not mandatory language.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-93 Log #1807 NEC-P03 **Final Action: Reject (725.2, 725.11, 725.15, 725.21, and 725.22)**

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 3-142
Recommendation: Accept this proposal.
Substantiation: The submitter's intent was to delete remote control and signaling from Article 725, rather to better align with similar concepts in other articles so the applications can still be utilized under the appropriate design application. The changes do not delete these applications, uses more general terms that still meet the current intent.
Panel Meeting Action: Reject
Panel Statement: Remote control and signaling circuits may be used in various other parts of the Code, but a single point of reference in an article for Class 1 power limited circuits, as well as non-power-limited Class 1 circuits, are much easier for the user of the Code to understand and access. Class 1,

Class 2, and Class 3 remote control, power limited and signaling circuits must remain in Article 725.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-94 Log #1603 NEC-P03 **Final Action: Accept**
(725.2 and 760.2)

Submitter: Allen C. Weidman, Society of the Plastics Industry, Inc.
Comment on Proposal No: 13-1
Recommendation: The Society of the Plastics Industry supports the removal of abandoned cables. One of our member companies is in the business of removing abandoned cables from buildings.
Substantiation: A single definition of "abandoned cable" is inappropriate to cover audio, information technology, class 2, class 3, fire alarm, optical fiber, communications, CATV and network-powered broadband because each of these cable types has its own installation practices that must be accommodated in the definition of "abandoned cable" to avoid inappropriate and unnecessary removal.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-95 Log #1222 NEC-P03 **Final Action: Accept**
(725.3)

Submitter: John Burke, Fusion Cable Systems
Comment on Proposal No: 3-144
Recommendation: Continue to Reject this Proposal.
Substantiation: We remove old and unused cable as part of our standard business practice especially in retrofit jobs. The amount of old cable on some jobs has caused damage to the building and created unsafe working conditions for our techs. We support continuing the abandoned cable removal requirement in the Code.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-96 Log #1437 NEC-P03 **Final Action: Accept in Principle**
(725.3 and 725.25 (New))

TCC Action: The Technical Correlating Committee directs that the text of the first sentence of 725.3(B) be revised for clarity as follows:
"Installation of Class 1, Class 2, and Class 3 circuits shall comply with 300.21."
Submitter: Allen C. Weidman, The Society of the Plastics Industry, Inc.
Comment on Proposal No: 3-148
Recommendation: Accept this proposal in principle by moving the requirement to remove abandoned cables to new section 725.25.
Substantiation: The Society of the Plastics Industry supports the removal of abandoned cables. One of our member companies is in the business of removing abandoned cables from buildings.
Reconsider this SPI proposal. Moving the requirements to 725.25 will maintain parallelism with Articles 770, 800, 820 and 830.
Panel Meeting Action: Accept in Principle
Remove the last sentence in 725.3(B) and add mandatory text to the reference of 300.21 as follows:
725.3(B) Spread of Fire or Products of Combustion. Section 300.21 shall provide the requirements for installations concerning the spread of fire or products of combustion. ~~The accessible portion of abandoned Class 2, Class 3, and PLTC cables shall be removed.~~
Panel Statement: The added text to 725.3(B) does not change the intent of the reference to 300.21 but provides the mandatory text to require compliance with 300.21 in accordance with the NEC Style Manual. See the panel action on Comment 3-111.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-97 Log #1604 NEC-P03 **Final Action: Accept in Principle**
(725.3 and 725.25 (new))

Submitter: Allen C. Weidman, Society of the Plastics Industry, Inc.
Comment on Proposal No: 3-148
Recommendation: Accept this proposal in principle by moving the requirement to remove abandoned cables to new section 725.25.
Substantiation: The Society of the Plastics Industry supports the removal of abandoned cables. One of our member companies is in the business of removing abandoned cables from buildings.
Reconsider this SPI proposal. Moving the requirements to 725.25 will maintain parallelism with Articles 770, 800, 820 and 830.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comments 3-96 and 3-111.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-98 Log #1434 NEC-P03 **Final Action: Accept**
(725.3 and 760.3)

Submitter: Allen C. Weidman, The Society of the Plastics Industry, Inc.
Comment on Proposal No: 3-145
Recommendation: Continue to reject these proposals.
Substantiation: The Society of the Plastics Industry supports the removal of abandoned cables. One of our member companies is in the business of removing abandoned cables from buildings.
Section 300.11 (Securing and Supporting) requires that "Raceways, cable assemblies, boxes, cabinets, and fittings shall be securely fastened in place." It is not possible to remove all abandoned cables if the installation complies with 300.11 and the cables are installed behind a wall.
The Society of the Plastics Industry recommends rejection all proposals that recommend the removal of all abandoned cables rather than the accessible portion of abandoned cables.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-99 Log #1608 NEC-P03 **Final Action: Accept**
(725.3 and 760.3)

Submitter: Allen C. Weidman, Society of the Plastics Industry, Inc.
Comment on Proposal No: 3-145
Recommendation: Continue to reject these proposals.
Substantiation: The Society of the Plastics Industry supports the removal of abandoned cables. One of our member companies is in the business of removing abandoned cables from buildings.
Section 300.11 (Securing and Supporting) requires that "Raceways, cable assemblies, boxes, cabinets, and fittings shall be securely fastened in place." It is not possible to remove all abandoned cables if the installation complies with 300.11 and the cables are installed behind a wall.
The Society of the Plastics Industry recommends rejection all proposals that recommend the removal of all abandoned cables rather than the accessible portion of abandoned cables.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-100 Log #1264 NEC-P03 **Final Action: Accept in Principle**
(725.3(B) and 760.3(A))

Submitter: Sanford Egesdal, Egesdal Associates PLC
Comment on Proposal No: 3-148
Recommendation: Accept Proposals 3-148 and 3-219.
Substantiation: The removal abandoned cable belongs in its own section in Part I.
I agree with Mr. Casparro's comments in the negative on this subject: See Proposals 3-146 and 3-217.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action and statement on Comment 3-111.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-101 Log #380 NEC-P03 **Final Action: Accept**
(725.8)

Submitter: Melvin K. Sanders, Ankeny, IA
Comment on Proposal No: 3-155
Recommendation: Proposal 3-155 should have been Accepted to allow cable ties to be used to secure Class I, Class 2 and Class 3 circuit cables and conductors.
Substantiation: A discussion of this proposal with many electric industry representatives did not indicate any problem with this long standing practice of securing these cables and conductors. In addition, there are no specific spacing requirements for the presently permitted support methods and experience has proven that workmanship recognizes where undue sags or spacing occurs and supports are added at that time. Cable ties would and do provide a quick easy method to do so.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 9 Negative: 4

Explanation of Negative:

CASPARRO, P.: Cable ties were designed to tie cables together not to support cables. I realize that we are talking about Class 1, Class 2 and Class 3 cables and if we start to support multiple cables in a bundle, we are looking at serious safety issues. With no strength requirement and minimum spacing intervals this installation can be an accident waiting to happen.

EGESDAL, S.: This comment should have been rejected, based on the Standards Council's decision on NFPA 90A. UL lists cable ties for installation in HVAC system plenums. Rejecting this comment would be consistent with the action taken by Panel 3 on comments 3-134, 3-164, and 3-176, which suggested a trivial editorial change to NFPA 262 listing requirements. The Panel used the NFPA 90A directive to reject these 3 comments.

Additionally, the submitters of comments did not provide technical substantiation to respond to the panel statement on proposal 3-155, as follows. "It is not acceptable to use a cable tie to serve as a sole support for a cable when there is no spacing requirement provided for the distance between supports." Further, the proposals, comments, and panel statements provide no technical substantiation for panel action that would require all hardware used to support these cables to be listed. Code-making panels 7 and 8 have steadily rejected similar proposals relating to the support of cables and raceways.

KEDEN, R.: I am voting negative to the Committee Actions for Comment No. 3-101, 3-102, 3-105, and 3-107. Since all these comments pertain to the same issue, my following reason is the same for all four comments.

Reason: Cable ties were originally introduced to tie cables together (thus the name "cable tie") into bundles. This application does not require special strength or spacing instructions. Even if one, or all, cable ties in a run of cables degrade or rip apart, there is no safety issue involved, since these bundles are contained in cable trays, surface raceways, J-Hooks and the like.

The picture changes, however, if cable ties, possibly with the addition of an eyelet, are made the sole support for a cable bundle. Imagine this to be cable carrying dangerous levels of energy and running across the ceiling in a factory above a path frequently travelled by a forklift. With no strength requirement and maximum spacing interval, this installation can be a catastrophe in waiting. I know about a plastic cable tie, designed to break at about 25 lbs. so not to indent sensitive data cable bundles. No requirement to not use them for hanging cables? Cable bundles and conduit are attached safely to structures and substructures with listed support hardware tested according to UL 2239 (ANSI approved) "Hardware for the Support of Conduit, Tubing, and Cable". Most cable ties could not pass this standard, however, hangers, staples, straps and beam clamps have to in order to become listed. This is a safety issue and NFPA should not sanction this industry "practice."

OWEN, S.: Cables ties were originally introduced to tie cables together in bundles - not to support cables. Generally when installing cable ties, the application does not require a special strength rating of the cable tie, or spacing instructions. If one or more cable ties installed in a run of cables degrades or rips apart (breaks), there is no safety issue involved when these bundles are contained in cable trays, surface raceways, J-hooks and the like.

The issue of safety changes if the cable ties are installed as the means of support, rather than bundling cables together. With no strength requirement and maximum spacing interval, this installation could become a dangerous installation.

Cable bundles and conduit are attached safely to structures and substructures with listed support hardware tested according to UL 2239 (ANSI approved) Hardware for the Support of Conduit, Tubing, and Cable. Most cable ties could not meet the requirements of this standard, whereas, hangers, staples, straps and beam clamps are required to meet this standard in order to become listed.

The use of cable ties as support devices is a safety issue and should not be permitted.

Comment on Affirmative:

AYER, L.: Cable ties are included in similar text in Articles 320, 330, and 334. These items have provided support for Type AC, Type MC, and Type NM cables for years without incident or hazard. To not allow cable ties to be used to support Class 2 or Class 3 low voltage and low energy wiring would not be consistent with the other parts of the code. Since cable ties can support the far heavier wiring methods mentioned in Chapter 3, they should also be allowed to be used to support Class 2 or Class 3 low voltage wiring methods in Article 725.

EASTER, L.: The panel should have accepted Comment 3-102 by T. McNeieve and specified a minimum loop tensile strength that provides primary support for such cables and that the cable ties need not be listed.

3-102 Log #484 NEC-P03 **Final Action: Accept in Part (725.8)**

Submitter: Timothy P. McNeive, Thomas & Betts Corporation
Comment on Proposal No: 3-155
Recommendation: Change the panel action to Accept in Principle. Add the additional text suggested in the comment on negative vote by Mr. Easter:

"Cable ties that provide primary support for such cables shall have a minimum loop tensile strength of 23 kg (50 lbs)."

Substantiation: "Minimum loop tensile" strength is commonly marked on packages of cable ties. The 23 kg minimum for cable support is well representative of typical straps, hangers and staples listed for flexible conduit and cable support in accordance with UL 2239, Hardware for Support of Conduit, Tubing and Cable. The panel is also asked to follow the long time positions of CMP-7 and 8 and not consider in its final decision, the requirement that cable ties or other support hardware to be listed.

Panel Meeting Action: Accept in Part

The panel accepts adding cable ties as a permitted method to support Class 1, Class 2, and Class 3 cables. The panel rejects the recommendation to add the sentence requiring that cable tie have a minimum tensile strength.

Panel Statement: Cable ties can be used for securing and supporting cables in a number of Chapter 3 wiring methods without any requirements for a minimum loop tensile strength.

Number Eligible to Vote: 13
Ballot Results: Affirmative: 9 Negative: 4
Explanation of Negative:

CASPARRO, P.: See my explanation of negative vote on Comment 3-101.

EASTER, L.: The panel should have accepted this comment to add the minimum loop tensile strength for cable ties that provide primary support for such cables and that cable ties need not be listed.

KEDEN, R.: See my Explanation of Negative Vote on Comment 3-101.

OWEN, S.: See my explanation of negative vote on Comment 3-101.

Comment on Affirmative:

AYER, L.: See my Explanation of Affirmative Vote on Comment 3-101.

3-103 Log #605 NEC-P03 **Final Action: Reject (725.8)**

Submitter: Jamie McNamara, Hastings, MN
Comment on Proposal No: 3-152
Recommendation: The panel should reconsider this proposal and except it.
Substantiation: To harmonize Article 725 with the requirements in Articles 770, 800, 820 and 830 is a goal we should be striving for. To require similar cable types to comply with the same rules makes for good code (understandable and enforceable for all). If there are inconsistent and unnecessary requirements in the code, let's work to change them all in this code cycle and the next. For now, and in the future, let's make the text the same for the same types of cable installations.

Panel Meeting Action: Reject

Panel Statement: Class 1 circuits are required by 725.25 to comply with Part I of Article 300, so the addition of the reference to 300.11 would only affect Class 2 and Class 3 circuits. There was no technical substantiation provided in the proposal to require Class 2 and 3 cables to comply with Section 300.11. For example, to require low-energy thermostat cables to be supported above an accessible ceiling and compy with the same requirements as Types MC and AC cables would be overkill for absolutely no safety reason. The NEC should not be required to be consistent between articles where there are no apparent safety issues involved in the requirement. Power wiring was required to be supported independently since there was a real possibility of damage to the conductors within raceways if the wire support clips were removed without replacement and the raceways were allowed to sag without support.

Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:

EASTER, L.: The comment should have been accepted. Acceptance of this comment will require that signaling cables installed above suspended ceilings be supported in accordance with Section 300.11. Including the requirement in Article 725 is consistent with the requirements for Chapter 3 wiring methods as well as communications cables covered by Articles 770, 800, 820 and 830. There is no reason that Article 725 wiring methods should be exempted.

3-104 Log #847 NEC-P03 **Final Action: Accept (725.8)**

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 3-156
Recommendation: The panel is encouraged to continue to Reject Proposal 3-156.
Substantiation: The reasons to continue to Reject the Proposal are as follows:

1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).

6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-105 Log #1265 NEC-P03 **Final Action: Reject**
(725.8 (New))

Submitter: Sanford Egesdal, Egesdal Associates PLC
Comment on Proposal No: 3-155
Recommendation: Continue to Reject Proposals 3-155 and 3-225.
Substantiation: I agree with the panels reasons to reject. Additionally, as I pointed out in my comment in the affirmative, UL lists cable ties for installation in plenums, so the Council's directive on NFPA 90A applies.
Panel Meeting Action: Reject
Panel Statement: Cable ties can be used for securing and supporting cables in a number of Chapter 3 wiring methods. There has not been any technical substantiation submitted to restrict cable ties from supporting various Class 1, Class 2, and Class 3 wiring methods.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 10 Negative: 3
Explanation of Negative:
CASPARRO, P.: See my explanation of negative vote on Comment 3-101.
KEDEN, R.: See my Explanation of Negative Vote on Comment 3-101.
OWEN, S.: See my explanation of negative vote on Comment 3-101.

3-106 Log #1335 NEC-P03 **Final Action: Reject**
(725.8)

Submitter: Kevin McCall, Local Union #98 IBEW
Comment on Proposal No: 3-152
Recommendation: Revise text as follows:
725.8 Mechanical Execution of Work. The installation shall also conform with 300.4(D) and 300.11.
Substantiation: To harmonize with the requirements in articles 770, 800, 820 and 830. In agreement with Mr. Casparro's statement that these Class 2 and Class 3 cable are no less a danger than the cables in other articles where 300.11 is a requirement.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 3-103.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
EASTER, L.: See NEMA recommendation and my explanation of negative vote on Comment 3-103.

3-107 Log #1805 NEC-P03 **Final Action: Accept**
(725.8)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 3-155
Recommendation: This proposal should have been accepted.
Substantiation: The panel statement is unresponsive to the proposal, and considering the other support methods listed, borders on nonsense. If "it is not acceptable to use a cable tie" because "there is no spacing requirement provided for distance between supports," then none of the other methods (straps, staples, hangers, or similar fittings) should be acceptable either. As noted in the proposal, cable ties are already recognized for numerous other wiring methods that are much heavier than the cables covered by Article 725 and cable ties have been accepted as support methods by Panels 7, 12, and 16, so the rejection of this proposal is highly inconsistent and unjustified. As noted in the Explanations of Negative, cable ties are already permitted in many places under the language "or similar fittings," but consistency in the code is highly desirable and directly addresses the ongoing issue of usability.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 10 Negative: 3
Explanation of Negative:
CASPARRO, P.: See my explanation of negative vote on Comment 3-101.
KEDEN, R.: See my Explanation of Negative Vote on Comment 3-101.
OWEN, S.: See my explanation of negative vote on Comment 3-101.
Comment on Affirmative:
AYER, L.: See my Explanation of Affirmative Vote on Comment 3-101.

3-108 Log #759 NEC-P03 **Final Action: Reject**
(725.15)

Submitter: David B. Wechsler, The Dow Chemical Company
Comment on Proposal No: 3-142
Recommendation: Revise as follows:
725.15 Class 1, Class 2, and Class 3 Circuit Requirements
~~A remote control, signaling, or power limited circuit shall comply with the following parts of this article:~~
(1) Class 1 Circuits: Parts I and II
(2) Class 2 and Class 3 Circuits: Parts I and III
Substantiation: The intent of this proposal is not to eliminate remote control, etc., but rather clarify within this General Part 1 section of Article 725 to better define what specific sections apply. Therefore the Requirements for Class I Circuits are found in Parts 1 and II of this Article; Class 2 and Class 3 are found in Parts 1 and III of this Article. 725.11 still continues to address remote-control circuits which in some cases need to be considered as Class 1. Power Limited circuits are addressed in the appropriate article parts, as defined by the circuit, and equally so are signaling circuits.
Panel Meeting Action: Reject
Panel Statement: Deleting the introductory text in this section would not be a user friendly change. The mandatory text in 725.15 provides the requirement that Class 1 remote control, signaling, or power-limited circuits must comply with Parts I and II and Class 2 and 3 must comply with Parts I and III. Deleting the mandatory text would take away any requirement for compliance.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-109 Log #2165 NEC-P03 **Final Action: Accept in Principle**
(725.16)

Submitter: Ray R. Keden, Erico, Inc. / Rep. BICSI
Comment on Proposal No: 3-158
Recommendation: Accept the Proposal.
Substantiation: The title of Section 725.3 is "Other Articles". The requirement for the removal of abandoned cables is not in another article; it is in Article 725. It is out of place in section 725.3. This proposal will move it to a new section of Article 725.
The current placement of the requirement for the removal of abandoned cables in sections 640.3, 725.3, 760.3, 770.3, 800.3, and 820.3 is an error. The error was made by Panel 16 in processing the 2002 NEC. Panel 16 recognized these errors and corrected them by accepting the movement of these requirements in its actions on Proposals 16-31, 128, 254, 259, and 361.
Moving the removal requirements to sections 725.25 and 760.25 will create parallelism between Articles 725, 760, 770, 800, 820, and 830.
Panel Meeting Action: Accept in Principle
Panel Statement: See the panel action on Comment 3-111.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-110 Log #760 NEC-P03 **Final Action: Reject**
(725.21)

Submitter: David B. Wechsler, The Dow Chemical Company
Comment on Proposal No: 3-142
Recommendation: Revise as follows:
725.21 Class 1 Circuit Classifications ~~and Power Source Requirements~~.
Class 1 circuits shall be classified as either Class 1 power-limited circuits where they comply with the power limitations of 725.21(A) or as Class 1 nonpower-limited ~~remote control and signaling circuits~~ where they ~~are used for remote control or signaling purposes and~~ comply with the power limitations of 725.21(B).
FPN: Remote-control and signaling circuits are examples of Class I, nonpower-limited circuits.
(A) Class 1 Power-Limited Circuits. These circuits shall be supplied from a source that has a rated output of not more than 30 volts and 1000 volt-amperes.
(B) Class I Nonpower-Limited ~~Remote Control and Signaling~~ Circuits. These circuits shall not exceed 600 volts. The power output of the source shall not be required to be limited.
Substantiation: The intent of this proposal is not to eliminate remote control, etc., but rather to clarify that just as in Article 760, Article 725, Part II, Class I Circuits come in either of two arrangements: Power limited or Non-Power Limited. Remote-control and signaling are just subsets of either of these types of Class I circuits. The suggested changes simply clarify, but do not delete, any requirements.
Panel Meeting Action: Reject
Panel Statement: Deleting the text and adding a fine print note with similar information as already located in the existing Code, as requested in the comment, does not provide any clarification.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-111 Log #547 NEC-P03 **Final Action: Accept**
(725.25 (New) and 760.25 (New))

TCC action: The Technical Correlating Committee directs that the Fine Print Notes contained in the recommendation be deleted because they contain a statement of intent. The Technical Correlating Committee notes that the rules as written in the recommendation are clear in that they apply to the accessible portion of the abandoned cable.
Submitter: Richard P. Owen, City of St. Paul
Comment on Proposal No: 3-140
Recommendation: Create 725.25 (New) and 760.25(New) as shown below:
725.25 Abandoned Cables. The accessible portion of abandoned Class 2, Class 3, and PLTC cables shall be removed. Where cables are identified for future use with a tag, the tag shall be of sufficient durability to withstand the environment involved.
FPN: See Article 100 for a definition of accessible. It is desirable to remove as much abandoned cable as is practical, but it is not the intent of this section to require construction or renovation specifically to facilitate the removal of abandoned cable.
760.25 Abandoned Cables. The accessible portion of abandoned fire alarm cables shall be removed. Where cables are identified for future use with a tag, the tag shall be of sufficient durability to withstand the environment involved.
FPN: See Article 100 for a definition of accessible. It is desirable to remove as much abandoned cable as is practical, but it is not the intent of this section to require construction or renovation specifically to facilitate the removal of abandoned cable.
Substantiation: This comment was written by a Task Group consisting of Stan Kaufman and Randy Ivans (Panel 16), John Mortimer (Panel 12) and Ron Maassen, Paul Casparro (Panel 3) plus Task Group Chair Richard Owen (Panel 3). The Task Group was directed by the Technical Correlating Committee to examine proposals submitted to all three Panels concerning abandoned cable and other related issues covered by the Panels.

The Task Group came to consensus on the following issues and submitted comments to the Panels as appropriate:

1) On the issue of abandoned cable removal, the task group agreed that only the accessible portions of abandoned cable should be removed. To require removal of all cable could, in some cases, necessitate demolition of the building finish in order to access cables that were properly fastened to the building in accordance with the rules in the various code articles. Furthermore, the task group agreed that the requirements for abandoned cable removal should not be in Section X.3 (Locations and Other Articles) but should be relocated into the general requirements of each article.

2) The task group also agreed to recommend the addition of a new Fine Print Note to further explain the removal requirement. This addition was thought to be necessary to address a common practice of cables that are "fished" inside existing walls. These cables, if abandoned, can be disconnected from their junction point in a wall and pulled out of the wall without having to harm the building finish. At present, in many cases, these cables are being cut off above the wall and left to drop into the wall space.

3) On the issue of "tagged for future use", the Task Group agreed that it was not necessary to require anything more than the cable tag being "...of sufficient durability to withstand the environment involved." This phrase is used in several other places in the NEC and leaves it up to the AHJ as to what is suitable. This language does not add requirements that are difficult, if not impossible, to enforce by adding unclear requirements for rodent-resistance, etc.

The current placement of the requirement for the removal of abandoned cables in sections 640.3, 725.3, 760.3, 770.3, 800.3 and 820.3 is an error. The error was made by panel 16 in processing the 2002 NEC. Panel 16 recognized these errors and corrected them by accepting the movement of these requirements in its actions proposals 16-31,128, 254, 259 and 361.

Panel 3 should not attach too much significance to the fact that the removal requirements are in the "Other Articles" section; it was a mistake that needs to be fixed. Moving the removal requirements to sections 725.25 and 760.25 will create parallelism between Articles 725, 760, 770, 800, 820 and 830.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-112 Log #622 NEC-P03 **Final Action: Accept in Principle**
(725.26(B)(4))

Submitter: Richard P. Owen, City Of St. Paul
Comment on Proposal No: 3-160
Recommendation: Revise text to read as follows:
(4) In Cable Trays. ~~In cable trays, where the~~ Class 1 circuit conductors and power-supply conductors, not functionally associated with ~~them~~ the Class 1 circuit conductors, ~~are~~ shall be separated by a solid fixed barrier of a material compatible with the cable tray, or ~~where the power-supply or Class 1 circuit conductors are in a metal-enclosed cable.~~ Class 1 circuit conductors and power-supply conductors, within multiconductor Type AC, Type MC, Type MI or Type TC cables, shall be permitted to be installed in a cable tray without barriers where all the conductors in the cables are insulated at 600 volts.
Substantiation: In following the recommendation of a Task group formed to address previous proposals concerning the installation of Class 1 circuits in a cable tray with and without a barrier, the panel may have made the existing allowance to install the Class 1 conductors with a barrier unclear. By reinstating the original requirement plus adding the new requirement, this would hopefully reinforce that either method is acceptable.
Panel Meeting Action: Accept in Principle
Revise 725.26(B)(4) to read:

(4) In Cable Trays. Installations in cable trays shall comply with 725.26(B)(4)(1) or 725.26(B)(4)(2).

(1) Class 1 circuit conductors and power-supply conductors not functionally associated with the Class 1 circuit conductors shall be separated by a solid fixed barrier of a material compatible with the cable tray.

(2) Class 1 circuit conductors and power-supply conductors not functionally associated with the Class 1 circuit conductors shall be permitted to be installed in a cable tray without barriers where all of the conductors are installed within separate multiconductor Type AC, Type MC, Type MI, or Type TC cables and all of the conductors in the cables are insulated at 600 volts.
Panel Statement: The word "separate" was added after "within" and before "multiconductor" to ensure that where the Class 1 circuits and the power supply conductors are not functionally associated, separate cables will be installed, one for the Class 1 and one for the power-supply conductors. The remainder of the comment was accepted. The text has been rearranged for clarity.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-113 Log #668 NEC-P03 **Final Action: Reject**
(725.26(B)(4))

Submitter: James M. Daly, Upper Saddle Riv
er, NJ
Comment on Proposal No: 3-160
Recommendation: This Proposal should have been Accepted in Principle in Part by not accepting the addition of "Type TC" and the removal of solid fixed barriers. The only change should be that the last phrase of the existing section be revised to read:

"...or where the power-supply or Class 1 circuit conductors are in a multiconductor Type AC, Type MC, or Type MI cable."

I agree with the panel action to change the word "Multi-conductor" to "multiconductor".
Substantiation: All of the cable types listed in the Proposal, except for Type TC, have a metallic sheath or armor (metal-enclosed) that provides an equipment grounding path in addition to physical protection.

I agree that specifically identifying the cable types permitted is much more useful to the user than merely stating "metal-enclosed".

When 725.26(B)(4) was added, the intent was to not only provide physical protection, but also provide an equipment grounding path between power supply conductors and Class 1 circuit conductors so that, in the event of a malfunction in any power supply conductors, that power would not be imposed onto adjacent Class 1 circuit conductors, particularly onto Class 1 circuit conductors not functionally associated with the power supply conductors. This requirement is consistent with the requirement in 725.26(B)(1).

Also, the text that currently appears in the 2005 NEC has been in the Code since the 1951 NEC, which the Panel pointed out in the panel statement. Type TC cable did not exist at that time and was not added until the 1975 NEC. No technical substantiation has been provided to support the contention that Type TC provides equivalent mechanical and electrical protection as a "metal-enclosed cable", particularly as related to providing equipment grounding and physical protection between power supply conductors and Class 1 circuit conductors not functionally associated with the power supply conductors. This proposed text would be inconsistent with similar requirements in 725.25(B).

The panel rewrite imposes additional restrictions beyond those that appear in the 2005 NEC. The panel rewrite requires that both the Class 1 circuit conductors and the power supply conductors be contained within a multiconductor cable whereas the current text only requires that either "the power-supply or Class 1 circuit conductors are in a metal-enclosed cable." This requirement would apply to "functionally associated" circuit wiring as well as those not "functionally associated". No technical substantiation was provided to support this more stringent requirement.

The panel rewrite deletes one option of providing a "solid fixed barrier" to separate power supply conductors from Class 1 circuit conductors not functionally associated with the power supply conductors. No technical substantiation was provided to support elimination of this option nor that a safety problem exists with the use of a solid fixed barrier.

The change to "multiconductor" provided an editorial correction for consistency. Multiconductor is not hyphenated. In the 2005 NEC, the word "multi-conductor" is only used in Articles 690 and 810 and Annex D. The word "multiconductor" is used in 31 Articles, Chapter 9, and Annex B.
Panel Meeting Action: Reject
Panel Statement: The definition of Power and Control Tray Cable (Type TC) is a factory assembly of two or more insulated conductors, with or without associated bare or covered grounding conductors, under a nonmetallic jacket. TC cable has an overall nonmetallic jacket that acts as mechanical protection

and is not relying just on the insulation of the individual conductors as a means of separation from the other circuits.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-114 Log #669 NEC-P03 **Final Action: Reject**
(725.26(B)(4))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 3-162
Recommendation: This Proposal should be Accepted in Principle in Part by not accepting the addition of "Type TC" and the removal of solid fixed barriers. The only change should be that the last phrase of the existing section be revised to read:

"...or where the power-supply or Class 1 circuit conductors are in a multiconductor Type AC, Type MC, or Type MI cable."

I agree with the panel action on Proposal 3-160 to change the word "Multi-conductor" to "multiconductor".
Substantiation: See the substantiation in my Comment on Proposal 3-160.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 3-113.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-115 Log #761 NEC-P03 **Final Action: Accept in Principle**
(725.26(B)(4))

Submitter: David B. Wechsler, The Dow Chemical Company
Comment on Proposal No: 3-160
Recommendation: Continue to support the actions taken at the ROP stage based upon the Task Group recommendations and the actions by the code panel to revise text to read as follows:

(4) In Cable Trays. ~~In cable trays, where the Class 1 circuit conductors and power supply conductors not functionally associated with them are separated by a solid fixed barrier of a material compatible with the cable tray, or where the power supply or Class 1 circuit conductors are in a metal enclosed cable.~~ In cable trays Class 1 circuit conductors and power-supply conductors, within multiconductor Type AC, Type MC, Type MI or Type TC cables shall be permitted to be installed in a cable tray without barriers where all the conductors in the cables are insulated at 600 volts.
Substantiation: I appreciate the actions of the Task Group and the committee action in taking the above action which resolves this issue. In passing, I still understand the NEC to distinguish between a cable tray and a raceway; thereby making them different.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel action and statement on Comment 3-112 address the submitter's recommendation.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-116 Log #920 NEC-P03 **Final Action: Reject**
(725.26(B)(4))

Submitter: Peter D. Noval, Jr., Philadelphia, PA
Comment on Proposal No: 3-162
Recommendation: This proposal should be rejected. Revise proposed text so that 725.26(B)(4) reads as follows:

(4) In Cable Trays. In cable trays, where the Class 1 circuit conductors and power-supply conductors not functionally associated with them are separated by a solid fixed barrier of a material compatible with the cable tray, or where the power-supply or Class 1 circuit conductors are in a metal-enclosed cable. ~~Multi-conductor Type TC, Type AC, Type MC, or Type MI cables shall be permitted to be installed in cable trays without barriers where all conductors in the cables are insulated at 600 volts or greater.~~
Substantiation: There is no technical substantiation provided for lessening the requirements of this section by allowing the installation of Type TC cable in cable trays without barriers between the Class 1 circuit conductors and power supply conductors not functionally associated with them, regardless of the type of insulation utilized.

To further support rejection of this proposal, refer to the following three panel statements, from NFPA 70 - May 2001 ROC and May 2004 ROP, regarding the originating proposal for 725.26(B)(4) and the intent of the panel:

Panel Statement from Comment #16-57 (May 2001 ROC):

"Proposal 16-51a provides for separation of circuits in cable trays in a manner consistent with other wiring methods in Article 725 and provides restrictions beyond those provided in Chapter 3."

Panel Statement from Comment #16-60 (May 2001 ROC):

"The intent of the panel is to require that in cable tray

1) Physical separation other than insulation, or

2) That the power supply circuits be functionally associated with the Class 1 circuits."

Panel Statement from Proposal #3-151 (May 2004 ROP):

"Requiring a barrier or a metal-enclosed cable separates Class 1 power-limited and nonpower-limited circuits from other circuits that are not functionally associated. Normally, low voltage circuits are isolated from power, lighting, and other higher voltage circuits to keep possible short circuits from the higher rated circuits from affecting the power-limited circuits. This separation rule is relaxed somewhat for Class 1 circuits if the same equipment is powered and controlled by conductors run together. In most instances, the disconnecting means for the equipment and the control circuits will be in close proximity to each other so that power can be shut down for the machine: i.e., functionally associated. Permitting both power and Class 1 control in the same cable tray, raceway, or enclosure provides a more efficient use of the wiring method without seriously compromising safety."

Proposal 3-162, as submitted, would permit insulation as the only means for separation where Type TC cable is installed in cable tray, without barriers between Class 1 circuit conductors and non-functionally associated power-supply conductors.

The revised text above, corrects this.
Panel Meeting Action: Reject
Panel Statement: Revising the proposed text is a better answer than total rejection of the proposal. See the panel action on Comment 3-112. Metal-enclosed cable is more correctly addressed as Type AC (armored cable), MC (metal clad) cable, or MI (mineral insulated) cable. See the panel statement on Comment 3-113 regarding the use of Type TC cable.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-117 Log #921 NEC-P03 **Final Action: Reject**
(725.26(B)(4))

Submitter: Peter D. Noval, Jr., Philadelphia, PA
Comment on Proposal No: 3-161
Recommendation: This proposal should be rejected. Revise proposed text so that 725.26(B)(4) reads as follows:

(4) In Cable Trays. ~~In cable trays, where (1) the power-supply conductors are run in wiring methods, listed in Table 392.3(A), or where (2) the power supply conductors are run as single conductors as covered in 392.3(B)(1) and all Class 1 circuit conductors not functionally associated with them are separated by a solid fixed barrier of a material compatible with the cable tray, or where the Class 1 circuit conductors are in in a metal-enclosed cable.~~

In cable trays, where the Class 1 circuit conductors and power-supply conductors not functionally associated with them are separated by a solid fixed barrier of a material compatible with the cable tray, or where the power-supply or Class 1 circuit conductors are in a metal-enclosed cable.
Substantiation: There is no technical substantiation provided for lessening the requirements of this section by allowing the installation of Type TC cable in cable trays without barriers between the Class 1 circuit conductors and power supply conductors not functionally associated with them, regardless of the type of insulation utilized.

To further support rejection of this proposal, refer to the following three panel statements, from NFPA 70 - May 2001 ROC and May 2004 ROP, regarding the originating proposal for 725.26(B)(4) and the intent of the panel:

Panel Statement from Comment #16-57 (May 2001 ROC):

"Proposal 16-51a provides for separation of circuits in cable trays in a manner consistent with other wiring methods in Article 725 and provides restrictions beyond those provided in Chapter 3."

Panel Statement from Comment #16-60 (May 2001 ROC):

"The intent of the panel is to require that in cable tray

1) Physical separation other than insulation, or

2) That the power supply circuits be functionally associated with the Class 1 circuits."

Panel Statement from Proposal #3-151 (May 2004 ROP):

"Requiring a barrier or a metal-enclosed cable separates Class 1 power-limited and nonpower-limited circuits from other circuits that are not functionally associated. Normally, low voltage circuits are isolated from power, lighting, and other higher voltage circuits to keep possible short circuits from the higher rated circuits from affecting the power-limited circuits. This separation rule is relaxed somewhat for Class 1 circuits if the same equipment is powered and controlled by conductors run together. In most instances, the disconnecting means for the equipment and the control circuits will be in close proximity to each other so that power can be shut down for the machine: i.e., functionally associated. Permitting both power and Class 1 control in the same cable tray, raceway, or enclosure provides a more efficient use of the wiring method without seriously compromising safety."

Proposal 3-162, as submitted, would permit insulation as the only means for separation where Type TC cable is installed in cable tray, without barriers between Class 1 circuit conductors and non-functionally associated power-supply conductors.

The revised text above, corrects this.
Panel Meeting Action: Reject
Panel Statement: Revising the proposed text is a better answer than total rejection of the proposal. See the panel action on Comment 3-112. Metal-enclosed cable is more correctly addressed as Type AC (armored cable), MC

(metal clad) cable, or MI (mineral insulated) cable. See the panel statement on Comment 3-113 regarding the use of Type TC cable.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-118 Log #931 NEC-P03 **Final Action: Reject**
(725.26(B)(4))

Submitter: Peter D. Noval, Jr., Philadelphia, PA
Comment on Proposal No: 3-160
Recommendation: This proposal should be rejected. The proposed new text should be deleted and the proposed deleted text should be retained so that 725.26(B)(4) remains unchanged to reads as follows:

(4) In Cable Trays. In cable trays, where the Class 1 circuit conductors and power-supply conductors not functionally associated with them are separated by a solid fixed barrier of a material compatible with the cable tray, or where the power-supply or Class 1 circuit conductors are in a metal-enclosed cable. ~~In cable trays Class 1 circuit conductors and power-supply conductors, within multiconductor Type AC, Type MC, Type MI or Type TC cable shall be permitted to be installed in a cable tray without barriers where all the conductors in the cables are insulated at 600 volts.~~

Substantiation: There is no technical substantiation provided for lessening the requirements of this section by allowing the installation of Type TC cable in cable trays without barriers between the Class 1 circuit conductors and power supply conductors not functionally associated with them, regardless of the type of insulation utilized.

To further support rejection of this proposal, refer to the following three panel statements, from NFPA 70 - May 2001 ROC and May 2004 ROP, regarding the originating proposal for 725.26(B)(4) and the intent of the panel:

Panel Statement from Comment #16-57 (May 2001 ROC):

"Proposal 16-51a provides for separation of circuits in cable trays in a manner consistent with other wiring methods in Article 725 and provides restrictions beyond those provided in Chapter 3."

Panel Statement from Comment #16-60 (May 2001 ROC):

"The intent of the panel is to require that in cable tray

1) Physical separation other than insulation, or

2) That the power supply circuits be functionally associated with the Class 1 circuits."

Panel Statement from Proposal #3-151 (May 2004 ROP):

"Requiring a barrier or a metal-enclosed cable separates Class 1 power-limited and nonpower-limited circuits from other circuits that are not functionally associated. Normally, low voltage circuits are isolated from power, lighting, and other higher voltage circuits to keep possible short circuits from the higher rated circuits from affecting the power-limited circuits. This separation rule is relaxed somewhat for Class 1 circuits if the same equipment is powered and controlled by conductors run together. In most instances, the disconnecting means for the equipment and the control circuits will be in close proximity to each other so that power can be shut down for the machine: i.e., functionally associated. Permitting both power and Class 1 control in the same cable tray, raceway, or enclosure provides a more efficient use of the wiring method without seriously compromising safety."

Proposal 3-160, as submitted, would permit insulation as the only means for separation where Type TC cable is installed in cable tray, without barriers between Class 1 circuit conductors and non-functionally associated power-supply conductors.

The revised text above, corrects this.

Panel Meeting Action: Reject
Panel Statement: Revising the proposed text is a better answer than total rejection of the proposal. See the panel action on Comment 3-112. Metal-enclosed cable is more correctly addressed as Type AC (armored cable), MC (metal clad) cable, or MI (mineral insulated) cable. See the panel statement on Comment 3-113 regarding the use of Type TC cable.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-119 Log #1267 NEC-P03 **Final Action: Reject**
(725.26(B)(4) (New))

Submitter: Sanford Egesdal, Egesdal Associates PLC
Comment on Proposal No: 3-160
Recommendation: Reconsider Proposal 3-160 and Accept in Principle using the text shown below:

(4) In Cable Trays. ~~In cable trays, where the~~ Class 1 circuit conductors and power-supply conductors not functionally associated with them shall be ~~are~~ separated by a solid fixed barrier of a material compatible with the cable tray, or where ~~the power-supply or Class 1 circuit conductors are in a metal-enclosed cable.~~ Class 1 circuit conductors or power-supply conductors not functionally associated with them are installed in a metal enclosed cable, the barrier shall not be required.

Substantiation: The intent of this section is the installation of Class 1 conductors and functionally associated power circuits. Where power-supply conductors not associated with the Class 1 conductors are installed in the same cable tray, a physical barrier is required.

Historically, the voltage rating of insulation has not been permitted as a means of separating Class 1 conductors from conductors not functionally associated with the Class 1 conductors.

Class 1 conductors may be Type TFN. Class 1 circuits are permitted to be installed with non-power-limited fire alarm circuits. Permitting Class 1 and fire alarm conductors to be in physical contact with non-associated power-supply conductors may pose a risk to life safety.

The proposed text is an attempt to clarify that a barrier is not necessary if either the Class 1 conductors or non-associated power-supply conductors are in metal enclosed cable.

Panel Meeting Action: Reject
Panel Statement: Metal-enclosed cable is more correctly addressed as Type AC (Armored Cable), MC (Metal Clad cable, or MI (Mineral Insulated) cable. In 725.26(B)(3)(1), the acceptable cable is metal-covered or UF, a thermoplastic jacketed cable without the flame retardance of a TC cable. TFN conductors are not permitted in cable trays, unless within a jacketed or metal sheathed cable. See the panel statement on Comment 3-113.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-120 Log #1806 NEC-P03 **Final Action: Accept in Principle**
(725.26(B)(4))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 3-160
Recommendation: This proposal should remain accepted in principle with an additional wording change as follows:

"In cable trays Class 1 circuit conductors and power-supply conductors within separate multiconductor Type AC, Type MC,...". (remainder as accepted in principle).

Substantiation: In the form that this proposal was accepted, the language literally allows the Class 1 and power-supply conductors in the same multiconductor cable even where they are not functionally associated, and implies that the 600 V insulation within the cable can be used for separation. The lack of functional association was a significant point according to the panel statement. This proposal, as modified by the panel action and this comment, allows the cable sheaths or jackets to serve as the barrier or separation method as supported by the substantiation.
Panel Meeting Action: Accept in Principle
Panel Statement: The panel action on Comment 3-112 addresses the submitter's recommendation.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-121 Log #918 NEC-P03 **Final Action: Reject**
(725.26(B)(4) Exception (New))

Submitter: Peter D. Noval, Jr., Philadelphia, PA
Comment on Proposal No: 3-163
Recommendation: This proposal should be rejected. Delete the added text entirely as follows:

~~725.26(B)(4) Exception: Where all cables in the cable tray have insulation suitable for 600 V listed multiconductor Type AC, TC, MC and MI cables shall be allowed to be installed together without barriers regardless of function.~~

Substantiation: There is no technical substantiation provided for lessening the requirements of this section by allowing the installation of Type TC cable in cable trays without barriers between the Class 1 circuit conductors and power supply conductors not functionally associated with them, regardless of the type of insulation utilized.

To further support rejection of this proposal, refer to the following three panel statements from NFPA 70 - May 2001 ROC and May 2004 ROP, regarding the originating proposal for 725.26(B)(4) and the intent of the Panel:

Panel Statement from Comment #16-57 (May 2001 ROC):

"Proposal 16-51a provides for separation of circuits in cable trays in a manner consistent with other wiring methods in Article 725 and provides restrictions beyond those provided in Chapter 3."

Panel Statement from Comment #16-60 (May 2001 ROC):

"The intent of the panel is to require that in cable tray

1) Physical separation other than insulation, or

2) That the power supply circuits be functionally associated with the Class 1 circuits."

Panel Statement from Proposal #3-151 (May 2004 ROP):

"Requiring a barrier or a metal-enclosed cable separates Class 1 power-limited and nonpower-limited circuits from other circuits that are not functionally associated. Normally, low voltage circuits are isolated from power, lighting, and other higher voltage circuits to keep possible short circuits from the higher rated circuits from affecting the power-limited circuits. This separation rule is relaxec somewhat for Class 1 circuits if the same equipment is powered and controlled by conductors run together. In most instances, the disconnecting means for the equipment and the control circuits will be in close

proximity to each other so that power can be shut down for the machine: i.e., functionally associated. Permitting both power and Class 1 control in the same cable tray, raceway, or enclosure provides a more efficient use of the wiring method without seriously compromising safety."

Proposal 3-163, as submitted, would permit insulation as the only means for separation where Type TC cable is installed in cable tray, without barriers between Class 1 circuit conductors and non-functionally associated power-supply conductors.

The deleted text, above, corrects this.

Panel Meeting Action: Reject

Panel Statement: Revising the proposed text is a better answer than total rejection of the proposal. See the panel action on Comment 3-112. Metal-enclosed cable is more correctly addressed as Type AC (armored cable), MC (metal clad cable, or MI (mineral insulated) cable. See the panel statement on Comment 3-113 regarding the use of Type TC cable.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-122 Log #1269 NEC-P03 **Final Action: Reject**

(725.53 (New))

Submitter: Sanford Egesdal, Egesdal Associates PLC

Comment on Proposal No: 3-164

Recommendation: Reconsider Proposal 3-164 and Accept in Principle using the text shown below. The numbering shown corresponds to the "parallel" renumbering in Article 760 for non-power-limited fire alarm cable.

725.53 Multiconductor Class 1 Cables. Multiconductor Class 1 cables that meet the requirements of 725.176 shall be permitted to be used on remote-control, signaling, and power-limited circuits operating at 150 volts or less and shall be installed in accordance with 725.53(A) and 725.53(B).

(A) Class 1 Wiring Method. Multiconductor Class 1 circuit cables shall be installed in accordance with 725.53(A)(1), (A)(2), and (A)(3).

(1) Exposed or Fished in Concealed Spaces. In raceway or exposed on surface of ceiling and sidewalls or fished in concealed spaces. Cable splices or terminations shall be made in listed fittings, boxes, enclosures, fire alarm devices, or utilization equipment. Where installed exposed, cables shall be adequately supported and installed in such a way that maximum protection against physical damage is afforded by building construction such as baseboards, door frames, ledges, and so forth. Where located within 2.1 m (7 ft) of the floor, cables shall be securely fastened in an approved manner at intervals of not more than 450 mm (18 in.).

(2) Passing Through a Floor or Wall. In metal raceway or rigid nonmetallic conduit where passing through a floor or wall to a height of 2.1 m (7 ft) above the floor unless adequate protection can be afforded by building construction such as detailed in 725.53(A)(1) or unless an equivalent solid guard is provided.

(3) In Hoistways. In rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible nonmetallic conduit, or electrical metallic tubing where installed in hoistways.

Exception: As provided for in 620.21 for elevators and similar equipment.

(B) Applications of Listed Class 1 Cables. The use of Class 1 circuit cables shall comply with 725.53(B)(1) through (B)(2).

(1) Riser. Cables installed in vertical runs and penetrating more than one floor or cables installed in vertical runs in a shaft shall be Type CL1R. Floor penetrations requiring Type CL1R shall contain only cables suitable for riser or plenum use.

Exception No. 1: Type CL1 or other cables that are specified in Chapter 3 encased in metal raceway.

Exception No. 2: Type CL1 cables located in a fireproof shaft having firestops at each floor.

FPN: See 300.21 for firestop requirements for floor penetrations.

Exception No. 3: Type CL1R-CI cable shall be permitted to be installed to provide a 2-hour circuit integrity rated cable.

(2) Other Wiring Within Buildings. Cables installed in building locations other than the locations covered in 725.53(B)(1), (B)(2), and (B)(3) shall be Type CL1.

Exception No. 1: Other wiring methods in compliance with Chapter 3.

Exception No. 2: Type CL1R cables shall be permitted.

Exception No. 3: Type CL1-CI cable shall be permitted to be installed to provide a 2-hour circuit integrity rated cable.

Substantiation: The Panel Statement indicates that a Listed Class 1 cable does not exist. That's true. Until the Panel provides a listing and marking requirement for a Class 1 cable, it will not exist. The proposed Class 1 cable construction and is identical to non-power-limited fire alarm cable. The application of the Class 1 cable would be very similar to non-power-limited fire alarm cable.

The proposed reference in 725.81 does not exist in the 2005 NEC. That's true. Until Panel provides a listing and marking requirement for a Class 1 cable, it will not exist.

There is an industry need for this cable. Hopefully, the Panel will decide to provide a listing and marking, and application.

In lieu of the research report requested by the Panel, this type of cable has been installed for fire alarm installations for decades. From conversations with cable manufacturers, it appears the many 10's of millions of feet of non-power-limited fire alarm cable has been installed since the cable was permitted in Article 760. The application of the proposed Class 1 cable and non-power-limited fire alarm cable is the same for identical devices, but used for different systems. Here are a couple of examples.

Non-power-limited fire alarm cable can be connected to control a 120 VAC motor that operates a smoke damper. A Class 1 circuit to a 120 VAC motor for a temperature control damper would be installed in raceway (typically, Type TFN or Article 3 conductors in EMT.

A similar application occurs for a mag-lock on a door that requires more power or higher voltage than permitted for Class 2, Class 3, or power-limited fire alarm system circuits. For a fire alarm system, the mag-lock can be connected to the fire alarm system with non-power-limited fire alarm cable. If the VAC mag-lock is part of a security system and the door is not an exit door, the connection to the security panel would be Class 1 circuit conductors in conduit.

There is an additional application that would benefit installers. Class 2 and Class 3 circuits can be reclassified as Class 1 circuits. If a Class 1 cable was available, the reclassified circuits could be installed with the Class 1 circuits in a Class 1 cable. This installation method has worked well for fire alarm systems for many years. That is power-limited fire alarm circuits are reclassified as non-power-limited circuits and permitted to be installed in non-power-limited cable (or in conduit) with non-power-limited circuits.

This type of cable has worked well for fire alarm systems, so it is reasonable to extend the same capability to Article 725 systems, such as security, temperature control, and access control.

Non-power-limited cable was introduced in the 1975 edition of the NEC, along with the first appearance Article 760, Fire Alarm Systems. Prior to 1975, the cable was permitted by NFPA 72-1972 in section 2140, Special Cables for Circuits Operating at 150 volts or Less. That's the extent of my library.

Panel Meeting Action: Reject

Panel Statement: Listing for non-power-limited fire alarm cable is based on UL 1425, Cables for Non-Power-Limited Fire Alarm Circuits, and this listing does not cover Class 1 circuits. A manufacturer could submit a request to the UL Standards Technical Panel (STP) for either a change to the UL standard to permit this application or a separate standard to cover Class 1 cables, but at this point there isn't a Class 1 cable or a standard that would specifically permit this application.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-123 Log #332 NEC-P03 **Final Action: Accept**

(725.56(E))

Submitter: Gerald Lee Dorna, Belden

Comment on Proposal No: 3-170

Recommendation: Reconsider and accept Proposal 3-170.

Substantiation: In my proposal under the substantiation I advised the panel that similar proposals were made to Articles 725, 760, 800, 820 and 830. That similar text is already in Article 770. See below the actions taken on all of my proposals.

Proposal Number	Section	Panel Action
3-170	725.56(E)	Reject
3-248	760.56	Accept
16-180	800.133(A)(1)	Accept
16-314	820.133(A)(1)	Accept
16-407	830.133(A)(1)	Accept

Panel 16 accepted all of the similar proposals. Panel 3 accepted one proposal (3-248) while rejecting another (3-170).

There seems to be inconsistency in the panel and should reconsider and accept proposal 3-170. The submitter may have chosen the wrong words "safely installed" when explaining why these cables should also be allowed in cable trays. I should have stated "Jacketed cables of Class 2 or Class 3 circuits shall be permitted in the same enclosure or raceway", then why not be permitted in the same cable tray? My proposal had nothing to do with installation methods.

All of the following types (CL2P, CL2R, CL2, CL3P, CL3R, CL3) are UL Listed suitable for use in cable trays because they all meet the minimum flame test requirements for cable trays which is the Vertical Tray test per UL-1685. If they are permitted in the same enclosure and raceway as those cables specified in (1), (2), (3), (4), and (5), then they should also be permitted in the same cable tray as those cables specified in (1), (2), (3), (4), and (5).

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-124 Log #803 NEC-P03 **Final Action: Accept**
(725.56(E))

Submitter: John Kincaid, Systimax Solutions
Comment on Proposal No: 3-170
Recommendation: Accept this proposal.
Substantiation: Mr. Dorna mentions in his substantiation that he submitted similar proposals for Articles 725, 760, 800, 820, and 830. He mentions that similar text is already in Article 770. The table below shows the actions taken by Panels 3 and 16.

Proposal Number	Section	Panel Action
3-170	725.56(E)	Reject
3-248	760.56	Accept
16-180	800.133(A)(1)	Accept
16-314	820.133(A)(1)	Accept
16-407	830.133(A)(1)	Accept

Panel 16 accepted all the proposals in the series. Panel 3 accepted the proposal for Article 760 while rejecting this proposal.

All the cable Types shown below are listed as suitable for use in cable trays and should be permitted in the same cable tray in a building. Section 725.61 permits many of these cables to substitute for Class 2 and Class 3 cables.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-125 Log #1812 NEC-P03 **Final Action: Accept**
(725.56(E))

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 3-170
Recommendation: Accept this proposal.
Substantiation: In the panel's own words cable trays provide support for jacketed cables. This section covers jacketed cables. If jacketed cables of Class 2 and Class 3 circuits are permitted to be installed together in raceways then why can't they be installed together in cable trays? There is no justification to exclude cable trays from this application. The panel's implication that a cable tray system does not have to meet installation requirements is incorrect. Article 392 provides strict requirements for the installation of cable tray systems so that cables are not damaged during installation the same as the conduit Articles.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-126 Log #2166 NEC-P03 **Final Action: Accept**
(725.56(E))

Submitter: Ray R. Keden, Erico, Inc. / Rep. BICSI
Comment on Proposal No: 3-170
Recommendation: Accept this Proposal.
Substantiation: Panel 3 accepted the Proposal 3-248 for Article 760 while rejecting this proposal. Both proposals deal with the same concept.

BICSI members routinely and safely install Class 2, Class 3, power-limited fire alarm, nonconductive optical fiber, conductive optical fiber, communications cables, CATV and low-power network-powered broadband cables that are general-purpose rated or better in the same cable tray. All of these cable types are suitable for installation in cable trays in buildings.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-127 Log #1691 NEC-P03 **Final Action: Accept**
(725.61)

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 3-171
Recommendation: Continue to Reject.
Substantiation: I commend CMP 3 rejecting this proposal. The submitter's recommendation to create a new cable designation (CL250 and CL350) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's substantiation would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13 Section 8.14.1. The submitter's substantiation references 2002 NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces" therefore making it impossible to enforce. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction.

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation, but this action does not indicate the panel's concurrence with the entire substantiation.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

[3-124 Log #803]

Class 2 Cables	Class 3 Cables	Power-Limited Fire Alarm Cables	Nonconductive Optical Fiber Cables	Conductive Optical Fiber Cables	Communications Cables	CATV	Low-Power Network-Powered Broadband Cables
CL2P	CL3P	FPLP	OFNP	OFCP	CMP	CATVP	BLP
CL2R	CL3R	FPLR	OFNR	OFCR	CMR	CATVR	BLR
CL2	CL3	FPL	OFN	OFC	CM	CATV	BL

3-128 Log #375 NEC-P03 **Final Action: Accept**
(725.61 (New 725.154))

Submitter: S. D. Kahn, Tri-City Electric Company, Inc. / Rep. NECA
Comment on Proposal No: 3-172
Recommendation: Continue to reject the recommendation in proposal 3-172, retain the existing 725.61 (renumbered to 725.154 by panel action on proposal 3-138) except for (G) which should be changed as shown and renumber the titles of the Table and Figure:

Renumber Table 725.61 to be Table 725.154(G) and Figure 725.61 to be Figure 725.154(G).

725.61(G) Class 2 and Class 3 Cable Substitutions. The substitutions for Class 2 and Class 3 cables listed in Table 725.61154(G) and illustrated in Figure 725.61154(G)
shall be permitted. Where substitute cables are installed, the wiring requirements of Article 725, Parts I and III shall apply.

FPN: For information on Types CMP, CMR, CM and CMX see 800.179.
Substantiation: Section 2.3 of the NEC Style Manual provides for two options for figures, either they are mandatory and can have mandatory language (shall) or they are non-mandatory and are in a fine print note and do not contain mandatory language. This comment will bring the cable substitution figures into compliance with the style manual by making the cable substitution figures part of the mandatory text.

Similar corrections for Articles 760, 770, 800 and 820 are contained in other comments.
This Comment has been prepared by a Task Group established by the Technical Correlating Committee. The Task Group includes R. Owen, M. Ode, S. Owen, J. Brunssen, S. Kaufman, S. Johnson, S. L. Stene and S. D. Kahn.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-129 Log #1597 NEC-P03 **Final Action: Accept**
(725.61(A), FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 3-174
Recommendation: Continue to reject.
Substantiation: The submitter's recommendation to add this FPN to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

I commend CMP 3 rejecting this proposal. CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154 and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC therefore it can and should be deleted.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation, but this action does not indicate the panel's concurrence with the entire substantiation.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-130 Log #1062 NEC-P03 **Final Action: Reject**
(725.61(D)(4))

Submitter: David Shapiro, Safety First Electrical Contracting Consulting & Safety Education
Comment on Proposal No: 3-177
Recommendation: Revise text to read as follows:
"...~~physical~~ damage of the sort that tends to be readily visible...".
Substantiation: NEC users rely on standard dictionary definitions, augmented by the NEC's explicit definitions. The NEC Style Manual saying in "3.2.5.5 Provisions on Protection Against Physical Damage. If protection against physical damage is to be one of the requirements, this can be standardized by the use of this terminology" this does not benefit the ordinary user. This is permissive language; the Style Manual is offering an option, not a requirement. I assumed the term was being used loosely to mean damage from blows, abrasion, pressure, or tension, but assumptions should not be necessary. An ideal I believe we share is to enforce the Code as written, not "You know what we mean." This CMP's statement indicates that they intended the long-term physical effects of chemicals and radiation, such as embrittlement, to be among types of damage excluded. Other CMPs use the term with somewhat different intentions, if one reads the Panel Statements in this ROP. Webster's definition does not clue us to this, nor does Article 100, nor does the beginning of this chapter. I would hope 110.3(A)(2)'s requirement of suitable "mechanical strength and durability" sufficed. If this additional statement is needed because that is too broad, let's say exactly what the CMP statement indicates is meant.
Panel Meeting Action: Reject
Panel Statement: The submitter has not provided any additional technical substantiation to delete the word "physical" from the text in 725.61(D)(4). The panel reaffirms its panel statement as follows: "Physical" is used throughout the NEC as a descriptive adjective to the noun "damage." While the submitter feels the phrase "physical damage" is superfluous, the word "physical" seems to provide a certain emphasis and a further description where combined into the phrase "physical damage." This phrase tends to draw more attention than just "damage." In addition, physical damage provides a description of thermal and mechanical damage where the damage can be readily identified, such as a raceway that has been physically damaged versus damage from ultraviolet light where the raceway may be more brittle and thus can be easily damaged physically by impact to the raceway. Chemicals or heat can cause unseen damage to electrical components that can eventually lead to physical damage at a later time. This phrase is used in the NEC Style Manual in 3.2.5.5 as an acceptable method to describe physical damage.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-131 Log #1598 NEC-P03 **Final Action: Accept**
(725.61(E), FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 3-180
Recommendation: Continue to reject.
Substantiation: The submitter's recommendation to add this FPN to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

I commend CMP 3 rejecting this proposal. CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154 and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC therefore it can and should be deleted.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the recommendation, but this action does not indicate the panel's concurrence with the entire substantiation.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-132 Log #1692 NEC-P03 **Final Action: Accept**
(725.61(G), FPN)

Submitter: Harold C. Ohde, IBEW #134

Comment on Proposal No: 3-185

Recommendation: Continue to Reject.

Substantiation: I commend CMP 3 for rejecting this proposal. The submitter's recommendation to create a new cable designation (CL250 and CL350) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's recommendation to add this FPN to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible, conduit or a sprinkler system to be installed in the concealed space of plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces" therefore making it impossible to enforce. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction.

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the recommendation, but this action does not indicate the panel's concurrence with the entire substantiation.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-133 Log #1700 NEC-P03 **Final Action: Reject**
(725.82)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association

Comment on Proposal No: 3-194

Recommendation: Revise 725.82 as follows:

(G) Class 2 and Class 3 Cable ~~Voltage~~ Ratings. Class 2 cables shall have a voltage rating of not less than 150 volts and a temperature rating of not less than 60°C (140°F). Class 3 cables shall have a voltage rating of not less than 300 volts and a temperature rating of not less than 60°C (140°F).

(L) Marking. Cables shall be marked in accordance with 310.11(A)(2), (A)(3), (A)(4), and (A)(5) and Table 725.82. Voltage ratings shall not be marked on the cables. Temperature ratings greater than 60°C shall be marked on the cable.

FPN. Voltage markings on cables may be misinterpreted to suggest that the cables may be suitable for Class 1 electric light and power applications.

Exception: Voltage markings shall be permitted where the cable has multiple listings and a voltage marking is required for one or more of the listings.

Substantiation: The proposed changes to 725(G) and (L) provide requirements that match present listing requirements, so will not impose a hardship on cable manufacturers.

Article 725 does not have a temperature rating requirement for cable. The temperature rating on cable is important for some installations. The proposed rating of 60°C (140°F) is used by testing laboratories as the required minimum temperature rating, but the temperature rating is not required to be marked on the cable.

Panel Meeting Action: Reject

Panel Statement: This comment does not add anything new except for marking, which is already covered by the product standard UL 13. The last sentence of the substantiation states that the proposed temperature rating is used by testing laboratories as the required minimum temperature rating, but since it is already in UL 13, adding the temperature rating to 725.82 is unnecessary.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12 Negative: 1

Explanation of Negative:

EGESDAL, S.: The NEC should not depend on Underwriters Laboratories to set the required temperature rating and marking on cable use for systems having requirements in Articles 725 and 760. Without a marking on the cable or a requirement in the NEC indicating that no marking means 60C, the installer may misapply a cable. Misapplication of cable into an environment that is greater than 60C, such as under a roof deck, may have life safety consequences. Additionally, UL is not the only test lab to list cable. The NEC should set the cable temperature marking requirements.

3-134 Log #655 NEC-P03 **Final Action: Reject**
(725.82(A), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council

Comment on Proposal No: 3-189

Recommendation: Revise text to read as follows:

725.82 Listing and Marking of Class 2, Class 3, and Type PLTC Cables. Class 2, Class 3, and Type PLTC cables installed as wiring within buildings shall be listed as being resistant to the spread of fire and other criteria in accordance with 725.82(A) through 725.82 (K) and shall be marked in accordance with 725.82(L).

(A) Types CL2P and CL3P. Types CL2P and CL3P plenum cables shall be listed as being suitable for use in ducts, plenums, and other space used for environmental air and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

FPN: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces. ~~is by establishing an acceptable value of the smoke produced when tested in accordance with NFPA 262-1999, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces, to a maximum peak optical density of 0.5 and a maximum average optical density of 0.15. Similarly, one method of defining fire-resistant cables is by establishing a maximum allowable flame travel distance of 1.52 m (5 ft) when tested in accordance with the same test.~~

No change for 725.82 (B) through 725.82 (K).

Substantiation: This comment recommends a slight change in wording for the existing Fine Print Note, by recognizing that listing of plenum cable by NFPA 262 represents listing to both low smoke and low flame spread, and that cables cannot be listed separately to either property. This is basically an editorial change, as a clarification, to the existing Fine Print Note.

The same change is being proposed to the corresponding Fine Print Notes in article 760. The new language is consistent with the language in the corresponding fine print notes in articles 770, 800, 820 and 830, all of which deal with the same type of cables.

The committee rejected the proposal based on, and I quote: "NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005 that states, in pertinent part, as follows:

"[S]o as not to inject the problems identified in the 2002 edition of NFPA 90A into the NEC®, and in order to give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues related to plenum cables by processing the issues through the entire upcoming NFPA 90A revision cycle, the Council directs the NEC Project to maintain the status quo in the NEC until the Technical Committee on Air Conditioning has, through the processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A."

However, Standards Council has since issued a new decision, NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. This decision addresses CMP decisions on Fine Print Notes referencing NFPA 13 and it states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)."

I believe that this Standards Council decision, indirectly, applies to the Fine Print Note to which this comment refers, for two reasons:

1. As Tom Guida explains in his negative on this item, "With reference to the Panel Statement, this proposal does not change the "status quo" with regard to plenum cables. The proposal is essentially editorial. The proposed revised FPN actually aligns the wording of the FPN with the existing wording in NFPA 90A for cables in ceiling cavity and raised floor plenums." In other words, retention of the Fine Print Note in its existing form engenders confusion because it gives the erroneous impression that plenum cables could be listed separately for flame spread and for smoke, and that is incorrect.

2. This Fine Print Note is identical to the ones in 760.81 (C) and in 760.82 (D), both of which are equally incorrect and potentially misleading. On the other hand the proposed revised text is identical to the Fine Print Notes in articles 770, 800, 820 and 830, which are correct. Thus, revising this Fine Print Note will provide further consistency within the NEC.

Panel Meeting Action: Reject

Panel Statement: The panel is acting on this and other proposals related to wire and cable in plenum and other air handling spaces based on NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005 that states, in pertinent part, as follows:

"So as not to inject the problems identified in the 2002 edition of NFPA 90A into the NEC, and in order to give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues related to plenum cables by processing the issues through the entire upcoming NFPA 90A revision cycle, the Council directs the NEC Project to maintain the status quo in the NEC until the Technical Committee on Air Conditioning has, through the processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A."

This action does not constitute agreement or disagreement with any of the substantiations submitted for the affected proposal.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-135 Log #1569 NEC-P03 **Final Action: Accept (725.82(G))**

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute

Comment on Proposal No: 3-195

Recommendation: Continue to reject.

Substantiation: I commend CMP 3 rejecting this proposal. The submitter's recommendation to create a new cable designation (concealed space cable) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's substantiation would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. CMP 3 panel statement also reflects that the definition for "concealed" in Article 100 does not apply to the proposed text. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited

to: cabling, nonmetallic plumbing piping, non-structural wood, etc...can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the recommendation but this action does not indicate the panel's concurrence with the entire substantiation.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-136 Log #1693 NEC-P03 **Final Action: Accept (725.82(G))**

Submitter: Harold C. Ohde, IBEW #134

Comment on Proposal No: 3-193

Recommendation: Continue to Reject.

Substantiation: I commend CMP 3 for rejecting this proposal. The submitter's recommendation to create a new cable designation (CL250 and CL350) is nothing more than a marketing ploy. The submitter's recommendation to add these two FPN's to this section is in grave error. FPN No. 1 is a backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The FPN No. 2 would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible, conduit or a sprinkler system to be installed in the concealed space of plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces" therefore making it impossible to enforce. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction.

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc...can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the recommendation, but this action does not indicate the panel's concurrence with the entire substantiation.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-137 Log #1467 NEC-P03 **Final Action: Reject (725.154, 725.179, 760.154, and 760.179)**

Submitter: Allen C. Weidman, The Society of the Plastics Industry, Inc.

Comment on Proposal No: 3-171

Recommendation: Reconsider and accept the proposals. The section numbers (xxx.154 & xxx.179) are from the Panel's renumbering in Proposals 3-138 & 3-211.

Substantiation: The Panel erred in applying the Council's directive on NFPA 90A, related to materials exposed to airflow in an air distribution system. The cables in each of the proposals did not have an "R" or "P" as the last letter in the type designation, so would not be permitted to be installed in a riser or air distribution system (air ducts and plenums). The cables would only be permitted as other wiring within buildings.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 3-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-138 Log #1453 NEC-P03 **Final Action: Reject**
(725.154(1))

Submitter: Sanford Egesdal, Egesdal Associates PLC
Comment on Proposal No: 3-171
Recommendation: Reconsider proposal 3-171 and revise 725.61 as shown below. Note that section 725.61 has been renumbered to 725.154 by panel action on proposal 3-138.
(I) Class 2 and Class 3 Fire Hazard (FHC) Cable. Fire hazard (FHC) cable shall be permitted for use in remote-control, signaling, and power-limited systems as other wiring within buildings in accordance with 725.154(E) to provide reduced potential heat release.
Substantiation: As pointed out in my affirmative comment, I agreed with the Panel's suggestion that the proposed text might be more appropriate in another section; and pointed out that application of the Standards Council's decision on NPFA 90A was an error. The proposed marking on the cable did not include a "P" added to CL2 or CL3. Type CL2P or Type CL3P cables are permitted to be installed in plenums.

This comment creates a new section for the fire hazard cable. The new section provides a requirement that clearly identifies that the fire hazard cable is permitted to be installed as "Other Wiring Within Buildings."

To better clarify that the Standards Council's decision on NFPA 90A does not apply and to better clarify where the cable is permitted to be installed, the marking on the cable is changed to Type CL2-FHC and Type CL3-FHC. The "FHC" suffix stands for fire hazard cable. There is a companion comment to revise the marking found in my comment to Proposal 3-193.

Some installations require large amounts of cable. A typical application of a fire hazard cable would be above a suspended ceiling or under a raised floor, neither of which is a plenum. The proposed cable has a very low fuel load, as compared to other types of cable insulation. Some cable constructions use one type of insulation on the conductor and another type for the jacket.

The Type CL2-FHC and CL3-FHC cables suggested for listing and marking in 725.179 (comment to proposal 3-193) has parameters (e.g. 3500 BTU/lb) that are standard in the building industry and useful to system designers and fire protection engineers.

To put cable insulation heat release in perspective, here are relative values:
Fire Hazard Cable insulation: less than 8 MJ/kg (3,500 BTU/lb)
PVC insulation: As high as 25 MJ/kg (11,000 BTU/lb)
Polyolefin insulation: As high as 46 MJ/kg (20,000 BTU/lb)
Panel Meeting Action: Reject
Panel Statement: The cables recommended in this comment and associated proposal are a variation of limited combustible cables. Limited combustible cables are available and are marked Type CL2P and can therefore be installed in any location a riser or general cable can be installed. There is no restriction in the Code preventing the use of this cable and there is no specific requirement for its use. Therefore, there is no reason at this time to add the recommended text to 725.61.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:

EGESDAL, S.: Six manufacturers have a listing for a robust cable that UL has identified as a limited combustible cable. Yet, CMP 3 has denied Articles 725 and Article 760 from including an application, listing, and marking for this robust cable with an Flame Spread Index less than 25, a Smoke Developed Index less than 50, and a Heat of Combustion less than 3500BTU/lb. The only NEC marking for this robust cable is for a combustible plenum cable (e.g. FPLP). A plenum cable, tested to NFPA 262, has a Smoke Developed Index of 500 or greater and an unknown Heat of Combustion.

This comment did not include an application for installation in plenums to comply with the Standards Council's directive on NFPA 90A.

The panel statement on this comment seems out-of-step with the panel statement to comment 3-122, which follows. "Listing for non-power-limited fire alarm cable is based on UL 1425, Cables for Non-Power-Limited Fire Alarm Circuits, and this listing does not cover Class 1 circuits. A manufacturer could submit a request to the UL Standards Technical Panel (STP) for either a change to the UL standard to permit this application or a separate standard to cover Class 1 cables, but at this point there isn't a Class 1 cable or a standard that would specifically permit this application."

It seems that the NEC TCC needs to provide guidance to the Code Making Panels on whether the NEC of UL should take the lead on requirements included or not included in the NEC.

3-139 Log #1258 NEC-P03 **Final Action: Reject**
(725.176 (New))

Submitter: Sanford Egesdal, Egesdal Associates PLC
Comment on Proposal No: 3-186
Recommendation: Reconsider proposal 3-186 and accept in principal as shown below. The suggested numbering matches the "parallel" section number for non-power-limited cable in 760.176, as renumbered by Panel action on proposal 3-211.

725.176 Listing and Marking of Class 1 Cables.
Class 1 cables installed as wiring within buildings shall be listed in accordance with 725.176(A) and 725.176(B) and as being resistant to the spread of fire in accordance with 725.176(C) through 725.176(D), and shall be marked in accordance with 725.176(F).
(A) Class 1 Conductor Materials. Conductors shall be 18 AWG or larger, solid or stranded copper.
(B) Insulated Conductors. Insulated conductors shall be suitable for 600 volts. Insulated conductors 14 AWG and larger shall be one of the types listed in Table 310.13 or one that is identified for this use. Insulated conductors 18 AWG and 16 AWG shall be in accordance with 725.27.
(C) Type CL1R. Type CL1R riser cable shall be listed as being suitable for use in a vertical run in a shaft or from floor to floor and shall also be listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.
FPN: One method of defining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is that the cables pass ANSI/UL 1666-2002, Test for Flame Propagation Height of Electrical and Optical-Fiber Cables Installed Vertically in Shafts.
(D) Type CL1. Type CL1 able shall be listed as being suitable for general-purpose use, with the exception of risers, ducts, plenums, and other space used for environmental air, and shall also be listed as being resistant to the spread of fire.
FPN No. 1: One method of defining resistant to the spread of fire is that the cables do not spread fire to the top of the tray in the vertical-tray flame test in ANSI/UL 1581-1991, Reference Standard for Electrical Wires, Cables and Flexible Cords.
FPN No. 2: Another method of defining resistant to the spread of fire is for the damage (char length) not to exceed 1.5 m (4 ft 11 in.) when performing the CSA vertical flame test for cables in cable trays, as described in CSA C22.2 No. 0.3-M-1985, Test Methods for Electrical Wires and Cables.
(E) Circuit Integrity (CI) Cable or Electrical Circuit Protective System. Cables used for survivability of critical circuits shall be listed as circuit integrity (CI) cable. Cables specified in 725.176(C), and (D), and used for circuit integrity shall have the additional classification using the suffix ¡°-CI.¡± Cables that are part of a listed electrical circuit protective system shall be considered to meet the requirements of survivability.
FPN No. 1: Fire alarm circuit integrity (CI) cable and electrical circuit protective systems may be used for fire alarm circuits to comply with the survivability requirements of NFPA 72®-2002, National Fire Alarm Code6.9.4.3 and 6.9.4.6, that the circuit maintain its electrical function during fire conditions for a defined period of time.
FPN No. 2: One method of defining circuit integrity (CI) cable is by establishing a minimum 2-hour fire resistance rating for the cable when tested in accordance with UL 2196-1995, Standard for Tests of Fire Resistive Cables.
(F) Class 1 Cable Markings. Multiconductor non–power-limited cables shall be marked in accordance with Table 725.176(F). Class 1 circuit cables shall be permitted to be marked with a maximum usage voltage rating of 150 volts. Cables that are listed for circuit integrity shall be identified with the suffix ¡°CI¡± as defined in 725.176(E).

Table 725.176(F) Class 1 Cable Markings

Cable Marking	Type
CL1R	Class 1 circuit riser cable725.31(E) and (H)
CL1	Class 1 circuit cable 725.31(F) and (H)

Note: Cables identified in 725.176(C) and(D) and meeting the requirements for circuit integrity shall have the additional classification using the suffix ¡°CI¡± (for example, CL1R-CI, and CL1-CI).
FPN: Cable types are listed in descending order of fire resistance rating.
Substantiation: The Panel Statement indicates that a Listed Class 1 cable does not exist. That's true. Until Panel provides a listing and marking requirement for a Class 1 cable, it will not exist. The proposed Class 1 cable construction is identical to non-power-limited fire alarm cable, less a listing and marking for plenum cable.

Non-power-limited fire alarm cable is found in 760.81 in the 2005 NEC.

In lieu of the research report requested by the Panel, this type of cable has been installed for fire alarm installations for decades. From conversations with cable manufacturers, it appears that many 10's of millions of feet of non-power-limited fire alarm cable has been installed. The application of the proposed Class 1 cable and non-power-limited fire alarm cable may be the same for identical devices, but used for different systems.

Non-power-limited cable was introduced in the 1975 edition of the NEC, along with the first appearance Article 760, Fire Alarm Systems. Prior to 1975,

the cable was permitted by NFPA 72-1972 in section 2140, Special Cables for Circuits Operating at 150 volts or Less. That's the extent of my library.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 3-122.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-140 Log #1456 NEC-P03 **Final Action: Reject**
(725.179(G) (New))

Submitter: Sanford Egesdal, Egesdal Associates PLC
Comment on Proposal No: 3-193
Recommendation: Reconsider proposal 3-193 and revise Section 725.82, as shown below. Note that section 725.82 was renumbered to 725.179 by panel action on proposal 3-138.

Sections 725.179(A), through (F) do not change.

Insert new 760.179(G), renumber existing subsections as follows: "G" to "H", "H" to "I"; and "I" to "J", "J" to "K", "K" to "L", and "L" to "M".
(G) Low Fire Hazard (-FHC) Cable. Cables used to reduce potential heat release shall be listed as fire hazard (-FHC) cable and shall have a low potential heat release. Cables specified in 725.154(E)(1), and used to reduce potential heat release shall have an additional classification using the suffix "-FHC".

FPN No. 1: One method of defining a low potential heat release cable is that the cable exhibits a maximum potential heat value of exceeding 8141 kJ/kg (3500 BTU/lb) when tested in accordance with NFPA 259, *Standard Test Method for Potential Heat of Building Materials*, as well as a maximum flame spread index of 25 and a maximum smoke developed index of 50 when tested in accordance with NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*.
Substantiation: As pointed out in my negative comment, I stated out that application of the Standards Council's decision on NPFA 90A was an error. The proposed marking on the cable did not include a "P" added to CL2 or CL3. Type CL2P or Type CL3P cables are permitted to be installed in plenums. To better clarify that the Standards Council's decision on NFPA does not apply and to better clarify where the cable is permitted to be installed, the marking on the cable is changed to Type CL2-FHC and Type CL3-FHC. The "FHC" suffix stands for fire hazard cable. There is a companion comment to revise the application of fire hazard cable in my comment to Proposal 3-171.

The proposed cable provides listing parameters useful to system designers and fire protection engineers.

The key parameter in the listing requirements is potential heat release.

To put cable heat release in perspective, here are relative values:

Fire Hazard Cable insulation: less than 8 MJ/kg (3,500 BTU/lb

PVC insulation: As high as 25 MJ/kg (11,000 BTU/lb)

Polyolefin insulation: As high as 46 MJ/kg (20,000 BTU/lb)

Polyolefin insulation is sometimes used as insulation on conductors, and is covered by a PVC jacket. Polyolefin insulation provides better electrical properties (dielectric constant) than PVC insulation.

Additionally, flame spread and smoke developed parameters identify the robustness of the cable.

A flame spread index of 25 is found in a number of NFPA publications, for example:

NFPA 13-2007

8.15.1 Concealed Spaces.

8.15.1.2.10 Concealed spaces where rigid materials are used and the exposed surfaces have a flame spread index of 25 or less, and the materials have been demonstrated not to propagate fire when tested in accordance with NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials, extended for an additional 20 minutes in the form in which they are installed, shall not require sprinkler protection.

NFPA 13 use of "concealed spaces" corresponds to a typical dictionary definition: out of sight, hidden. This definition add "spaces" to "concealed" and represents a different meaning from how the NEC defines "concealed." Where both the NEC and NFPA 13 apply, "concealed" cable can be removed from a "concealed space." After removal of the cable, the "concealed space" would remain.

A smoke developed index of 50 is more rigorous than the typical smoke developed index of 450 for interior finishes. Interior finishes can be considered a "fixed" application: one sheet or one coat. Cable installations are a "variable" application: one cable or hundreds of cables. It seems reasonable to establish a robust requirement, due to the variable application. Electronic equipment is susceptible to damage from smoke and heat, both components of a fire.

There a number of manufacturers with cable listed to the requirements in the proposed FPN, so these requirements are not a financial hardship.
Panel Meeting Action: Reject
Panel Statement: See the panel statement in Comment 3-138.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
EGESDAL, S.: See my negative vote on comment 3-138.

ARTICLE 727 — INSTRUMENTATION TRAY CABLE: TYPE ITC

3-141 Log #1813 NEC-P03 **Final Action: Accept in Principle**
(727.5)

Submitter: Michael Walls, American Chemistry Council
Comment on Proposal No: 3-208
Recommendation: Accept this proposal.
Substantiation: Power Limited Class 1 circuits provide no more of a fire hazard or shock threat than ITC circuits. In fact Power Limited Class 1circuits are less of a hazard. Power Limited Class 1 circuits must be not more than 30 volts and 1000 volt-amperes. ITC circuits can be 150 volts or less and 5 amperes or less. But the NEC allows a Non-power limited Class 1 circuit (up to 600 volts & no power limitation) and a Power Limted Class 1 circuit to be in the raceway or cable tray. The panel needs re-examine the separation of circuits in raceways, enclosures and cable trays.
Panel Meeting Action: Accept in Principle
Revise the recommended text to read:
727.5 Uses Not Permitted. Type ITC cable shall not be installed on circuits operating at more than 150 volts or more than 5 amperes. Installation of Type ITC cable with other cables shall be subject to the stated provisions of the specific articles for the other cables. Where the governing articles do not contain stated provisions for installation with Type ITC cable, the installation of Type ITC cable with the other cables shall not be permitted.

Type ITC cable shall not be installed with power, lighting, Class 1 circuits that are not power limited, or other non–power-limited circuits.
Panel Statement: The panel has reconsidered and accepts the original proposal with the revision to be compatible with the terminology used in 725.21.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

ARTICLE 760 — FIRE ALARM SYSTEMS

3-142 Log #2221 NEC-P03 **Final Action: Reject**
(760.2)

Submitter: James S. Conrad, Tyco Thermal Controls
Comment on Proposal No: 3-214
Recommendation: Reconsider this proposal as an Accept in Principle and move to 760.61(C)(2) to read as follows:

FPN: See UL Guide info on FHIT systems for CI cable installed in conduit.
Substantiation: The proposed FPN will alert AHJ, installers and system designers that there are specific installation requirements when installing CI cable in a raceway.
Panel Meeting Action: Reject
Panel Statement: Section 110.3(B) already requires listed and labeled equipment to be installed and used in accordance with listing and labeling instructions.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-143 Log #1224 NEC-P03 **Final Action: Accept**
(760.3(A))

Submitter: John Burke, Fusion Cable Systems
Comment on Proposal No: 3-216
Recommendation: Continue to Reject this Proposal.
Substantiation: We remove old and unused cable as part of our standard business practice especially in retrofit jobs. The amount of old cable on some jobs has caused damage to the building and created unsafe working conditions for our techs. We support continuing the abandoned cable removal requirement in the Code.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-144 Log #1808 NEC-P03 **Final Action: Reject**
(760.3(B) Exception)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 3-220
Recommendation: This proposal should have been accepted or alternatively, accepted in principal as suggested in the Explanation of Negative by Mr. Ayer.
Substantiation: The panel statement is incorrect. The exception does not refer to any section that covers power-limited cables and does not modify any section that covers non-power-limited cables. Power-limited plenum FA cables are not for installation in ducts and plenums. As noted in 300.22 and in other articles that cover power-limited circuits, so-called "plenum" cables are for use

in other spaces for environmental air. The Exception in question confuses that issue. Nothing in 760.61 contradicts this because the exception does not refer to 760.61 it only refers to 760.30 which in turn covers only non-power limited cables. So compliance with 300.22 is still required under 760.61 and therefore, 760.61 must be interpreted to permit plenum cables only in other spaces for environmental air. (About the only use that would be permitted in a duct or plenum to comply with 300.22(B) would be a line-type fire detector that has to go in the duct for its function, or perhaps some unusual type of detector that is installed in the duct rather than being outside the duct with a sampling tube inserted in the duct.) Furthermore, the Exception to 760.3(B) does not provide any exception to 300.22 as it purports to do because 730.30(B)(1) and (B)(2) also require compliance with 300.22(C) (other spaces for environmental air). The deletion of this exception will not change anything except to remove a reference that apparently, according to the panel statement, is confusing even to the panel.

Panel Meeting Action: Reject

Panel Statement: Section 300.22(B) does not permit nonmetallic wiring in ducts and plenums. Section 760.30(B)(1) and (2) state that NPLFP is not permitted in the plenum or duct, and 760.61(A) says that FPLP is permitted in plenum or duct. Chapter 7 modifies Chapter 3, so the exception is needed.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-145 Log #486 NEC-P03 **Final Action: Accept in Part (760.8)**

Submitter: Timothy P. McNeive, Thomas & Betts Corporation

Comment on Proposal No: 3-225

Recommendation: Change the panel action to Accept in Principle. Add the additional text suggest in the comment on negative vote by Mr. Easter:

"Cable ties that provide primary support for such cables shall have a minimum loop tensile strength of 23 kg (50 lbs)."

Substantiation: "Minimum loop tensile" strength is commonly marked on packages of cable ties. The 23 kg minimum for cable support is well representative of typical straps, hangers and staples listed for flexible conduit and cable support in accordance with UL 2239, Hardware for Support of Conduit, Tubing and Cable. The panel is also asked to follow the long time position of CMP-7 and not consider in its final decision the requirement that cable ties or other support hardware to be listed.

Panel Meeting Action: Accept in Part

The panel accepts adding cable ties as a permitted method to support fire alarm cables. The panel rejects the recommendation to add the sentence requiring cable ties to have a minimum tensile strength.

Panel Statement: Cable ties can be used for securing and supporting cables in a number of Chapter 3 wiring methods without any requirements for a minimum loop tensile strength.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12 Negative: 1

Explanation of Negative:

EASTER, L.: See NEMA recommendation and my explanation of negative vote on Comment 3-102.

3-146 Log #1809 NEC-P03 **Final Action: Accept (760.8)**

Submitter: Noel Williams, Herriman, UT

Comment on Proposal No: 3-225

Recommendation: This proposal should have been accepted.

Substantiation: The panel statement is unresponsive to the proposal, and considering the other support methods listed, borders on nonsense. If "it is not acceptable to use a cable tie" because "there is no spacing requirement provided for distance between supports," then none of the other methods (straps, staples, hangers, or similar fittings) should be acceptable either. As noted in the proposal, cable ties are already recognized for numerous other wiring methods that are much heavier than the cables covered by Article 760 and cable ties have been accepted as support methods by Panels 7, 12, and 16, so the rejection of this proposal is highly inconsistent and unjustified. As noted in the Explanations of Negative, cable ties are already permitted in many places under the language "or similar fittings," but consistency in the code is highly desirable and directly addresses the ongoing issue of usability.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12 Negative: 1

Explanation of Negative:

EGESDAL, S.: This comment should have been rejected, based on the Standards Council's decision on NFPA 90A. UL lists cable ties for installation in HVAC system plenums. Rejecting this comment would be consistent with the action taken by Panel 3 on comments 3-134, 3-164, and 3-176, which suggested a trivial editorial change to NFPA 262 listing requirements. The Panel used the NFPA 90A directive to reject these 3 comments.

Additionally, the submitters of comments did not provide technical substantiation to respond to the panel statement on proposal 3-155, as follows. "It is not acceptable to use a cable tie to serve as a sole support for a cable when there is no spacing requirement provided for the distance between supports." Further, the proposals, comments, and panel statements provide no technical substantiation for panel action that would require all hardware used to support these cables to be listed. Code-making panels 7 and 8 have steadily rejected similar proposals relating to the support of cables and raceways.

Comment on Affirmative:

AYER, L.: See my Explanation of Affirmative Vote on Comment 3-101.

3-147 Log #899 NEC-P03 **Final Action: Accept (760.8, FPN)**

Submitter: John P. Masarick, Independent Electrical Contractors Inc.

Comment on Proposal No: 3-228

Recommendation: The Panel is encouraged to accept Proposal 3-228.

Substantiation: 1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.

2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.

3. These standards are also covered by a fine print note in 110.12.

4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.

5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).

6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Accept

Panel Statement:

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12 Negative: 1

Explanation of Negative:

EGESDAL, S.: This comment should be rejected. A few code cycles ago, the FPN to this section referenced 3 documents that were not directly related to fire alarm systems. At that time, CMP 16 had jurisdiction over Article 760. Panel 16 declined to remove the 3 documents until a standard on fire alarm system job practices (not NFPA requirements) was available. The NECA/ANSI standard provides information on execution of work that, while generic, is specific to fire alarm systems. The standard has gone through the ANSI process, so has had wide fire alarm industry review.

3-148 Log #1708 NEC-P03 **Final Action: Reject (760.9)**

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association

Comment on Proposal No: 3-231

Recommendation: The proposal should be Accept in Principle. Revise wording as follows:

760.9. Fire Alarm Circuit and Equipment Grounding. Fire alarm circuits and equipment shall be grounded in accordance with Part II and Part VIII of Article 250.

Substantiation: While the present text is a violation of the NEC Style Manual, it seems reasonable to provide NEC users a clue that grounding rules may or may not apply to Article 760 circuits. Deletion of 760.9 creates a conflict with Table 250.3, which points to 760.9.

Panel Meeting Action: Reject

Panel Statement: Section 250.112(I) already states that fire alarm circuits must comply with Parts II and VIII of Article 250 where the fire alarm systems are required to be grounded, so this text is not necessary in Article 760.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12 Negative: 1

Explanation of Negative:

EGESDAL, S.: Fire alarm system installers understand that fire alarm circuits are not grounded. However, it is important to highlight grounding in Article 760 to assure the fire alarm panel is grounded in compliance with Article 250. The main panel reason for deleting the reference to Article 250 is to comply with the NEC Style Manual. The proposed change to this NEC Section provided a reference to Parts of Article 250 in compliance with the NEC Style Manual.

3-149 Log #1710 NEC-P03 **Final Action: Accept**
(760.10)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association
Comment on Proposal No: 3-234
Recommendation: Accept the Proposal in Principle and modify 760.10.
760.10 Fire Alarm Circuit Identification. Fire alarm circuits shall be identified at terminal and junction locations in a manner that will help to prevent unintentional ~~interference with the signaling~~ signals on fire alarm system circuits during testing and servicing of other systems.
Substantiation: The Section provides requirements to aid service personnel that are working on systems other than the fire alarm system. Article 760 permits conductors and cables of other systems to be installed with fire alarm conductors and cables. Additionally, the circuit identification is an aid to fire alarm system personnel for effective testing, servicing, or troubleshooting the fire alarm system.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-150 Log #1942 NEC-P03 **Final Action: Reject**
(760.10)

Submitter: Barry F. O'Connell, Tyco Thermal Controls
Comment on Proposal No: 3-232
Recommendation: I urge the Panel to reconsider this Proposal. I agree that a prime purpose of marking at terminals and junction locations is to ensure maintenance personnel do not inadvertently cause problems with the fire alarm; however, this proposal also sought to address another issue: facilitating identification and inspection of the circuits throughout the run to ensure these fire-rated circuits are supported at the correct minimum intervals described in their Electrical Circuit Protective listing, instead of the standard 10 ft spacings.
Substantiation: None given.
Panel Meeting Action: Reject
Panel Statement: This section deals with fire alarm circuit identification, not identification of fire alarm raceways, so the suggested additional sentence would not be appropriate for this section. Requiring a raceway to be identified by painting or some other means is not going to ensure the proper installation, raceway support, or inspection of the system.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-151 Log #1713 NEC-P03 **Final Action: Reject**
(760.15)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association
Comment on Proposal No: 3-237
Recommendation: The Proposal should be Accept in Principle. Revise wording as follows:
760.15. Fire Alarm Circuit Requirements. Fire alarm circuits and equipment shall comply with 760.15(A) and 760.15(B).
(A) Non-Power-Limited Fire Alarm (NPLFA) Circuits. See Parts I and II.
(B) Power-Limited Fire Alarm (FPLA) Circuits. See Parts I and III.
FPN to (A) and (B): See NFPA 72, National Fire Alarm Code, for "monitoring for integrity" functionality for Class A and Class B fire alarm circuits and separation of outbound and return Class A circuit conductors.
Substantiation: Class A fire alarm circuits have physical separation installation requirements. Unless the system designer and installer is alerted, the outbound and return fire alarm circuit conductors may be installed in the same cable or raceway, thereby defeating the purpose of requiring a Class A circuit.
NFPA 72, National Fire Alarm Code, is not directly adopted in many jurisdictions. It is imperative that the NEC "assist" the fire alarm industry by providing guidance on key fire alarm system functionality.
Panel Meeting Action: Reject
Panel Statement: Section 760.1 already has a fine print note that refers the reader to NFPA 72 for further information on the installation and monitoring for integrity requirements in fire alarm systems. Adding a non-mandatory fine print note in this section will not provide enough information to someone doing a fire alarm installation in a jurisdiction that does not adopt the National Fire Alarm Code (NFPA 72). Class A and Class B circuits are not defined in the NEC.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
EGESDAL, S.: NFPA 72, National Fire Alarm Code, has many installation requirements for the installation fire alarm equipment and wiring. The request for a Fine Print Note on Class A and B fire alarm circuits is in response to incorrect installation occurring. The number of fire alarm devices connected to a fire alarm circuit is usually greater than the number connected to a Class B circuit. It is important that installers understand there is a life safety need for physical separation of the outbound and return Class A circuit, so in the event of a break in the circuit, all devices remain connected to the fire alarm panel.

3-152 Log #2167 NEC-P03 **Final Action: Accept in Principle**
(760.16)

Submitter: Ray R. Keden, Erico, Inc. / Rep. BICSI
Comment on Proposal No: 3-238
Recommendation: Accept this Proposal.
Substantiation: The title of Section 725.3 is "Other Articles". The requirement for the removal of abandoned cables is not in another article; it is in Article 725. It is out of place in section 725.3. This proposal will move it to a new section of Article 725.
The current placement of the requirement for the removal of abandoned cables in sections 640.3, 725.3, 760.3, 770.3, 800.3, and 820.3 is an error. The error was made by Panel 16 in processing the 2002 NEC. Panel 16 recognized these errors and corrected them by accepting the movement of these requirements in its actions on Proposals 16-31, 128, 254, 259, and 361.
Moving the removal requirements to sections 725.25 and 760.25 will create parallelism between Articles 725, 760, 770, 800, 820, and 830.
Panel Meeting Action: Accept in Principle
Accept in Principle
Panel Statement: See the panel action and panel statement in Comment 3-111.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-153 Log #1810 NEC-P03 **Final Action: Reject**
(760.25)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 3-240
Recommendation: This proposal should have been accepted in principle with the following change: Change the added reference to 300.7(A).
Substantiation: The substantiation dealt only with issues of condensation, so the only part of 300.7 that is applicable is the sealing requirement of 300.7(A). The substantiation did not address the issues covered in 300.7(B).
Panel Meeting Action: Reject
Panel Statement: Although the substantiation for the proposal dealt only with the condensation issue, if a conduit is exposed to temperature changes that are extreme enough to cause condensation, the expansion and contraction issue needs to be addressed at the same time.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-154 Log #1599 NEC-P03 **Final Action: Accept**
(760.30(B)(2), FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 3-243
Recommendation: Continue to reject.
Substantiation: The submitter's recommendation to add this FPN to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?
NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:
8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.
8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)
8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.
A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

I commend CMP 3 rejecting this proposal. CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154 and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC therefore it can and should be deleted.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the recommendation, but this action does not indicate the panel's concurrence with the entire substantiation.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-155 Log #1600 NEC-P03 **Final Action: Accept (760.30(B)(4), FPN)**

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute

Comment on Proposal No: 3-244

Recommendation: Continue to reject.

Substantiation: The submitter's recommendation to add this FPN to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

I commend CMP 3 rejecting this proposal. CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154 and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC therefore it can and should be deleted.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the recommendation, but this action does not indicate the panel's concurrence with the entire substantiation.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-156 Log #1703 NEC-P03 **Final Action: Reject (760.32(B)(2), 760.32(B)(3), 760.32(B)(4), 760.61(A), 760.61(B)(1), 760.61(C))**

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association

Comment on Proposal No: 3-230

Recommendation: The proposal should be accepted in principal. Add new text in six places.

Add the following fine print note to Exception No. 3 of three Sections: 760.32(B)(2), 760.32(B)(3) and 760.32(B)(4)

FPN to Exception No. 3: It is critical for circuit integrity cable functionality to observe manufacturer's instructions that may require or prohibit installing cable in raceway.

Add a fine print note to 760.61(A).

FPN: It is critical for circuit integrity cable functionality to observe manufacturer's instructions that may require or prohibit installing cable in raceway.

Add a fine print note to immediately following 760.61(B)(1)

FPN to 760.61(B)(1): It is critical for circuit integrity cable functionality to observe manufacturer's instructions that may require or prohibit installing cable in raceway.

Add a fine print note to 760.61(C)

FPN: It is critical for circuit integrity cable functionality to observe manufacturer's instructions that may require or prohibit installing cable in raceway.

Substantiation: Circuit integrity cable is listed for installation exposed, installed in metal raceway, or either installation method. Fire alarm circuit integrity cables provide for survivability of notification circuits during a fire emergency. It is critical that circuit integrity cable be installed according to its listing and manufacturer's installation instructions.

Panel Meeting Action: Reject

Panel Statement: Section 110.3(B) already requires listed and labeled equipment to be installed and used in accordance with listing and labeling instructions.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12 Negative: 1

Explanation of Negative:

EGESDAL, S.: It is important for system designers, installers, and AHJ's to understand that there are special installation requirements for circuit integrity cable (e.g., Type FPLR-CI), which is installed for survivability of certain fire alarm circuits. The panel statement neglects to mention the information shared by presenters at the ROC meeting. Performance of circuit integrity cable when exposed to fire is dependent on correct installation. That is, the cable may or may not be permitted to be installed in metal raceway. Additionally, the manufacturer's instructions are not shipped with the cable, so installers are not given a "heads-up" as to specific installation requirements.

3-157 Log #1702 NEC-P03 **Final Action: Reject (760.32(B)(2), 760.32(B)(3), 760.32(B)(4), 760.61(A), 760.61(B)(1), and 760.61(C))**

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association

Comment on Proposal No: 3-214

Recommendation: The proposal should be accepted in principal. Add new text in six places.

Add the following fine print note to Exception No. 3 of three Sections: 760.32(B)(2), 760.32(B)(3) and 760.32(B)(4)

FPN to Exception No. 3: It is critical for circuit integrity cable functionality to observe manufacturer's instructions that may require or prohibit installing cable in raceway.

Add a fine print note to 760.61(A).

FPN: It is critical for circuit integrity cable functionality to observe manufacturer's instructions that may require or prohibit installing cable in raceway.

Add a fine print note to immediately following 760.61(B)(1)

FPN to 760.61(B)(1): It is critical for circuit integrity cable functionality to observe manufacturer's instructions that may require or prohibit installing cable in raceway.

Add a fine print note to 760.61(C)

FPN: It is critical for circuit integrity cable functionality to observe manufacturer's instructions that may require or prohibit installing cable in raceway.

Substantiation: Circuit integrity cable is listed for installation exposed, installed in metal raceway, or either installation method. Fire alarm circuit integrity cables provide for survivability of notification circuits during a fire emergency. It is critical that circuit integrity cable be installed according to its listing and manufacturer's installation instructions.

Panel Meeting Action: Reject

Panel Statement: Section 110.3(B) already requires listed and labeled equipment to be installed and used in accordance with listing and labeling instructions.

Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:
EGESDAL, S.: See my negative vote on comment 3-156.

3-158 Log #1811 NEC-P03 **Final Action: Reject**
(760.52(B))

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 3-246
Recommendation: This proposal should have been accepted in principle with the following change: Change the added reference to 300.7(A).
Substantiation: The substantiation dealt only with issues of condensation, so the only part of 300.7 that is applicable is the sealing requirement of 300.7(A). The substantiation did not address the issues covered in 300.7(B).
Panel Meeting Action: Reject
Panel Statement: Although the substantiation for the proposal dealt only with the condensation issue, if a conduit is exposed to temperature changes that are extreme enough to cause condensation, the expansion and contraction issue needs to be addressed at the same time.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-159 Log #1940 NEC-P03 **Final Action: Accept in Part**
(760.52(B))

Submitter: Barry F. O'Connell, Tyco Thermal Controls
Comment on Proposal No: 3-246
Recommendation: I agree with this Proposal, however, the reference to Article 300 is shown as inserted under devices instead of cables; in addition, I believe the wording needs to be adjusted to reflect the fact that Electrical Circuit Protective Systems require compatible sealing materials that have been tested:
(B) PLFA Wiring Methods and Materials. Power-limited fire alarm conductors and cables described in 760.82 shall be installed as detailed in 760.52(B)(1), (B)(2), or (B)(3) of this section and 300.7. Devices shall be installed in accordance with 110.3(B), ~~300.7,~~ 300.11(A), and 300.15.
FPN: See the Electrical Circuit Protective System listing for sealing materials approved for use with Electrical Circuit Protective Systems, in connection with 300.7.
Substantiation: None given.
Panel Meeting Action: Accept in Part
The panel accepts the recommendation to relocate 300.7 and rejects the recommendation to add a new fine print note.
Panel Statement: The information proposed for the fine print note is more appropriately covered under 110.3 (B).
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-160 Log #1694 NEC-P03 **Final Action: Accept**
(760.61)

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 3-250
Recommendation: Continue to Reject.
Substantiation: I commend CMP 3 for rejecting this proposal. The submitter's recommendation to create a new cable designation (FPL50) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's substantiation would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces" therefore making it impossible to enforce. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction.
NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:
8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.
8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)
8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.
A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.
In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.
CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation, but this action does not indicate the panel's concurrence with the entire substantiation.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-161 Log #367 NEC-P03 **Final Action: Accept**
(760.61 (New 760.154))

Submitter: S. D. Kahn, Tri-City Electric Company, Inc. / Rep. NECA
Comment on Proposal No: 3-251
Recommendation: Continue to reject the recommendation in proposal 3-251. Retain the existing 760.61 (renumbered to 760.154 by panel action on proposal 3-138) except for (D) which should be changed as shown and renumber the titles of the Table and Figure:
Renumber Table 760.61 to be Table 760.154(D) and Figure 760.61 to be Figure 760.154(D).
760.6154(D) Fire Alarm Cable Substitutions. The substitutions for fire alarm cables listed in Table 760.6 154(D) and illustrated in Figure 760.6154(D) shall be permitted. Where substitute cables are installed, the wiring requirements of Article 760, Parts I and III shall apply.
FPN: For information on communications cables (CMP, CMR, CMG and CM) see 800.179.
Substantiation: Section 2.3 of the NEC Style Manual provides for two options for figures, either they are mandatory and can have mandatory language (shall) or they are non-mandatory and are in a fine print note and do not contain mandatory language. This comment will bring the cable substitution figures into compliance with the style manual by making the cable substitution figures part of the mandatory text.
Similar corrections for Articles 725, 770, 800 and 820 are contained in other comments.
This Comment has been prepared by a Task Group established by the Technical Correlating Committee. The Task Group includes R. Owen, M. Ode, S. Owen, J. Brunssen, S. Kaufman, S. Johnson, S. L. Stene and S. D. Kahn.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-162 Log #1601 NEC-P03 **Final Action: Accept**
(760.61(A), FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 3-253
Recommendation: Continue to reject.
Substantiation: The submitter's recommendation to add this FPN to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?
NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:
8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.
8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)
8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.
A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would

not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

I commend CMP 3 rejecting this proposal. CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154 and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC therefore it can and should be deleted.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the recommendation, but this action does not indicate the panel's concurrence with the entire substantiation.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-163 Log #1696 NEC-P03 **Final Action: Accept**
(760.61(D), FPN)

Submitter: Harold C. Ohde, IBEW #134

Comment on Proposal No: 3-255

Recommendation: Continue to Reject.

Substantiation: I commend CMP 3 for rejecting this proposal. The submitter's recommendation to create a new cable designation (FPL50) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's recommendation to add this FPN to this section is in grave error. This FPN would not provide to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirements because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces" therefore making it impossible to enforce. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction.

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not requ ire sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the recommendation, but this action does not indicate the panel's concurrence with the entire substantiation.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-164 Log #656 NEC-P03 **Final Action: Reject**
(760.81(C), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council

Comment on Proposal No: 3-259

Recommendation: Revise text to read as follows:

760.81 Listing and Marking of NPLFA Cables. Non–power-limited fire alarm cables installed as wiring within buildings shall be listed in accordance with 760.81(A) and 760.81(B) and as being resistant to the spread of fire in accordance with 760.81(C) through 760.81(F), and shall be marked in accordance with 760.81(G).

(A) NPLFA Conductor Materials. Conductors shall be 18 AWG or larger solid or stranded copper.

(B) Insulated Conductors. Insulated conductors shall be suitable for 600 volts. Insulated conductors 14 AWG and larger shall be one of the types listed in Table 310.13 or one that is identified for this use. Insulated conductors 18 AWG and 16 AWG shall be in accordance with 760.27.

(C) Type NPLFP. Type NPLFP non–power-limited fire alarm cable for use in other space used for environmental air shall be listed as being suitable for use in other space used for environmental air as described in 300.22(C) and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

FPN: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces. ~~is by establishing an acceptable value of the smoke produced when tested in accordance with NFPA 262-1999, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces, to a maximum peak optical density of 0.5 and a maximum average optical density of 0.15. Similarly, one method of defining fire-resistant cables is by establishing a maximum allowable flame travel distance of 1.52 m (5 ft) when tested in accordance with the same test.~~

No change for 760.81 (D) through 760.81 (G).

Substantiation: This comment recommends a slight change in wording for the existing Fine Print Note, by recognizing that listing of plenum cable by NFPA 262 represents listing to both low smoke and low flame spread, and that cables cannot be listed separately to either property. This is basically an editorial change, as a clarification, to the existing Fine Print Note.

The same change is being proposed to the corresponding Fine Print Notes in article 725 and the other Fine Print Note in article 760. The new language is consistent with the language in the corresponding fine print notes in articles 770, 800, 820 and 830, all of which deal with the same type of cables.

The committee rejected the proposal based on, and I quote: "NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005 that states, in pertinent part, as follows:

"[S]o as not to inject the problems identified in the 2002 edition of NFPA 90A into the NEC®, and in order to give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues related to plenum cables by processing the issues through the entire upcoming NFPA 90A revision cycle, the Council directs the NEC Project to maintain the status quo in the NEC until the Technical Committee on Air Conditioning has, through the processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A."

However, Standards Council has since issued a new decision, NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. This decision addresses CMP decisions on Fine Print Notes referencing NFPA 13 and it states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)."

I believe that this Standards Council decision, indirectly, applies to the Fine Print Note to which this comment refers, for two reasons:

1. As Tom Guida explains in his negative on this item, "With reference to the Panel Statement, this proposal does not change the "status quo" with regard to plenum cables. The proposal is essentially editorial. The proposed revised FPN actually aligns the wording of the FPN with the existing wording in NFPA 90A for cables in ceiling cavity and raised floor plenums." In other words, retention of the Fine Print Note in its existing form engenders confusion because it gives the erroneous impression that plenum cables could be listed separately for flame spread and for smoke, and that is incorrect.

2. This Fine Print Note is identical to the ones in 725.82 (A) and in 760.82 (D), both of which are equally incorrect and potentially misleading. On the other hand the proposed revised text is identical to the Fine Print Notes in articles 770, 800, 820 and 830, which are correct. Thus, revising this Fine Print Note will provide further consistency within the NEC.

Panel Meeting Action: Reject
Panel Statement: The panel is acting on this and other proposals related to wire and cable in plenum and other air handling spaces based on NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005 that states, in pertinent part, as follows:

"So as not to inject the problems identified in the 2002 edition of NFPA 90A into the NEC, and in order to give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues related to plenum cables by processing the issues through the entire upcoming NFPA 90A revision cycle, the Council directs the NEC Project to maintain the status quo in the NEC until the Technical Committee on Air Conditioning has, through the processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A."

This action does not constitute agreement or disagreement with any of the substantiations submitted for the affected proposal.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-165 Log #2180 NEC-P03 **Final Action: Reject**
(760.81(F) and 760.82(G), FPN 3 (New))

Submitter: James S. Conrad, Tyco Thermal Controls
Comment on Proposal No: 3-230
Recommendation: Reconsider this Proposal as Accept in Principle and move to 760.81(F) FPN No. 3 and 760.82(G) FPN No. 3 to read as follows:

FPN No. 3: UL Guide information for electrical circuit protective systems (FHIT) contains information on proper installations requirements to maintain the fire rating.
Substantiation: The proposed FPN will alert AHJs, installers and system designers that there are specific installation requirements to maintain the fire rating of an electrical circuit protective system.
Panel Meeting Action: Reject
Panel Statement: See the panel statement on Comment 3-156.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-166 Log #1715 NEC-P03 **Final Action: Reject**
(760.82)

Submitter: Thomas P. Hammerberg, Automatic Fire Alarm Association
Comment on Proposal No: 3-263
Recommendation: Revise 760.82 as follows:

(C) Ratings. The cables shall have a voltage rating of not less than 300 volts and a temperature rating of not less than 60°C (140°F).

(I) Cable Marking. The cable shall be marked in accordance with Table 760.82(I). The voltage ratings shall not be marked on the cable. Temperature ratings greater than 60°C shall be marked on the cable. Cables that are listed for circuit integrity shall be identified with the suffix CI as defined in 760.82(G).

FPN. Voltage markings on cables may be misinterpreted to suggest that the cables may be suitable for Class 1, electric light, and power applications.
Exception: Voltage markings shall be permitted where the cable has multiple listings and a voltage marking is required for one or more of the listings.
Substantiation: The proposed changes to 760(C) and (I) provide requirements that match present listing requirements, so will not impose a hardship on cable manufacturers.
Article 760 does not have a temperature rating requirement for cable. The temperature rating on cable is important for some installations. The proposed rating of 60°C (140°F) is used by testing laboratories as the required minimum temperature rating, but the temperature rating is not required to be marked on the cable.
Panel Meeting Action: Reject
Panel Statement: This comment does not add anything new except for marking, which is already covered by the UL product standard. The last sentence of the substantiation states that the proposed temperature rating is used by testing laboratories as the required minimum temperature rating, but since it is already in the standard, adding the temperature rating to 760.82 is unnecessary.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:

EGESDAL, S.: The NEC should not depend on Underwriters Laboratories to set the required temperature rating and marking on cable use for systems having requirements in Articles 725 and 760. Without a marking on the cable or a requirement in the NEC indicating that no marking means 60C, the installer may misapply a cable. Misapplication of cable into an environment that is greater than 60C, such as under a roof deck, may have life safety consequences. Additionally, UL is not the only test lab to list cable. The NEC should set the cable temperature marking requirements.

3-167 Log #657 NEC-P03 **Final Action: Reject**
(760.82(D), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 3-265
Recommendation: Revise as follows:
760.82 Listing and Marking of PLFA Cables and Insulated Continuous Line-Type Fire Detectors.
Type FPL cables installed as wiring within buildings shall be listed as being resistant to the spread of fire and other criteria in accordance with 760.82(A) through 760.82(H) and shall be marked in accordance with 760.82(I). Insulated continuous line-type fire detectors shall be listed in accordance with 760.82(J).
(A) Conductor Materials. Conductors shall be solid or stranded copper.
(B) Conductor Size. The size of conductors in a multiconductor cable shall not be smaller than 26 AWG. Single conductors shall not be smaller than 18 AWG.
(C) Ratings. The cable shall have a voltage rating of not less than 300 volts.
(D) Type FPLP. Type FPLP power-limited fire alarm plenum cable shall be listed as being suitable for use in ducts, plenums, and other space used for environmental air and shall also be listed as having adequate fire-resistant and low smoke-producing characteristics.

FPN: One method of defining a cable that is low smoke-producing cable and fire-resistant cable is that the cable exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a maximum flame spread distance of 1.52 m (5 ft) or less when tested in accordance with NFPA 262, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces. ~~is by establishing an acceptable value of the smoke produced when tested in accordance with NFPA 262-1999, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces, to a maximum peak optical density of 0.5 and a maximum average optical density of 0.15. Similarly, one method of defining fire-resistant cables is by establishing a maximum allowable flame travel distance of 1.52 m (5 ft) when tested in accordance with the same test.~~
No change for 760.82 (E) through 760.82 (J).
Substantiation: This comment recommends a slight change in wording for the existing Fine Print Note, by recognizing that listing of plenum cable by NFPA 262 represents listing to both low smoke and low flame spread, and that cables cannot be listed separately to either property. This is basically an editorial change, as a clarification, to the existing Fine Print Note.

The same change is being proposed to the corresponding Fine Print Notes in article 725 and the other Fine Print Note in article 760. The new language is consistent with the language in the corresponding fine print notes in articles 770, 800, 820 and 830, all of which deal with the same type of cables.

The committee rejected the proposal based on, and I quote: "NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005 that states, in pertinent part, as follows:
"[S]o as not to inject the problems identified in the 2002 edition of NFPA 90A into the NEC®, and in order to give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues related to plenum cables by processing the issues through the entire upcoming NFPA 90A revision cycle, the Council directs the NEC Project to maintain the status quo in the NEC until the Technical Committee on Air Conditioning has, through the processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A."

However, Standards Council has since issued a new decision, NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. This decision addresses CMP decisions on Fine Print Notes referencing NFPA 13 and it states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)."

I believe that this Standards Council decision, indirectly, applies to the Fine Print Note to which this comment refers, for two reasons:

1. As Tom Guida explains in his negative on the companion proposal to this item, "With reference to the Panel Statement, this proposal does not change the "status quo" with regard to plenum cables. The proposal is essentially editorial. The proposed revised FPN actually aligns the wording of the FPN with the existing wording in NFPA 90A for cables in ceiling cavity and raised floor plenums." In other words, retention of the Fine Print Note in its existing form engenders confusion because it gives the erroneous impression that plenum cables could be listed separately for flame spread and for smoke, and that is incorrect.

2. This Fine Print Note is identical to the ones in 725.82 (A) and in 760.81 (C), both of which are equally incorrect and potentially misleading. On the other hand the proposed revised text is identical to the Fine Print Notes in articles 770, 800, 820 and 830, which are correct. Thus, revising this Fine Print Note will provide further consistency within the NEC.

Panel Meeting Action: Reject
Panel Statement: The panel is acting on this and other proposals related to wire and cable in plenum and other air handling spaces based on NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005 that states, in pertinent part, as follows:

"So as not to inject the problems identified in the 2002 edition of NFPA 90A into the NEC, and in order to give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues related to plenum cables by processing the issues through the entire upcoming NFPA 90A revision cycle, the Council directs the NEC Project to maintain the status quo in the NEC until the Technical Committee on Air Conditioning has, through the processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A."

This action does not constitute agreement or disagreement with any of the substantiations submitted for the affected proposal.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-168 Log #1570 NEC-P03 **Final Action: Accept (760.82(H))**

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 3-266
Recommendation: Continue to reject.
Substantiation: I commend CMP 3 rejecting this proposal. The submitter's recommendation to create a new cable designation (concealed space cable) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's substantiation would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. CMP 3 panel statement also reflects that the definition for "concealed" in Article 100 does not apply to the proposed text. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation, but this action does not indicate the panel's concurrence with the entire substantiation.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-169 Log #1571 NEC-P03 **Final Action: Accept (760.82(H))**

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 3-267
Recommendation: Continue to reject.
Substantiation: I commend CMP 3 rejecting this proposal. The submitter's recommendation to create a new cable designation (concealed space cable) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's substantiation would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. CMP 3 panel statement also reflects that the definition for "concealed" in Article 100 does not apply to the proposed text. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the recommendation, but this action does not indicate the panel's concurrence with the entire substantiation.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-170 Log #1572 NEC-P03 **Final Action: Accept (760.82(H))**

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 3-268
Recommendation: Continue to reject.
Substantiation: I commend CMP 3 rejecting this proposal. The submitter's recommendation to create a new cable designation (concealed space cable) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's substantiation would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. CMP 3 panel statement also reflects that the definition for "concealed" in Article 100 does not apply to the proposed text. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2. Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the recommendation, but this action does not indicate the panel's concurrence with the entire substantiation.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-171 Log #1697 NEC-P03 **Final Action: Accept**
(760.82(H) and Table 760.82(I))

Submitter: Harold C. Ohde, IBEW #134

Comment on Proposal No: 3-269

Recommendation: Continue to Reject.

Substantiation: I commend CMP 3 for rejecting this proposal. The submitter's recommendation to create a new cable designation (FPL50) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's recommendation to add these two FPN's to this section is in grave error. The FPN No. 1 is a backdoor approach you might say to get NFPA 255 and NFPA 259 calbes in the cable in the cable hierarchy. The FPN No. 2 would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requiremetn because of NFPA 13 Section 8.14.1. CMP 3 panel statement also reflects that the definition for "concealed" in Article 100 does not apply to the proposed text. It is important to note that the NEC does not have a definition of "concealed spaces" therefore making it impossible to enforce. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction.

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 3 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the recommendation, but this action does not indicate the panel's concurrence with the entire substantiation.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-172 Log #1678 NEC-P03 **Final Action: Reject**
(760.154 and 760.179)

Submitter: Richard J. Rockosi, ARKEMA Chemicals

Comment on Proposal No: 3-266

Recommendation: The panel should reconsider these proposals and accept them based upon the substantiations provided with the proposals. The section numbers referenced are from the panel actions on renumbering in proposals 3-138 and 3-211.

Substantiation: The Code Panel applied the Standards Council directive on NFPA 90A related to materials exposed to airflow in an air distribution system when rejecting these proposals. These proposals are not related to the 90A issue. The proposed cables are FPL – CS cables. There is no "P" designation associated with them. They cannot be, nor were they intended to be, used in spaces where they may be exposed to the airflow such as ceiling or raised floor plenums. They are intended for use in concealed or inaccessible (for normal maintenance) spaces as a low fuel load cable providing users with the highest fire performance for cables currently recognized by the code and a fuel load content consistent with building materials exhibiting low fuel properties. The listing addresses the opportunity to reduce the potential for the spread of fire from within these spaces when large quantities of cables are installed and ignited by another source.

Panel Meeting Action: Reject

Panel Statement: These proposals involve a variation of limited combustible cables. Limited combustible cables are available and are marked Type FPLP and can therefore be installed in any location that a riser or general cable can be installed. The definition for "concealed" in Article 100 in the 2005 NEC does not apply to the proposed text. The reference to NFPA 13 in the substantiation does not seem appropriate at this time, since putting a sprinkler head in an inaccessible location inside the wall or above a drywall ceiling would not permit access for servicing. The area above a suspended ceiling is not considered by the NEC to be a concealed space.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-173 Log #1458 NEC-P03 **Final Action: Reject**
(760.154(C) (New))

Submitter: Sanford Egesdal, Egesdal Associates PLC

Comment on Proposal No: 3-250

Recommendation: Reconsider proposal 3-250 and revise 760.61(C) as shown below. Note that section 760.61 has been renumbered to 760.154 by panel action on proposal 3-211.

(C) Other Wiring Within Buildings. Cables installed in building locations other than those covered in 760.154(A) or 760.154(B) shall be as described in either (1), (2), (3), or (4). Type FPL-CI cable shall be permitted to be installed as described in either (1), (2), (3), or (4) to provide a 2-hour circuit integrity rated cable. Type FPL-FHC cable shall be permitted to be installed as described in either (1), (2), (3), or (4) to provide reduced potential heat release.

(1) Type FPL shall be permitted.

(2) Cables shall be permitted to be installed in raceways.

(3) Cables specified in Chapter 3 and meeting the requirements of 760.179(A) and 760.179(B) shall be permitted to be installed in nonconcealed spaces where the exposed length of cable does not exceed 3 m (10 ft).

(4) A portable fire alarm system provided to protect a stage or set when not in use shall be permitted to use wiring methods in accordance with 530.12.

Substantiation: As pointed out in my affirmative comment, I agreed with the Panel's suggestion that the proposed text might be more appropriate in another section; and pointed out that application of the Standards Council's decision on NPFA 90A was an error. The proposed marking on the cable did not include a "P" added to FPL. Type FPLP cable is permitted to be installed in plenums.

This comment adds a sentence to existing 760.61(C) [renumbered as 760.154(C)] to incorporate fire hazard cable. By adding fire hazard cable to this section, it is clear that the cable is permitted to be installed as "Other Wiring Within Buildings."

To better clarify that the Standards Council's decision on NFPA does not apply and to better clarify where the cable is permitted to be installed, the marking on the cable is changed to Type FPL-FHC. The "FHC" suffix stands for fire hazard cable. There is a companion comment to revise the marking found in my comment to Proposal 3-269.

Some installations require large amounts of cable. A typical application of a fire hazard cable would be above a suspended ceiling or under a raised floor, neither of which is a plenum. The proposed cable has a very low fuel load, as compared to other types of cable insulation. Some cable constructions use one type of insulation on the conductor and another type for the jacket.

The Type FPLP-FHC cable suggested for listing and marking in 760.179 (comment to proposal 3-269) has parameters (e.g. 3500 BTU/lb) that are standard in the building industry and useful to system designers and fire protection engineers.

To put cable insulation heat release in perspective, here are relative values:
Fire Hazard Cable insulation: less than 8 MJ/kg (3,500 BTU/lb
PVC insulation: As high as 25 MJ/kg (11,000 BTU/lb)
Polyolefin insulation: As high as 46 MJ/kg (20,000 BTU/lb)

Panel Meeting Action: Reject

Panel Statement: The cables recommended in this comment and associated proposal involve a variation of limited combustible cables. Limited combustible cables are available and are marked Type FPLP and can therefore be installed in any location that a riser or general cable can be installed. There is no restriction in the Code preventing the use of this cable and there is no specific requirement for its use. Therefore there is no reason at this time to add the recommended text to 760.61.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12 Negative: 1

Explanation of Negative:

EGESDAL, S.: Six manufacturers have a listing for a robust cable that UL has identified as a limited combustible cable. Yet, CMP 3 has denied Articles 725 and Article 760 from including an application, listing, and marking for this robust cable with an Flame Spread Index less than 25, a Smoke Developed Index less than 50, and a Heat of Combustion less than 3500BTU/lb. The only NEC marking for this robust cable is for a combustible plenum cable (e.g. FPLP). A plenum cable, tested to NFPA 262, has a Smoke Developed Index of 500 or greater and an unknown Heat of Combustion.

This comment did not include an application for installation in plenums to comply with the Standards Council's directive on NFPA 90A.

The panel statement on this comment seems out-of-step with the panel statement to comment 3-122, which follows. "Listing for non-power-limited fire alarm cable is based on UL 1425, Cables for Non-Power-Limited Fire Alarm Circuits, and this listing does not cover Class 1 circuits. A manufacturer could submit a request to the UL Standards Technical Panel (STP) for either a change to the UL standard to permit this application or a separate standard to cover Class 1 cables, but at this point there isn't a Class 1 cable or a standard that would specifically permit this application."

It seems that the NEC TCC needs to provide guidance to the Code Making Panels on whether the NEC of UL should take the lead on requirements included or not included in the NEC.

3-174 Log #1459 NEC-P03 **Final Action: Reject**
(760.179(H) (New))

Submitter: Sanford Egesdal, Egesdal Associates PLC
Comment on Proposal No: 3-269
Recommendation: Reconsider proposal 3-269 and revise as shown below. Note that 760.82 was renumbered to 760.179 by panel action on proposal 3-211.

Sections 760.179(A), through (G) do not change.

Insert new 760.179(H), renumber existing subsections as follows: "H" to "I"; and "I" to "J", and renumber "Table 760.179(I) Cable Markings" to "Table 760.179(J) Cable Markings".

(H) Power-Limited Fire Hazard (-FHC) Cable. Cables used to reduce potential heat release shall be listed as fire hazard (-FHC) cable and shall have a low potential heat release. Fire hazard cables specified in 760.154(C), and used to reduce potential heat release shall have an additional classification using the suffix "-FHC".

FPN No. 1: One method of defining a low potential heat release cable is that the cable exhibits a maximum potential heat value of exceeding 8141 kJ/kg (3500 BTU/lb) when tested in accordance with NFPA 259, *Standard Test Method for Potential Heat of Building Materials* as well as a maximum flame spread index of 25 and a maximum smoke developed index of 50 when tested in accordance with NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*.

Substantiation: As pointed out in my negative comment, I stated out that application of the Standards Council's decision on NPFA 90A was an error. The proposed marking on the cable did not include a "P" added to FPL. Type FPLP cable is permitted to be installed in plenums.

To better clarify that the Standards Council's decision on NFPA 90A does not apply and to better clarify where the cable is permitted to be installed, the marking on the cable is changed to Type FPL-FHC. The "FHC" suffix stands for fire hazard cable. There is a companion comment to revise the application of fire hazard cable in my comment to Proposal 3-250.

The proposed cable provides listing parameters useful to system designers and fire protection engineers.

The key parameter in the listing requirements is potential heat release.

To put cable heat release in perspective, here are relative values:
Fire Hazard Cable insulation: less than 8 MJ/kg (3,500 BTU/lb
PVC insulation: As high as 25 MJ/kg (11,000 BTU/lb)
Polyolefin insulation: As high as 46 MJ/kg (20,000 BTU/lb)

Polyolefin insulation is sometimes used as insulation on conductors, and is covered by a PVC jacket. Polyolefin insulation provides better electrical properties (dielectric constant) than PVC insulation.

Additionally, flame spread and smoke developed parameters identify the robustness of the cable.

A flame spread index of 25 is found in a number of NFPA publications, for example:

NFPA 13-2007

8.15.1 Concealed Spaces.

8.15.1.2.10 Concealed spaces where rigid materials are used and the exposed surfaces have a flame spread index of 25 or less, and the materials have been demonstrated not to propagate fire when tested in accordance with NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials, extended for an additional 20 minutes in the form in which they are installed, shall not require sprinkler protection.

NFPA 13 use of "concealed spaces" corresponds to a typical dictionary definition: out of sight, hidden. This definition add "spaces" to "concealed" and represents a different meaning from how the NEC defines "concealed." Where both the NEC and NFPA 13 apply, "concealed" cable can be removed from a "concealed space." After removal of the cable, the "concealed space" would remain.

A smoke developed index of 50 is more rigorous than the typical smoke developed index of 450 for interior finishes. Interior finishes can be considered a "fixed" application: one sheet or one coat. Cable installations are a "variable" application: one cable or hundreds of cables. It seems reasonable to establish a robust requirement, due to the variable application. Electronic equipment is susceptible to damage from smoke and heat, both components of a fire.

There a number of manufacturers with cable listed to the requirements in the proposed FPN, so these requirements are not a financial hardship.

Panel Meeting Action: Reject

Panel Statement: See the panel statement on Comment 3-173.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12 Negative: 1

Explanation of Negative:

EGESDAL, S.: See my negative vote on comment 3-173.

ARTICLE 770 — OPTICAL FIBER CABLES AND RACEWAYS

16-2 Log #1530 NEC-P16 **Final Action: Reject**
(770)

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-3
Recommendation: Accept this proposal.
Substantiation: I reiterate my 'Explanation of Negative' expressed during the Panel voting. This proposal should be accepted. The preponderance of optical fiber cable applications today is in the telecommunications industry. A number of telecommunications utilities have either begun, or are contemplating, a "fiber-to-the-home" program whereby optical fiber will be provided directly to the customer's premises. The optical fiber cable will be attached to, and possibly installed within the customer's building. While optical fiber cable is also used for data and control circuits, many of these circuits are similar in nature to communications circuits with respect to their installation and safety requirements. It is therefore appropriate that Article 770 be incorporated in Chapter 8. Relocation of Article 770 to Chapter 8 will facilitate usability of the NEC and have no impact on existing requirements.
Panel Meeting Action: Reject
Panel Statement: The panel reafirms its intent to reject. It is more appropriate for Article 770 to remain in Chapter 7. Optical fiber cable is also used for applications other than communications (e.g. control).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
BRUNSSEN, J.: This comment should have been accepted, as should the original Proposal 16-3. The preponderance of optical fiber cable applications is in communications, hence Article 770 belongs in Chapter 8, Communications Systems. For further substantiation see my explanation of negative on Proposal 16-3 and the substantiation accompanying my Comment 16-2.
JOHNSON, S.: I support the commentor's recommendation to relocate Article 770 to Chapter 8. 770 is very similar and largely parallel to Articles 800, 820, and 830 and, therefore, should be similarly located and treated. Articles 770, 800, 820, and 830 all deal with wiring methods used for a variety of telecommunications and communications services.

16-3 Log #153 NEC-P16 **Final Action: Accept**
(770, 800, 810, 820 and 830)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-4
Recommendation: The Technical Correlating Committee understands that the Panel Action on this Proposal should be "Accept in Principle" and further understands the Panel Action text in Proposal 16-4a and Proposal 16-25 provides the additional accepted and modified text. It is also the action of the Technical Correlating Committee that further consideration be given to the comments on the affirmative vote. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
In 820.100(B)(2)(7) (in the preprint) replace the word "grounded" with the word "connected" as follows: "…. disconnecting means that is grounded connected to an electrode as covered in 250.32."
In 820.106(A) (1) revise the text as follows:
"(1) Where there is no mobile home service equipment located in sight from, and not more than 9.0 m (30 ft) from, the exterior wall of the mobile home it serves, the coaxial cable shield ground, or surge arrester ground, shall be connected to a grounding conductor in accordance with 820.100(B)(2)."
In 820.106(A) (2) revise the text as follows:
"(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within sight from, and not more than 9.0m (30 ft) from, the exterior wall of the mobile home it serves, the coaxial cable shield ground, or surge arrester ground, shall be connected to a grounding conductor in accordance with 820.100(B)(2)."
Panel Statement: The panel agrees that the action should have been accept in principle.
The panel has considered the comment an affirmative as directed by the TCC and made the indicated revisions to the text of 820.100(B)(2)(7) and 820.106(A)(1) and (2) as currently contained in the preprint. These revisions are consistent with the panel action on proposals affecting similar requirements in 820.93 and Articles 770, 800, and 830.
See panel action and statement on Proposal 16-305.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
BRUNSSEN, J.: The underlined and strikeout text (legislative format) as developed by Panel 16 does not appear in the Panel Meeting Action text of this comment. Revise the text to read as follows:
Revise 820.100(B)(2)(7) to read: "... disconnecting means that is connected to an electrode as covered in 250.32."
Revise 820.106(A)(1) to read: "(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the coaxial cable shield ground, or surge arrester ground, shall be connected to a grounding conductor in accordance with 820.100(B)(2)."
Revise 820.106(A)(2) to read: "(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the coaxial cable shield ground, or surge arrester ground, shall be connected to a grounding conductor in accordance with 820.100(B)(2)."

16-4 Log #237 NEC-P16 **Final Action: Reject**
(770.1)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-3
Recommendation: Accept this proposal.
Substantiation: The submitter's statement that the preponderance of applications for optical fiber cables is for communications is correct. While the panel's statement that optical fiber cables are also used for other applications such as control is also correct, the noncommunications applications are minor.
It is not accidental that the format of Article 770 parallels the format of the communications articles 800 and 820. Article 770 was written with Article 800 as the template.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 16-2.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
BRUNSSEN, J.: This comment should have been accepted, as should the original Proposal 16-3. See my explanation of negative vote for Comment 16-2.
JOHNSON, S.: See my explanation of negative vote on Comment 16-2.

16-4a Log #CC1600 NEC-P16 **Final Action: Accept**
(770.2)

Submitter: Code-Making Panel 16,
Comment on Proposal No: 16-4a
Recommendation: Revise panel action on Proposal 16-4a to delete new FPNs No. 1 and No. 2.
Substantiation: The FPNs provide unnecessary cross references.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-4b Log #CC1601 NEC-P16 **Final Action: Accept**
(770.2)

Submitter: Code-Making Panel 16,
Comment on Proposal No: 16-4a
Recommendation: Revise 770.2 as follows:
"Point of Entrance. The point within a building at which the cable emerges from an external wall, from a concrete floor slab, or from a rigid metal conduit (Type RMC) or an intermediate metal conduit (Type IMC) connected by a grounding conductor to an electrode in accordance with ~~800.100(B)~~ 770.100(B)."
Substantiation: Proposal 16-25 has incorporated the grounding requirements of 800.100(B) into 770.100(B). Therefore, the appropriate reference is 770.100(B), not 800.100(B). This change correlates with similar text of Articles 800, 820 and 830.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-5 Log #154 NEC-P16 **Final Action: Accept**
(770.2)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-5
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept
Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

The panel has concluded that the added reference to Article 100 is appropriate. Telecommunications constitutes a large portion of optical fiber applications, installed by technicians familiar with Chapter 8 and its independent status. Hence, a reminder to consider the definitions of Article 100 is most helpful and appropriate for these individuals.

While Style Manual conflict is acknowledged, other justifications may warrant the repetitiveness. The application of these references is required for individuals who may not be familiar with other areas of the Code. The Style Manual encourages uniformity of parallel articles.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-6 Log #1104 NEC-P16 **Final Action: Reject (770.2)**

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-4
Recommendation: The Panel Action should continue to be Accept in Principle with the following additional text deletion.
In 770.2, delete the last phrase "connected by a grounding conductor to an electrode in accordance with 800.100(B)."
Substantiation: The deletion of the phrase is required to comply with 2.2.2 of the NEC Style Manual which states "Definitions shall not contain requirements or recommendations." and 2.3.2.2 of the Manual of Style for NFPA Technical Committee Documents which states "Definitions shall not contain requirements."
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comments 16-86, 16-87, 16-201, 16-202, 16-205, 16-284 and 16-285.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-7 Log #1105 NEC-P16 **Final Action: Reject (770.2)**

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-4a
Recommendation: The Panel Action should continue to be Accept in Principle with the following additional text deletion in the Panel Action.
In 770.2, delete the last phrase "connected by a grounding conductor to an electrode in accordance with 800.100(B.)"
Substantiation: The deletion of the phrase is required to comply with 2.2.2 of the NEC Style Manual which states "Definitions shall not contain requirements or recommendations." and 2.3.2.2 of the Manual of Style for NFPA Technical Committee Documents which states "Definitions shall not contain requirements."
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comments 16-86, 16-87, 16-201, 16-202, 16-205, 16-284 and 16-285.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-8 Log #1106 NEC-P16 **Final Action: Reject (770.2)**

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-5
Recommendation: The Panel Action should be to Accept in Part by revising the Proposal as follows:
770.2 Definitions. ~~See Article 100~~. For purposes of this article, the following ~~additional~~ definitions apply.
Substantiation: I agree with the Explanation of Negative by H. Ohde. In accordance with 90.3, Article 100 already applies and there is no need for this additional text reference.
The Panel might want to Reject the Proposal completely in accordance with 2.2.2.2 and the accompanying examples in the NEC Style Manual.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 16-5.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-9 Log #1284 NEC-P16 **Final Action: Reject (770.2)**

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-4a
Recommendation: The Proposal should be Rejected.
Substantiation: I agree with the Explanation of Negative by H. Ohde.

Also, while the panel provided a panel statement explaining the addition of the phrase "connected by a grounding conductor", no substantiation or reason was provided for the addition of the two FPNs.

The FPNs should not be included since the user should be knowledgeable enough in the Code and electrical materials to know what Intermediate Metal Conduit (Type IMC) and Rigid Metal Conduit (RMC) are, or, if not, know enough to go to the specific articles on these raceways for additional information.
Panel Meeting Action: Reject
Panel Statement: See Comment 16-4a (Log #CC1600).

See panel action and statement on Comments 16-86, 16-87, 16-201, 16-202, 16-205, 16-284, and 16-285.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-10 Log #1576 NEC-P16 **Final Action: Accept (770.2)**

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-9
Recommendation: Continue to reject.
Substantiation: The term "air duct" is not used in Article 770 and, therefore, it does not need to be defined in 770.2. Defining a term that is not being used (such as air duct) in that Article is in direct violation with the National Electrical Code Style Manual. CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

I do believe that expansion of, or, a new definition of, air duct in another Article would be a violation of Standards Council Decision D#05-24. Standards Council recognizes the 2002 edition of the NEC as being status quo.
Panel Meeting Action: Accept
Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-11 Log #1577 NEC-P16 **Final Action: Accept (770.2)**

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-10
Recommendation: Continue to reject.
Substantiation: The term "air duct" is not used in Article 770 and, therefore, it does not need to be defined in 770.2. Defining a term that is not being used (such as air duct) in that Article is in direct violation with the National Electrical Code Style Manual. CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

I do believe that expansion of, or, a new definition of, air duct in another Article would be a violation of Standards Council Decision D#05-24. Standards Council recognizes the 2002 edition of the NEC as being status quo.
Panel Meeting Action: Accept
Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-12 Log #1578 NEC-P16 **Final Action: Accept (770.2)**

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-11
Recommendation: Continue to reject.
Substantiation: The term "air duct" is not used in Article 770 and, therefore, it does not need to be defined in 770.2. Defining a term that is not being used (such as air duct) in that Article is in direct violation with the National Electrical Code Style Manual. CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

I do believe that expansion of, or, a new definition of, air duct in another Article would be a violation of Standards Council Decision D#05-24. Standards Council recognizes the 2002 edition of the NEC as being status quo.
Panel Meeting Action: Accept
Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-13 Log #1686 NEC-P16 **Final Action: Accept**
(770.2)

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-13
Recommendation: Continue to Reject.
Substantiation: The submitter's recommendation to add this definition to 770.2 because the term "concealed space" is used in 770.154(A) FPN is misleading. This definition does not belong in the NEC. The 770.154(A) FPN provided no guidance to designers, installers or code officials. This FPN has misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirements because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, the confusion and making it impossible to enforce. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154 and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC, therefore, it can and should be deleted. There is no need for the term "concealed spaces" to be defined.
Panel Meeting Action: Accept
Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original
action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-14 Log #155 NEC-P16 **Final Action: Accept**
(770.2.Abandoned Fiber Optical Cable)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-6
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

The panel accepts the portion of the comments dealing with "Abandoned Optical Fiber Cable" and notes that the term is correct in the preprint. The panel rejects the portion of the comments concerning the fine print note. Equipment is not covered by Article 770; hence the reader must go to Article 100. Usability is enhanced by directing the reader to the definition in Article 100.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:

JENSEN, R.: We agree with the Panel action as to the portion of the comments dealing with "Abandoned Optical Fiber Cable" and notes that the term is correct in the preprint.

However we disagree with including a FPN that duplicates identical normative text that is just a couple of lines above this definition.

CMP 16 accepted proposal 16-5 which will harmonize 770-2, 800-2, 820-2, and 830-2 by including a normative reference to "See Article 100". Adding a FPN to again "See Article 100" is redundant, especially since this FPN will be two lines down from the identical wording in normative text. Additionally, the 2003 NEC Style Guide specifically states to avoid redundant use of references.

16-15 Log #156 NEC-P16 **Final Action: Accept**
(770.2.Optical Fiber Raceway)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-20
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the Panel as a Public Comment. It is the intention of Fine Print Notes to provide explanatory information and they are not intended as a vehicle to provide unnecessary cross-references.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

Usability is enhanced by directing the reader to the definition in Article 100.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-16 Log #157 NEC-P16 **Final Action: Accept**
(770.2.Point of Entrance)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-21
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action with respect to the panel action on Proposal 16-4a.

In addition, it was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. It is the intention of Fine Print Notes to provide explanatory information and they are not intended as a vehicle to provide unnecessary cross-references.

This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Delete the FPNs in 770.2.

Revise 770.2 as follows:

Point of Entrance. The point within a building at which the cable emerges from an external wall, from a concrete floor slab, or from a rigid metal conduit (Type RMC) or an intermediate metal conduit (Type IMC) connected by a grounding conductor to an electrode in accordance with 770.100(B).
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action.

The panel deleted the FPNs and updated the definition of Point of Entrance. This satisfies the comments expressed in the voting.

The panel correlated the text with Proposal 16-25.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-17 Log #1282 NEC-P16 **Final Action: Accept in Part**
(770.2, 800.93, and 820.93)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-4
Recommendation: The panel action should be to Accept in Principle and consideration should be given to the Comment on Affirmative vote by J. Brunssen.

In 770.2, delete FPN No. 1 and No. 2.
In 800.93, delete the FPN.
In 820.93, delete FPN No. 1 and revise "FPN No. 2" to read "FPN".

Substantiation: The Affirmative comment by J. Brunssen contains numerous valid revisions that should be made.

The FPNs should be deleted since the user should be knowledgeable enough in the Code and electrical materials to know what Intermediate Metal Conduit (Type IMC) and Rigid Metal Conduit (RMC) are, or, if not, know enough to go to the specific articles on these raceways for additional information.

The FPNs in 800.93 and 820.93 should be deleted since the definition of Point of Entrance is included in the definition section of each article and it should not be necessary to add FPNs throughout the article referring the user back to the definition.

Panel Meeting Action: Accept in Part
Panel Statement: The panel accepts the portion of the comment to consider the affirmative comment by J. Brunssen. See panel action and statement on Comment 16-3.

The panel accepts the portion of the comment that the panel action should be 'accept in principle'. See panel action and statement on Comment 16-3.

The panel accepts the deletion of 770.2, FPN No. 1 and No. 2. See Comment 16-4a (Log #CC1600).

The panel rejects the portion of the comment to delete the fine print note associated with the "point of entrance" in 800.93, as it is existing text and its removal would constitute new material.

The panel rejects deletion of FPN No. 1 in 820.93. See panel action and statement on Comment 16-224

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-18 Log #158 NEC-P16 **Final Action: Accept**
(770.3, 770.133(C) and 770.100 (new))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-25
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal with respect to the use of the word "and" in the sentence "The grounding conductor shall be connected in accordance with 770.100(B)(1), (B)(2), and (B)(3)."

It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 5-20. This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Revise 770.100(B) as follows:

''The grounding conductor shall be connected in accordance with 770.100(B)(1), (B)(2), or (B)(3)."

Revise 770.100(B)(1) as follows:

"(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination, the grounding conductor shall be connected to the intersystem bonding termination."

Revise 770.100(B)(2) as follows:

"(2) In Buildings or Structures with Grounding Means. If the building or structure served has no intersystem
bonding termination, the grounding conductor shall be connected to the nearest accessible location on the following:"

Revise 770.100(B)(3) as follows:

"(3) In Buildings or Structures Without Intersystem Bonding Termination or Grounding Means. If the building or structure served has no intersystem bonding termination or grounding means, as described in 770.100(B)(2), the grounding conductor shall be connected to either of the following:"

Panel Statement: The panel accepts the direction of the TCC to review clarification of the panel action.

The panel has clarified the panel action on Proposal 16-25 with respect to the word "and" as indicated in the panel action on this comment. It is not the intent to accomplish the grounding connections of 770.100 (B)(1), (B)(2), and (B)(3) simultaneously. The panel has reconsidered Proposal 16-25 in light of the panel action on Proposal 5-20 as directed by the TCC and revised "intersystem grounding termination" to "intersystem bonding termination" as indicated in the panel action on this comment.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-19 Log #1225 NEC-P16 **Final Action: Accept**
(770.3(A))

Submitter: John Burke, Fusion Cable Systems
Comment on Proposal No: 16-26
Recommendation: Continue to Reject this Proposal.
Substantiation: We remove old and unused cable as part of our standard business practice especially in retrofit jobs. The amount of old cable on some jobs has caused damage to the building and created unsafe working conditions for our techs. We support continuing the abandoned cable removal requirement in the Code.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-20 Log #159 NEC-P16 **Final Action: Accept**
(770.3(A), 770.25 (new) & 770.26 (new))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-29
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal with the Panel Action in Proposal 16-25 since there was accepted text for 770.3(A) in Proposal 16-25 and this Proposal 16-29 deletes 770.3(A). This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review clarification of the panel action.

The panel accepted the proposed revisions to the introductory text of 770.3 in Proposal 16-25 and deleted 770.3(A) in Proposal 16-29. Section 770.3(A) was deleted, since 770.3, Other Articles, is not the appropriate location for material on "spread of fire or products of combustion". The panel, in keeping with the editorial task group recommendations, relocated and expanded this material in 770.26 which correlates with similar changes in Articles 800, 820, and 830. Proposal 16-36 adds a new 770.3(A) concerning composite optical fiber cables.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-21 Log #160 NEC-P16 **Final Action: Accept**
(770.3(A), 770.25 (new) and 770.26 (new))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-31
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal and that further consideration be given to the comments expressed in the affirmative voting. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

The panel accepts the direction of the TCC to clarify the panel action.

See panel action and statement on Comments 16-22 and 16-23.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-22 Log #1436 NEC-P16 **Final Action: Accept**
(770.3(A), 770.25 and 770.26)

Submitter: Allen C. Weidman, The Society of the Plastics Industry, Inc.
Comment on Proposal No: 16-31
Recommendation: Accept this proposal in principle by continuing to accept the panel actions and restore the fine print note that the submitter proposed and the panel inadvertently omitted in its actions.
Substantiation: SPI supports the work of the CMP-16 Special Editorial Task Group to produce a more user-friendly code. We agree that the requirements for the removal of abandoned cable do not belong in "Other Locations". We also agree that the firestop requirements should be in the article and not referenced

back to Chapter 3. This is especially important for optical fiber installations since they are not electrical. The low-voltage and no-voltage installers of communications and optical fiber cables should not have to interpret the applicability of the electrical requirements of Chapter 3 to their installations. The fine print note needs to be restored to correct an error.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-23 Log #1602 NEC-P16 **Final Action: Accept**
(770.3(A), 770.25, and 770,26)

Submitter: Allen C. Weidman, Society of the Plastics Industry, Inc.
Comment on Proposal No: 16-31
Recommendation: Accept this proposal in principle by continuing to accept the panel actions and restore the fine print note that the submitter proposed and the panel inadvertently omitted in its actions.
Substantiation: SPI supports the work of the CMP-16 Special Editorial Task Group to produce a more user-friendly code. We agree that the requirements for the removal of abandoned cable do not belong in "Other Locations". We also agree that the firestop requirements should be in the article and not referenced back to Chapter 3. This is especially important for optical fiber installations since they are not electrical. The low-voltage and no-voltage installers of communications and optical fiber cables should not have to interpret the applicability of the electrical requirements of Chapter 3 to their installations. The fine print note needs to be restored to correct an error.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-24 Log #2014 NEC-P16 **Final Action: Reject**
(770.3(A), 770.25, and 770.26)

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-29
Recommendation: This Proposal should have been Rejected.
Substantiation: The submitter's recommendation to add a new 770.26 with this FPN No. 2 to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. 770.26 also has a term "concealed spaces" and it is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 should have rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154, and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo.
Panel Meeting Action: Reject
Panel Statement: The panel rejected the text that the submitter of the comment objected to.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-25 Log #2015 NEC-P16 **Final Action: Reject**
(770.3(A), 770.25, and 770.26)

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-30
Recommendation: This Proposal should have been Rejected.
Substantiation: The submitter's recommendation to add a new 770.26 with this FPN No. 2 to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. 770.26 also has a term "concealed spaces" and it is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 should have rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154, and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo.
Panel Meeting Action: Reject
Panel Statement: The panel rejected the text that the submitter of the comment objected to.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-26 Log #1286 NEC-P16 **Final Action: Hold**
(770.12 and 770.110 (New))

T**CC Action: The Technical Correlating Committee understands that the panel action was to "Hold" the comment only.**
Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-38
Recommendation: The panel action on the Proposal should continue to be Accept in Principle, however, the following additional changes should be made to the panel action:

Revise 770.12 as shown:

770.12 ~~Innerduct for~~ Optical Fiber Cables Installed in Raceways. Listed ~~plenum~~ optical fiber raceways~~, listed riser optical fiber raceway, or listed general purpose optical fiber raceway~~ selected in accordance with the provisions of 770.154 shall be permitted to be installed ~~as innerduct~~ in any type of listed raceway permitted in Chapter 3.

Revise the new 770.110 as follows:

770.110 Raceways for Optical Fiber Cables. Where optical fiber cables are installed in a raceway, the raceway shall be either of a type ~~either~~ permitted in Chapter 3 and installed in accordance with Chapter 3 or a listed ~~plenum~~ optical

fiber raceway~~, listed riser optical fiber raceway, or listed general purpose optical fiber raceway~~ selected in accordance with the provisions of 770.154, and installed in accordance with ~~362.24~~ 362.22 through 362.56, where the requirements applicable to electrical nonmetallic tubing apply. ~~Where optical fiber cables are installed in raceway without current carrying conductors, the raceway fill tables of Chapter 3 and Chapter 9 shall not apply. Where nonconductive optical fiber cables are installed with electric conductors in a raceway, the raceway fill tables of Chapter 3 and Chapter 9 shall apply.~~

Substantiation: "Innerduct" is not defined in the Code and is only used in 770.12. Changing the text as proposed will still permit the installation of listed optical fiber raceways (plenum, riser, or general-purpose) in any type of listed raceway permitted in Chapter 3 without adding an undefined term to the Code. Addition of the term "innerduct" is not necessary to permit the installations proposed, may be confusing to the user since it is not used anywhere else in the Code, and does not add clarity nor enhance usability of the Code.

Relocation of the word "either" provides the consistency between Articles 770, 800, and 820 that the proposer indicated as one of the objectives in the substantiation.

Using the term "listed optical fiber raceways" will also permit the installation of other types of listed optical fiber raceways that may be included in future Codes without having to revise 770.12.

The first sentence in the submitter's substantiation states that "This is an editorial proposal." Deletion of the maximum percentage fill requirements for Chapter 3 raceways is not editorial.

No substantiation was submitted to support the deletion of the maximum percentage fill requirements of Chapters 3 and 9. The fill requirements are based on the physical limitations of being able to pull conductors or cables into raceways without damaging the conductors or cables, particularly when there are bends in the run, and avoiding conductor/cable jamming. The maximum percentage fill requirements are independent of whether they are electrical conductors or not.

The maximum percentage fill requirements in Chapters 3 and 9 are an integral part of the permitted uses of the raceways contained in Chapter 3 and if conductors or cables are to be installed in a Chapter 3 raceway, then the maximum percentage fill requirements must also apply.

The first sentence in proposed 770.10 already states that "installed in accordance with Chapter 3" which would include all of Chapter 3 requirements pertaining to raceways including the maximum percentage fill limitations in Chapter 9. The proposal introduces conflicting requirements between the first and second sentences.

Chapter 9, Table 1 permits 53 percent fill when one conductor or cable is installed in a raceway; 31 percent for two; and 40 percent for three or more.

When electrical conductors are installed in raceways, with or without nonmetallic optical fiber cable or nonmetallic optical fiber raceways, then 310.15 applies and the ampacity adjustment factors in Table 310.15(B)(2)(a) for more than three current-carrying conductors in a raceway or cable would also apply, if applicable.

Panel Meeting Action: Hold

Panel Statement: Changing the installation requirements from "362.24 through 362.56" to "362.22 through 362.56" is new material.

Applying raceway fill requirements to optical fiber cables is new material.

The proposed revision(s) constitute new material that has not had the benefit of public review and cannot be considered at this stage of the code-making cycle. Refer to 4.4.6.2.2 of the Regulations Governing Committee Projects.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-27 Log #368 NEC-P16 **Final Action: Reject**
(770.24)

Submitter: S. D. Kahn, Tri-City Electric Company, Inc. / Rep. NECA

Comment on Proposal No: 16-43

Recommendation: Reject the Proposal.

Substantiation: Although I agree with the proposal and the submitter's intent to introduce consistency, the material is used in plenums and other air handling spaces. Consequently, the proposal should have been subjected to the direction given by the Standards Council, as were many other proposals which were rejected.

As Mr. Dorna noted in his "Explanation of Negative Vote", "The UL Directory (2005), shows that category ZODZ covers "cable ties, cable tie mounts and similar types of related hardware". Likewise, Conduit and Fittings, category DWFV covers "cable ties, conduit straps, staples and similar hardware...". Both categories list as "Suitable for use in air handling spaces in accordance with Sec 300.22(C) and (D) of the National Electrical Code."

This proposal should have been rejected because of the Standards Council decision concerning NFPA 90A. Code Making Panels must be consistent in their handling of all submitted proposals**.**

Panel Meeting Action: Reject

Panel Statement: This is not a 90A issue.

The guide information for ZODZ, Wire Positioning Devices states that:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

The reference to air handling spaces is only a reference and is stated as:

"…for those devices which have been investigated to determine their suitability for use in air handling areas…"

This is a standard statement that is found in a wide variety of listing categories including the category for IT and Telecom equipment to cover situations where a special investigation is done to evaluate a device for air handling spaces. It no way implies that devices in the category are automatically intended for air handling spaces.

Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

Devices are evaluated for properties that we are concerned about. It is NOT a requirement for a listed device to be evaluated for use in air handling spaces.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

JOHNSON, S.: I disagree with the panel statement. This is an NFPA 90A issue and, therefore, should not be acted on per the Standards Council directive.

16-28 Log #369 NEC-P16 **Final Action: Reject**
(770.24)

Submitter: S. D. Kahn, Tri-City Electric Company, Inc. / Rep. NECA

Comment on Proposal No: 16-45

Recommendation: Reject the Proposal.

Substantiation: This proposal should be rejected as the term "listed" should not be introduced at this time. The panel accepted moving the abandoned cable requirement but did not accept deleting "The accessible portion of". The panel rejected the remainder of the proposal except for adding the word "listed". Other proposals move the abandoned cable requirement.

I agree with the submitter's intent with reference to "listed" in order to introduce consistency, however the material is used in plenums and other air handling spaces. Consequently, the proposal should have been subjected to the direction given by the Standards Council, as were many other proposals which were rejected because of that direction.

As Mr. Dorna noted in his "Explanation of Negative Vote", "The UL Directory (2005), shows that category ZODZ covers "cable ties, cable tie mounts and similar types of related hardware". Likewise, Conduit and Fittings, category DWFV covers "cable ties, conduit straps, staples and similar hardware..." Both categories list as "Suitable for use in air handling spaces in accordance with Sec 300.22(C) and (D) of the National Electrical Code."

The proposal portion that introduces "listed" should have been rejected because of the Standards Council decision concerning NFPA 90A. Code Making Panels must be consistent in their handling of all submitted proposals.

Panel Meeting Action: Reject

Panel Statement: This is not a 90A issue.

The guide information for ZODZ, Wire Positioning Devices states that:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

The reference to air handling spaces is only a reference and is stated as:

"…for those devices which have been investigated to determine their suitability for use in air handling areas…"

This is a standard statement that is found in a wide variety of listing categories including the category for IT and Telecom equipment to cover situations where a special investigation is done to evaluate a device for air handling spaces. It no way implies that devices in the category are automatically intended for air handling spaces.

Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

Devices are evaluated for properties that we are concerned about. It is NOT a requirement for a listed device to be evaluated for use in air handling spaces.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

JOHNSON, S.: See my explanation of negative vote on Comment 16-27.

16-29 Log #476 NEC-P16 **Final Action: Reject**
(770.24)

Submitter: Timothy P. McNeive, Thomas & Betts Corporation
Comment on Proposal No: 16-43
Recommendation: Delete the word "listed".
Substantiation: Refer to my comment in ROP 16-45. The use of the term "listed" is redundant in this section whether or not my comment in 16-45 is accepted. I agree with Mr. Boyer's comment accompanying his Negative Vote. The suggested additional text is not needed, however, in this section, if adopted in 770.24(B) according to my comment on ROP 16-45.
Panel Meeting Action: Reject
Panel Statement: The guide information for ZODZ, Wire Positioning Devices, states:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

Listed devices are evaluated using UL1565, Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning which may include bundling and securing or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

The evaluation of positioning devices includes:

- Classification by mechanical strength, material, maximum temperature, and environmental conditions
- Required markings giving critical information to the installer / inspector
- Mechanical strength tests
- Flammability classification of polymeric materials and coatings (NOT air-handling space requirements)
- Relative thermal index
- Material requirements (including blending and substitution)
- Corrosion resistance
- Sharp edges
- Installation
- Mechanical strength
- Vibration
- Tests for mounting blocks and other mounting hardware and devices
- Environmental conditioning.....

Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

BOYER, J.: Proposals, comments nor panel statements provide any technical substantiation for the panel action that would require all hardware used to support these cables to be listed. Code-making Panels 7 and 8 have steadily rejected similar proposals relating to the support of cables and raceways and Code-Making Panel 3 has established no general requirements of this nature. Unlike CMP 7 and 8, CMP 16 has never found it necessary to specify maximum spacing intervals for support of these cables, an indication that reliance on approval of such installations by the authorities having jurisdiction provides sufficient levels of safety. Requiring that all support hardware be listed will provide no appreciable increase in safety but it will decrease the authority of the AHJ and options for supporting the cables, and will increase the cost of cable installations, all without substantiation and consistent treatment of support for cables through the NEC.

JOHNSON, S.: Listing of support hardware is overkill. Requiring brackets, cable ties, bolts, nuts, washers, nails, etc. to be listed where it is obvious that the hardware is suitable for the purpose, does not add to the safety of the installation.

16-30 Log #481 NEC-P16 **Final Action: Reject**
(770.24)

Submitter: Timothy P. McNeive, Thomas & Betts Corporation
Comment on Proposal No: 16-45
Recommendation: Accept the panel action, but delete the requirement that hardware be "listed" in 770.24(B). Add the following sentence before the last sentence in 770.24(B):

"Cable ties that provide primary support for optical fiber cables and raceways shall have a minimum loop tensile strength of 23 kg (50 lbs)."

Substantiation: Adding a requirement that all hardware be "listed" is far from editorial as asserted in the substantiation accompanying the proposal. The panel is asked to consider the long-standing positions of CMP-7 and CMP-8 that do not require support hardware to be "listed". Above all else, consistency in the NEC seems to be what the original submitter values most. No substantiation has been provided in the proposal that would differentiate treatment of antenna television and radio distribution cables from other wiring systems with respect to support. The wide variety of hardware used for supporting cables and raceways are called upon to provide both primary support required in the NEC and very often secondary support or wire management functions. All hardware need not be held to the highest standard.

The comment provided by Mr. Dorna with his negative vote references two UL categories under which cable ties and other hardware are "listed". The correct UL category for Hardware for Support of Conduit, Tubing and Cable (UL 2239) is DWMU, not DWFV. Nevertheless, this standard and UL 1565, Positioning Devices (ZODZ) establishes a 23 kg test load for all support products for flexible conduits and cables in accordance with the requirements for primary support throughout the NEC. For cable ties, "minimum loop tensile strength" is commonly marked on packages. The 23 kg minimum for cable support is well representative of typical straps, hangers and staples listed for flexible conduit and cable support in accordance with UL 2239, Hardware for Support of Conduit, Tubing and Cable. The proposed new text will add value to inspectors in acceptance of appropriate cable ties without requiring lists.

Companion proposals have been submitted for 640.6, 725.8, 760.8, 800.24, 820.24 and 830.24.
Panel Meeting Action: Reject
Panel Statement: There is more to listing than mechanical strength. Also, the mechanical strength should be based on the use and ratings of the device.

Cable ties can be used for securing and supporting cables in a number of Chapter 3 wiring methods without any requirements for a minimum loop tensile strength of 23 kg (50 lbs) or any particular strength. For example, Section 334.30 covering securing and supporting of "nonmetallic-sheathed cable requires supporting and securing by staples, cable ties, straps, hangers, or similar fittings designed and installed so as not to damage the cable, at intervals not exceeding 1.4 m (4 1/ 2 ft) and within 300 mm (12 in.) of every outlet box, junction box, cabinet, or fitting." Notice it does not have any recommendation for the support strength, nor does it need this additional marking or special consideration. The cables may not be providing any support at all where the tie wrap is simply anchoring it to a beam or joist. Types AC and MC cable also give permission to use cable ties for securing and supporting these cables in 320.30 and 330.30, respectively. In addition, this added text could be considered to be new information that has not been reviewed as part of the process.

Listing includes an evaluation of the particular device that goes beyond the ability to support cable. The guide information for ZODZ, Wire Positioning Devices states that:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

BOYER, J.: See my explanation of vote on Comment 16-29.

JOHNSON, S.: See my explanation of negative vote on Comment 16-29.

16-31 Log #1529 NEC-P16 **Final Action: Reject**
(770.24)

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-44
Recommendation: Accept this proposal.
Substantiation: This proposal should be accepted. The requirement added by Panel 16 during the 2005 revision cycle is overly restrictive and inappropriate for optical fiber cables. The Fine Print Note associated with 770.24 directs the reader to the appropriate installation standards. The Panel has enhanced the Fine Print Note during this cycle by the addition of a reference to ANSI/ NECA/FOA 301-2004 covering the installation of optical fiber cables (see Proposal 16-46). These references are all that is necessary and sufficient for such cables without imposing the burdensome requirements of 300.11. Section 300. 11 is directed toward power cable assemblies that are heavier and larger than optical fiber cables. Optical fiber cables contain no power. (Where composite optical fiber cables are used, they are classified as electrical cables in accordance with the type of electrical conductors.) If the Panel continues to reject Proposal 16-44, then, at the very least, 300.11(C) should be excepted. See my companion comment on Proposal 16-48.
Panel Meeting Action: Reject
Panel Statement: The requirements of 300.11 are applicable to optical fiber cables.

The panel recognizes that cables not appropriately secured and supported could pose additional safety hazards.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
BRUNSSEN, J.: This comment should have been accepted as should the original Proposal 16-44. The securing and supporting requirements of 300.11 are overly restrictive and inappropriate for optical fiber cable. Section 300.11 is directed toward power cables that are physically larger and operate at substantially greater voltage, current and power levels. For further substantiation, see my explanation of negative on Proposal 16-44 and the substantiation accompanying my Comment 16-31.

JOHNSON, S.: I support the submitter's arguments. These are lightweight cables and pose no significant safety risk.

JONES, R.: There is no need to incorporate the requirements of 300.11. The installation requirements of Article 770 are adequate. In addition, the Panel has enhanced the Fine Print Note during this cycle by the addition of a reference to ANSI/NECAIFOA 301-2004 covering the installation of optical fiber cables. Section 300.11 is directed toward power cable assemblies that are heavier and larger than optical fiber cables. Optical fiber cables contain no power. (Where composite optical fiber cables are used, they are classified as electrical cables in accordance with the type of electrical conductors.)

16-32 Log #1532 NEC-P16 **Final Action: Reject**
(770.24)

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-48
Recommendation: Accept this proposal.
Substantiation: This proposal should be accepted. If the Panel continues to support the addition of the requirements of 300.11 to 770.24, then at the very least, the requirements of 300.11(C) should be waived. Section 300.11(C) is clearly not applicable to optical fiber cables. Typical installation practice is to lash optical fiber cables together to form a "cable assembly". This frequently occurs during modifications or additions to an existing installation. Optical fiber cables are physically smaller and lighter than power cables and carry no power. Application of 300.11(C) is overly restrictive and will preclude lashing of optical fiber cables together to form a cable assembly. Optical fiber cables secured in this manner have adequate support (see 300.11(A)), are supported independently of the suspended ceiling grid, and are not likely to collapse in the event the suspended ceiling collapses. Such restriction imposes additional installation costs with no improvement in safety. See my companion comment on Proposal 16-44.
Panel Meeting Action: Reject
Panel Statement: Securing an additional cable to an existing cable does not constitute support. Additional cables must be directly supported by the same structural member that supports the first cable. In such installations, the additional cable is being supported by the same structural member.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
BRUNSSEN, J.: This comment should have been accepted, as should the original Proposal 16-48. If the panel continues to support the addition of the securing and supporting requirements of 300.11, then at the very least 300.11(C) should be exempted. It is clearly not applicable to optical fiber cables. For further substantiation, see my explanation of negative on Proposal 16-48 and the substantiation accompanying my Comment 16-32. Additionally, the final sentence of the panel statement is unclear.

JOHNSON, S.: See my explanation of negative vote on Comment 16-31.

JONES, R.: See my Explanation of Negative Vote on Comment 16-31.

16-33 Log #2000 NEC-P16 **Final Action: Reject**
(770.24)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 16-43
Recommendation: This Proposal should have been Accepted without modification by the panel.
Substantiation: Cable ties of different types, materials, and configurations are widely used without problems and probably fall under the existing language "or similar fittings," so they would still continue to be used even if the proposal were rejected. However, much of the hardware that was already specifically permitted is not even available as listed products. For example, most straps, staples, and "hangers" are not listed products. Entire lines of one-hole and two-hole straps, standoff brackets, ring hangers, and the strut-type hardware used for all types of even the most heavy electrical wiring methods are not listed. The requirement should rest on the basic requirement of 110.2 - that all such materials be approved. The proposed wording in the Explanation of Negative by Mr. Boyer would also be usable, as there is a listing standard for the cable ties and this language, since it refers to primary support, would not restrict the use of cable ties that are used only for cable management. The language accepted by the panel would eliminate most of the products currently in use by this industry, without any evidence being provided of a problem with those products.
Panel Meeting Action: Reject
Panel Statement: The guide information for ZODZ, Wire Positioning Devices states that:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

The evaluation of positioning devices includes:

- Classification by mechanical strength, material, maximum temperature, and environmental conditions
- Required Markings giving critical information to the installer / inspector
- Mechanical strength tests
- Flammability classification of polymeric materials and coatings (NOT air-handling space requirements)
- Relative thermal index
- Material requirements (Including blending and substitution)
- Corrosion resistance
- Sharp edges
- Installation
- Mechanical strength
- Vibration
- Tests for mounting blocks and other mounting hardware and devices
- Environmental conditioning.....

Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
JOHNSON, S.: See my explanation of negative vote on Comment 16-29.

16-34 Log #717 NEC-P16 **Final Action: Reject**
(770.24, FPN)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 16-46
Recommendation: The action should be to delete this Fine Print Note.
Substantiation: The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. Code Making Panel 16 should consider taking an action to delete this FPN to coordinate with the other technical committees in the NEC project. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). In the action to reject proposal 8-3, one technical committee member promotes NECA standards as "….a tool to assist untrained electricians to make safer and better installations." The TCC should intervene, uphold the provisions of 90.1(C) and prohibit these types of Fine Print Notes. CMP16 should reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Reject
Panel Statement: Proposal 16-46 pertained to updating the FPN, not to delete it.

The comment requests the FPN be deleted. The FPN provides valuable information, and the panel intends that it be retained but the date updated. The references provided in the FPN provide guidance for installation in a neat and workmanship-like manner.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
PREZIOSO, L.: While I agree with the panel action based on the specific wording of the comment, the proposal referenced a fine print note (FPN) identifying an ANSI/NECA/BICSI Standard as the source for identifying accepted industry practices. The comment writer made the intent of the comment clear in the substantiation, but the panel's action disregarded the substantiation based on an incorrect reference in the recommendation. While it

is true that FPNs are not enforceable, referencing these standards in a FPN as a means for determining the acceptable industry standard is, at best, misleading. I fully support these standards, but on many projects these standards are not incorporated as requirements into the design or the construction of the system or the building. The owners and tenants often waive compliance with these standards as a means of reducing costs. In this situation, referencing the ANSI/ NECA/BICSI Standards as the accepted industry practice for the installation of wires and cables is incorrect, and through the use of the NEC by the AHJ, puts an undue burden on the installer. Accordingly, the comment writer is correct in writing that the FPN should not be in the NEC and panel is correct in rejecting the comment.

16-35 Log #869 NEC-P16 **Final Action: Reject**
(770.24, FPN (New))

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 16-47
Recommendation: The panel is encouraged to continue to Accept Proposal 16-47.
Substantiation: The reasons to continue to Accept the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Reject
Panel Statement: The panel has rejected Proposal 16-47 for the reason given in the panel statement. The submitter of this comment encourages the panel to "continue to accept Proposal 16-47", which is inconsistent with the panel action on Proposal 16-47.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
PREZIOSO, L.: See my explanation of affirmative vote on Comment 16-34.

16-36 Log #543 NEC-P16 **Final Action: Accept in Principle**
(770.25(New), 800.25 (New), 820.25 (New), and 830.25 (New))

TCC Action: The Technical Correlating Committee directs that the Fine Print Notes added in the panel action be deleted because they contain a statement of intent.
The Technical Correlating Committee notes that the rules, as written in the main code text, are clear in that they apply to the accessible portion of the abandoned cable.
Submitter: Richard P. Owen, City Of St. Paul
Comment on Proposal No: 16-29
Recommendation: Revise 770.25 (New), 800.25 (New), 820.25 (New) and 830.25 (New) as shown below:
770.25 Abandoned Cables. The accessible portion of abandoned optical fiber cables shall be removed. Where cables are identified for future use with a tag, the tag shall be of sufficient durability to withstand the environment involved.
FPN: See Article 100 for a definition of accessible. It is desirable to remove as much abandoned cable as is practical, but it is not the intent of this section to require construction or renovation specifically to facilitate the removal of abandoned cable.
800.25 Abandoned Cables. The accessible portion of abandoned communications cables shall be removed. Where cables are identified for future use with a tag, the tag shall be of sufficient durability to withstand the environment involved.
FPN: See Article 100 for a definition of accessible. It is desirable to remove as much abandoned cable as is practical, but it is not the intent of this section to require construction or renovation specifically to facilitate the removal of abandoned cable.
820.25 Abandoned Cables. The accessible portion of abandoned coaxial cables shall be removed. Where cables are identified for future use with a tag, the tag shall be of sufficient durability to withstand the environment involved.
FPN: See Article 100 for a definition of accessible. It is desirable to remove as much abandoned cable as is practical, but it is not the intent of this section to require construction or renovation specifically to facilitate the removal of abandoned cable.
830.25 Abandoned Cables. The accessible portion of abandoned network-powered broadband cables shall be removed. Where cables are identified for future use with a tag, the tag shall be of sufficient durability to withstand the environment involved.
FPN: See Article 100 for a definition of accessible. It is desirable to remove as much abandoned cable as is practical, but it is not the intent of this section to require construction or renovation specifically to facilitate the removal of abandoned cable.
Substantiation: This comment was written by a Task Group consisting of Stan Kaufman and Randy Ivans (Panel 16), John Mortimer (Panel 12) and Ron Maassen, Paul Casparro (Panel 3) plus Task Group Chair Richard Owen (Panel 3). The Task Group was directed by the Technical Correlating Committee to examine proposals submitted to all three Panels concerning abandoned cable and other related issues covered by the Panels.
The Task Group came to consensus on the following issues and submitted comments to the Panels as appropriate:
1) On the issue of abandoned cable removal, the task group agreed that only the accessible portions of abandoned cable should be removed. To require removal of all cable could, in some cases, necessitate demolition of the building finish in order to access cables that were properly fastened to the building in accordance with the rules in the various code articles. Furthermore, the task group agreed that the requirements for abandoned cable removal should not be in Section X.3 (Locations and Other Articles) but should be relocated into the general requirements of each article.
2) The task group also agreed to recommend the addition of a new Fine Print Note to further explain the removal requirement. This addition was thought to be necessary to address a common practice of cables that are "fished" inside existing walls. These cables, if abandoned, can be disconnected from their junction point in a wall and pulled out of the wall without having to harm the building finish. At present, in many cases, these cables are being cut off above the wall and left to drop into the wall space.
3) On the issue of "tagged for future use", the Task Group agreed that it was not necessary to require anything more than the cable tag being "...of sufficient durability to withstand the environment involved." This phrase is used in several other places in the NEC and leaves it up to the AHJ as to what is suitable. This language does not add requirements that are difficult, if not impossible, to enforce by adding unclear requirements for rodent-resistance, etc.
Panel Meeting Action: Accept in Principle
Change the FPN of 770.25, 800.25, 820.25, and 830.25 as follows:
" FPN: See Article 100 for a definition of "Accessible (as applied to wiring methods)". It is desirable to remove as much abandoned cable as is practical."
Panel Statement: The panel accepts the submitter's comment with modification to the FPN of 770.25, 800.25, 820.25 and 830.25 only. The definition of "Accessible (as applied to wiring methods)" adequately covers the last part of the FPN that was removed.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-37 Log #161 NEC-P16 **Final Action: Accept**
(770.30)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-50
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action and Statement on this Proposal and that further consideration be given to the comments expressed in the affirmative votes. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review clarification of the panel action.
The panel accepts the direction of the TCC to review clarification of the panel action.
The panel concurs with the affirmative comments that the correct reference is Proposal 16-84, not Proposal 16-184.
The panel clarifies the panel action per the TCC request as follows. The panel accepts in principle the proposed relocation of the abandoned cable removal requirements, but to 770.25, not 770.30 (see Proposals 16-29, -31). The panel rejects the proposed revision to 770.154(A) per Standards Council Decision 05-24 (SC#05-7-4), and accepts the proposed deletion of text in 770.154(B)(1). Hence, the panel action to "accept in principle in part".
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-38 Log #868 NEC-P16 **Final Action: Reject**
(770.42, FPN)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 16-46
Recommendation: The panel is encouraged to continue to Reject Proposal 16-46.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Reject
Panel Statement: The panel action on Proposal 16-46 was to accept in principle; therefore the panel cannot accept the submitter's recommendation to continue to reject.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
PREZIOSO, L.: See my explanation of affirmative vote on Comment 16-34.

16-39 Log #244 NEC-P16 **Final Action: Accept in Principle**
(770.93)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-54
Recommendation: Accept this proposal in principle by revising 770.93 as shown below:
~~Where exposed to contact with electric light or power conductors, the non–current-carrying metallic members of optical fiber cables entering buildings shall be grounded as close to the point of entrance as practicable or shall be interrupted as close to the point of entrance as practicable by an insulating joint or equivalent device.~~
Optical fiber cables entering buildings or attaching to buildings shall comply with (A) or (B).
(A) Entering Buildings. In installations where an optical fiber cable is exposed to contact with electric light or power conductors and enters the building, the non–current-carrying met
allic members shall be either grounded or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point of entrance.
(B) Terminating Outside of the Building. In installations where an optical fiber cable is exposed to contact with electric light or power conductors and the cable is terminated outside of the building building, the non–current-carrying metallic members shall be either grounded or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point of attachment or termination of the cable.
Substantiation: The suggested text is an editorial clarification. The text the panel accepted deals with two scenarios, installations where the cable enters the building and installations where the cable is terminated outside of the building. It is clearer to deal with each scenario in a separate sentence. The suggested text retains these options.
The suggested text is an editorial clarification intended to bring this section into compliance with section 3.3.1(2) of the NEC Style Manual which states:
2. Use simple declarative sentence structure, and keep sentences short. Writing rules in long sentences full of commas, dependent clauses, and parenthetical expressions often creates confusion and misunderstanding. The requirement can be written in two or more short sentences, expressed using a list or table, or both.
The existing paragraph deals with two scenarios, 1) installations where the cable enters the building and 2) installations where the cable is terminated outside of the building. It is clearer to deal with each scenario in a separate subsection.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-40.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-40 Log #1533 NEC-P16 **Final Action: Accept**
(770.93)

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-4
Recommendation: Accept this proposal in principle by revising 770.93 as shown below:
~~Where exposed to contact with electric light or power conductors, the non–current-carrying metallic members of optical fiber cables entering buildings shall be grounded as close to the point of entrance as practicable or shall be interrupted as close to the point of entrance as practicable by an insulating joint or equivalent device.~~
Optical fiber cables entering the building or terminating on the outside of the building shall comply with (A) or (B).
(A) Entering Buildings. In installations where an optical fiber cable is exposed to contact with electric light or power conductors and the cable enters the building, the non–current-carrying metallic members shall be either grounded as specified in 770.100, or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point of entrance.
(B) Terminating On the Outside of the Building. In installations where an optical fiber cable is exposed to contact with electric light or power conductors and the cable is terminated on the outside of the building, the non–current-carrying metallic members shall be either grounded as specified in 770.100, or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point of termination of the cable.
Substantiation: The Panel, in revising this section, recognized that the cable does not always enter the building. In many cases it is terminated on the outside of the building in an Optical Network Termination (ONT) or similar device. In attempting to accommodate this scenario, the Panel added the text "or attached" and "point of attachment". However, the addition of that text is misleading and will result in impractical and unwieldy grounding and interruption requirements. The suggested text provides editorial clarification by addressing the two scenarios, cables entering the building and cables terminating on the outside of the building, separately. Further, the suggested text eliminates any confusion that may result from the use of the terms "attached" and "point of attachment", and addresses the issue directly: cables that are terminated on the outside of the building. The phrase "connected to an electrode by a grounding conductor" as contained in Proposal 16-4 (770.93) and in the 2008 NEC Draft is unnecessary as the Panel has accepted the addition of the perscriptive grounding requirements of 770.100 (see Proposal 16-25). The text "as specified in 770.100" is added for consistency with the Panel Action on Proposal 16-4 for 800.93, 820.93 and 830.93
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-41 Log #1107 NEC-P16 **Final Action: Accept**
(770.93, FPN (New))

TCC Action: The Technical Correlating Committee directs that the action on this comment be reported as "Accept."
The Technical Correlating Committee notes that a Fine Print Note directing the user from 770.93 back to 770.2 is unnecessary since it is in the same article.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-56
Recommendation: The Panel Action on the Proposal should be Reject.
Substantiation: I agree with the Explanation of Negative submitted by H. Ohde.
Also, the Technical Correlating Committee action on Proposals 16-116 and 16-117, which states in part "It is the intention of Fine Print Notes to provide explanatory information and they are not intended as a vehicle to provide unnecessary cross-references." provides a valid reason to not include the FPN.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 16-224.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-42 Log #1531 NEC-P16 **Final Action: Accept**
(770.100(B))

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-25
Recommendation: Revise the text of 770.100(B) as follows:
"**(B) Electrode.** The grounding conductor shall be connected in accordance with 770.100 (B) (1), (B) (2) ~~and~~ or (B) (3)."

Substantiation: The present text is incorrect as 700.100 (B) refers to three individual requirements that are appropriate under three separate circumstances. They are not to be done simultaneously. Hence, "and" should be replaced by "or".
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 16-18.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-43 Log #1557 NEC-P16 **Final Action: Accept**
(770.100(B))

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-25
Recommendation: Continue to accept the proposal, but change the term "Intersystem Grounding Termination" to "Intersystem Bonding Termination."
Substantiation: This is a correlating comment to correlating with the actions of CMP-5 taken on proposal 5-20 as directed by the TCC. CMP-5 changed the term "Intersystem Grounding Termination" to "Intersystem Bonding Termination."
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 16-18.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-44 Log #2002 NEC-P16 **Final Action: Reject**
(770.113)

TCC Action: The Technical Correlating Committee understands that the text of 770.113 is to be constructed as follows:

Proposal 16-50 shows the title, proposal 16-57 shows the first sentence, and Proposal 16-52 introduces a new Exception to 770.113.

Proposal 16-52 reworded exceptions in the 2005 NEC into positive language in 770.48(A) and (B).

The Technical Correlating Committee directs that the new Exception be written as a complete sentence in accordance with Section 3.1.4.1 of the NEC Style Manual as follows:

"Exception: Optical fiber cables that comply with 770.48 shall not be required to be listed."

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 16-60
Recommendation: This Proposal should have been Rejected.
Substantiation: This proposal conflicts with the language in Proposal 16-57 which was also accepted, and which includes much better language. Proposal 16-57 says where optical fiber cables are installed in buildings they must be listed. This proposal says, literally, listed optical fiber cables must be installed in all buildings. The change in the exception language is unnecessary. If the cable is listed it has to be marked. The change in title is also unnecessary - the content is about listed cables - where they are necessary and where they are not.
Panel Meeting Action: Reject
Panel Statement: The actions on Proposals 16-57 and 16-60 do not conflict. The action on Proposal 16-57 only changed the first sentence of 770.113. The action on Proposal 16-60 left the first sentence of 770.113 unchanged.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-45 Log #162 NEC-P16 **Final Action: Accept**
(770.113 and Table 770.113)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-60
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 16-57. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider and correlate with the action on Proposal 16-57.

See panel action and statement on Comment 16-44.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-46 Log #163 NEC-P16 **Final Action: Accept**
(770.113 Exception No. 2)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-62
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposals 8-53 and 8-78. See Technical Correlating Committee action on Proposals 8-53 and 8-78. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider and correlate with the action on Proposals 8-53 and 8-78.

See panel action and statement on Comment 16-47. There is no requirement that RTRC have the appropriate fire properties to be suitable for this application.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:

STENE, S.: 770.113, Exception No. 2 currently allows rigid nonmetallic conduit, Type RNC in accordance with Article 352. RNC includes both rigid PVC and RTRC conduit. A new Article 355 is being created to cover RTRC, which will then be removed from Article 352. The panel action to remove RTRC from the list of acceptable raceways effectively removes a product which was previously acceptable.

16-47 Log #361 NEC-P16 **Final Action: Accept in Part**
(770.113 Exception No. 2)

TCC Action: The Technical Correlating Committee understands that the change indicated in the panel action should occur in 770.48(B). There is no change in 770.113 as a result of the panel action on this proposal.
Submitter: Code-Making Panel 8,
Comment on Proposal No: 16-62
Recommendation: CMP-16 should accept Proposal 16-62 as originally proposed.
Substantiation: CMP-16 should accept Proposal 16-62 as originally proposed to correlate with the action taken by CMP-8 on Proposals 8-53 and 8-78.

This comment has been balloted through CMP-8 with the following ballot results:

12 Eligible to Vote
11 Affirmative
1 Negative

Mr. R. Loyd voted negatively stating: "Proposal 16-62 was to Reject. I agree with Mr. Burn's' recommendation to revise the panel action, but it should be Accepted in Principle as follows:

"Recommended change:

Revise 770.113, Exception No. 2 to read as follows: "Exception no. 2: Nonconductive optical fiber cables shall not be required to be listed and marked where the cable enters the building from the outside and is run in raceway systems installed in compliance with any of the following Articles in Chapter 3; Article 342, Intermediate Metal Conduit; Type IMC; Article 344, Rigid Metal Conduit; Type RMC; Article 352, PVC Conduit; Article 355, Reinforced Thermosetting Resin Conduit, Type RTRC; and Article 358, Electrical Metallic Tubing, Type EMT."

Substantiation: This change is necessary to correlate with the actions of CMP-8."
Panel Meeting Action: Accept in Part

Revise 770.113 Exception No. 2 as follows:

Exception No. 2: Nonconductive optical fiber cables shall not be required to be listed and marked where the cable enters the building from the outside and is run in raceway systems installed in compliance with any of the following articles in Chapter 3; Article 342, Intermediate Metal Conduit; Type IMC; Article 344, Rigid Metal Conduit; Type RMC; Article 352, Rigid ~~Nonmetallic~~ PVC Conduit; Type PVC ~~RNC~~; and Article 358, Electrical Metallic Tubing: Type EMT.
Panel Statement: The panel accepts the use of PVC conduit and rejects the use of RTRC. There is no requirement for RTRC to have the appropriate fire properties to be suitable for this application.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:

STENE, S.: See my explanation of negative vote on Comment 16-46.

16-48 Log #393 NEC-P16 **Final Action: Accept in Part**
(770.113 Exception No. 2)

Submitter: David H. Kendall, Carlon
Comment on Proposal No: 16-62
Recommendation: This proposal should be Accept in Principle and revised to read as follows:

Exception No. 2: Nonconductive optical fiber cables shall not be required to be listed and marked where the cable enters the building from the outside and is run in raceway systems installed in compliance with any of the following articles in Chapter 3; Article 342, Intermediate Metal Conduit; Type IMC; Article 344, Rigid Metal Conduit; Type RMC; Article 352, Rigid Polyvinyl Chloride Conduit; ~~Nonmetallic Conduit~~; Type PVC, ~~RNC~~; Article 355, Reinforced Thermosetting Resin Conduit; Type RTRC; and Article 358, Electrical Metallic Tubing; Type EMT.
Substantiation: Panel 8 did Accept in Principle Proposals 8-53 and 8-78. To be consistent with the revised Article 352 "Article 352, Rigid Polyvinyl Chloride Conduit: Type PVC" should be used instead of "Article 352, Rigid PVC Conduit; Type PVC" as proposed.

Panel Meeting Action: Accept in Part
Panel Statement: See panel action and statement on Comment 16-47.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
STENE, S.: See my explanation of negative vote on Comment 16-46.

16-49 Log #1388 NEC-P16 **Final Action: Accept in Part**
(770.113 Exception No. 2)

Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 16-62
Recommendation: This Proposal should Accepted as originally proposed.
Exception No. 2: Nonconductive optical fiber cables shall not be required to be listed and marked where the cable enters the building from the outside and is run in raceway systems installed in compliance with any of the following articles in Chapter 3: Article 342, Intermediate Metal Conduit; Type IMC; Article 344, Rigid Metal Conduit: Type RMC; Article 352, Rigid ~~Nonmetallic~~ PVC Conduit: Type PVC ~~RNC~~; Article 355, Reinforced Thermosetting Resin Conduit: Type RTRC; and Article 358, Electrical Metallic Tubing: Type EMT.
Substantiation: In accordance with CMP-8's actions on Proposals 8-53 and 8-78, Article 352 will now apply to "Rigid Polyvinyl Chloride Conduit: Type PVC", and Article 355 will now apply to "Reinforced Thermosetting Resin Conduit: Type RTRC". Prior to the separation of these Articles both of these conduit Types were included in Article 352 as "Rigid Nonmetallic Conduit: Type RNC." Therefore, it is necessary to revise the reference in Exception No. 2 of 770.113 as noted above.
This will correlate with the TCC Action on Proposal 16-62.
Panel Meeting Action: Accept in Part
Panel Statement: See panel action and statement on Comment 16-47.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
STENE, S.: See my explanation of negative vote on Comment 16-46.

16-50 Log #1768 NEC-P16 **Final Action: Reject**
(770.154)

Submitter: Robert W. Jensen, dbi
Comment on Proposal No: 16-70
Recommendation: Accept proposal to delete Fine Print Note
~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~
Substantiation: The Standards Council issued two decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address Code Making Panel (CMP) decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. Proposals to the fine print notes were filed and rejected by the responsible CMP based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is clearly open for further consideration and action during the Comment phase."
This FPN is being misinterpret and used in aggressive marketing attempts to require the installation of "limited combustible cable" (one such example is found at http://www.dupont.com/cablingsolutions/products/codes.html). The FPN has had a profound effect in which it is used in misleading the AHJ to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
As an example, an AHJ Massachusetts would not provide a certificate of occupancy until the communications cabling was either replaced with limited combustible cable, the CMP cable was placed in conduit, or a sprinkler system installed above the suspended ceiling.. Although the installer had met the requirements of the NEC, the FPN misled the AHJ causing project delays and the potential of inordinate cost to the project. A plea to the NFPA aided the communications installer in which clarification was given that the CMP cabling was indeed sufficient to meet code and that NFPA 13 allowed some quantities (which is not defined) of communications cabling within concealed spaces. The installation of the CMP cable was allowed.
To further the removal of this FPN, the Report on Proposals A2006 from NFPA 13 (copy provided), the NFPA committee specifically added an annex A.8.14.1.2.1 in 13-284 log #551 stating that, "Some minor quantities of combustible materials, such as communication wiring, can be present in some concealed spaces but should not typically be viewed as requiring sprinklers (see 8.14.1.1). The threshold value at which sprinklers become necessary in the concealed space is not defined. For example, the usual amounts of data or telephone wiring found above a ceiling would not typically constitute a threat. If bundles of unsheathed computer wiring are installed above the ceiling or beneath the floor in a manner where fire propagation in all directions is likely, then the concealed space should be treated the same as a combustible space, thereby requiring appropriate sprinkler protection."
In addition to the above, Panel 3 rejected the last minute introduction of this proposal that was made in the ROC stage. BICSI, which represents 24,000 installers, designers and manufacturers, feels that this last minute interjection of a FPN was not sufficiently vetted to industry and that the TCC should review this matter.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.
JOHNSON, S.: Various commentors have all indicated that this fine print note causes confusion in the field. FPNs are intended to clarify and are not enforceable. If removing the note will eliminate confusion, I support deletion of the FPN.
OHDE, H.: This comment should have been accepted as this FPN does not provide useful guidance as indicated in the Panel Statement. This FPN which references 8.14.1 of NFPA 13 (2002) Installation of Sprinkler Systems has shown to be problematic and therefore should be deleted as allowed per Standards Council Decision D#06-03. If the FPN were to be deleted this would in effect restore the NEC to the 2002 edition.
The panel statement also included that the 2007 Edition of NFPA 13 would automatically eliminate the possibilities of misinterpretation. There was no opportunity for CMP 16 or the public to review the new proposed edition to see if this would eliminate the possibilities of misinterpretation. The 2007 edition of NFPA 13 also could be in violation of Standards Council Decision D#05-24 to remain status quo on these issues.

16-51 Log #1771 NEC-P16 **Final Action: Reject**
(770.154)

Submitter: Robert W. Jensen, dbi
Comment on Proposal No: 16-70
Recommendation: Accept proposal to delete Fine Print Note
~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~

Substantiation: The Standards Council issued two decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address Code Making Panel (CMP) decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles

725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. Proposals to the fine print notes were filed and rejected by the responsible CMP based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is clearly open for further consideration and action during the Comment phase."

This FPN is being misinterpret and used in aggressive marketing attempts to require the installation of "limited combustible cable" (one such example is found at http://www.dupont.com/cablingsolutions/products/codes.html). The FPN has had a profound effect in which it is used in misleading the AHJ to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

As an example, an AHJ Massachusetts would not provide a certificate of occupancy until the communications cabling was either replaced with limited combustible cable, the CMP cable was placed in conduit, or a sprinkler system installed above the suspended ceiling.. Although the installer had met the requirements of the NEC, the FPN misled the AHJ causing project delays and the potential of inordinate cost to the project. A plea to the NFPA aided the communications installer in which clarification was given that the CMP cabling was indeed sufficient to meet code and that NFPA 13 allowed some quantities (which is not defined) of communications cabling within concealed spaces. The installation of the CMP cable was allowed.

To further the removal of this FPN, the Report on Proposals A2006 from NFPA 13 (copy provided), the NFPA committee specifically added an annex A.8.14.1.2.1 in 13-284 log #551 stating that, "Some minor quantities of combustible materials, such as communication wiring, can be present in some concealed spaces but should not typically be viewed as requiring sprinklers (see 8.14.1.1). The threshold value at which sprinklers become necessary in the concealed space is not defined. For example, the usual amounts of data or telephone wiring found above a ceiling would not typically constitute a threat. If bundles of unsheathed computer wiring are installed above the ceiling or beneath the floor in a manner where fire propagation in all directions is likely, then the concealed space should be treated the same as a combustible space, thereby requiring appropriate sprinkler protection."

In addition to the above, Panel 3 rejected the last minute introduction of this proposal that was made in the ROC stage. BICSI, which represents 24,000 installers, designers and manufacturers, feels that this last minute interjection of a FPN was not sufficiently vetted to industry and that the TCC should review this matter.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-50.

16-52 Log #1772 NEC-P16 **Final Action: Reject**
(770.154)

Submitter: Robert W. Jensen, dbi
Comment on Proposal No: 16-71
Recommendation: Accept proposal to delete Fine Print Note
~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~
Substantiation: The Standards Council issued two decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address Code Making Panel (CMP) decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. Proposals to the fine print notes were filed and rejected by the responsible CMP based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is clearly open for further consideration and action during the Comment phase."

This FPN is being misinterpret and used in aggressive marketing attempts to require the installation of "limited combustible cable" (one such example is found at http://www.dupont.com/cablingsolutions/products/codes.html). The FPN has had a profound effect in which it is used in misleading the AHJ to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

As an example, an AHJ Massachusetts would not provide a certificate of occupancy until the communications cabling was either replaced with limited combustible cable, the CMP cable was placed in conduit, or a sprinkler system installed above the suspended ceiling.. Although the installer had met the requirements of the NEC, the FPN misled the AHJ causing project delays and the potential of inordinate cost to the project. A plea to the NFPA aided the communications installer in which clarification was given that the CMP cabling was indeed sufficient to meet code and that NFPA 13 allowed some quantities (which is not defined) of communications cabling within concealed spaces. The installation of the CMP cable was allowed.

To further the removal of this FPN, the Report on Proposals A2006 from NFPA 13 (copy provided), the NFPA committee specifically added an annex A.8.14.1.2.1 in 13-284 log #551 stating that, "Some minor quantities of combustible materials, such as communication wiring, can be present in some concealed spaces but should not typically be viewed as requiring sprinklers (see 8.14.1.1). The threshold value at which sprinklers become necessary in the concealed space is not defined. For example, the usual amounts of data or telephone wiring found above a ceiling would not typically constitute a threat. If bundles of unsheathed computer wiring are installed above the ceiling or beneath the floor in a manner where fire propagation in all directions is likely, then the concealed space should be treated the same as a combustible space, thereby requiring appropriate sprinkler protection."

In addition to the above, Panel 3 rejected the last minute introduction of this proposal that was made in the ROC stage. BICSI, which represents 24,000 installers, designers and manufacturers, feels that this last minute interjection of a FPN was not sufficiently vetted to industry and that the TCC should review this matter.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-50.

16-53 Log #1773 NEC-P16 **Final Action: Reject**
(770.154)

Submitter: Robert W. Jensen, dbi
Comment on Proposal No: 16-78
Recommendation: Accept proposal to delete Fine Print Note
~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~
Substantiation: The Standards Council issued two decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address Code Making Panel (CMP) decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes

that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. Proposals to the fine print notes were filed and rejected by the responsible CMP based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is clearly open for further consideration and action during the Comment phase."

This FPN is being misinterpret and used in aggressive marketing attempts to require the installation of "limited combustible cable" (one such example is found at http://www.dupont.com/cablingsolutions/products/codes.html). The FPN has had a profound effect in which it is used in misleading the AHJ to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

As an example, an AHJ Massachusetts would not provide a certificate of occupancy until the communications cabling was either replaced with limited combustible cable, the CMP cable was placed in conduit, or a sprinkler system installed above the suspended ceiling.. Although the installer had met the requirements of the NEC, the FPN misled the AHJ causing project delays and the potential of inordinate cost to the project. A plea to the NFPA aided the communications installer in which clarification was given that the CMP cabling was indeed sufficient to meet code and that NFPA 13 allowed some quantities (which is not defined) of communications cabling within concealed spaces. The installation of the CMP cable was allowed.

To further the removal of this FPN, the Report on Proposals A2006 from NFPA 13 (copy provided), the NFPA committee specifically added an annex A.8.14.1.2.1 in 13-284 log #551 stating that, "Some minor quantities of combustible materials, such as communication wiring, can be present in some concealed spaces but should not typically be viewed as requiring sprinklers (see 8.14.1.1). The threshold value at which sprinklers become necessary in the concealed space is not defined. For example, the usual amounts of data or telephone wiring found above a ceiling would not typically constitute a threat. If bundles of unsheathed computer wiring are installed above the ceiling or beneath the floor in a manner where fire propagation in all directions is likely, then the concealed space should be treated the same as a combustible space, thereby requiring appropriate sprinkler protection."

In addition to the above, Panel 3 rejected the last minute introduction of this proposal that was made in the ROC stage. BICSI, which represents 24,000 installers, designers and manufacturers, feels that this last minute interjection of a FPN was not sufficiently vetted to industry and that the TCC should review this matter.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-50.

16-54 Log #1774 NEC-P16 **Final Action: Reject**
(770.154)

Submitter: Robert W. Jensen, dbi

Comment on Proposal No: 16-81

Recommendation: Accept proposal to delete Fine Print Note

~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~

Substantiation: The Standards Council issued two decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address Code Making Panel (CMP) decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. Proposals to the fine print notes were filed and rejected by the responsible CMP based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is clearly open for further consideration and action during the Comment phase."

This FPN is being misinterpret and used in aggressive marketing attempts to require the installation of "limited combustible cable" (one such example is found at http://www.dupont.com/cablingsolutions/products/codes.html). The FPN has had a profound effect in which it is used in misleading the AHJ to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

As an example, an AHJ Massachusetts would not provide a certificate of occupancy until the communications cabling was either replaced with limited combustible cable, the CMP cable was placed in conduit, or a sprinkler system installed above the suspended ceiling.. Although the installer had met the requirements of the NEC, the FPN misled the AHJ causing project delays and the potential of inordinate cost to the project. A plea to the NFPA aided the communications installer in which clarification was given that the CMP cabling was indeed sufficient to meet code and that NFPA 13 allowed some quantities (which is not defined) of communications cabling within concealed spaces. The installation of the CMP cable was allowed.

To further the removal of this FPN, the Report on Proposals A2006 from NFPA 13 (copy provided), the NFPA committee specifically added an annex A.8.14.1.2.1 in 13-284 log #551 stating that, "Some minor quantities of combustible materials, such as communication wiring, can be present in some concealed spaces but should not typically be viewed as requiring sprinklers (see 8.14.1.1). The threshold value at which sprinklers become necessary in the concealed space is not defined. For example, the usual amounts of data or telephone wiring found above a ceiling would not typically constitute a threat. If bundles of unsheathed computer wiring are installed above the ceiling or beneath the floor in a manner where fire propagation in all directions is likely, then the concealed space should be treated the same as a combustible space, thereby requiring appropriate sprinkler protection."

In addition to the above, Panel 3 rejected the last minute introduction of this proposal that was made in the ROC stage. BICSI, which represents 24,000 installers, designers and manufacturers, feels that this last minute interjection of a FPN was not sufficiently vetted to industry and that the TCC should review this matter.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-50.

16-55 Log #2016 NEC-P16 **Final Action: Accept**
(770.154)

Submitter: Harold C. Ohde, IBEW #134

Comment on Proposal No: 16-69

Recommendation: Continue to Reject.

Substantiation: The submitter's recommendation to create a new cable designation (OFN50 and OFC50) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's substantiation would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. The submitter's substantiation references 2002 NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition

of "concealed spaces", therefore making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-56 Log #1466 NEC-P16 **Final Action: Reject**
(770.154, 770.179, 800.154, 800.179, 820.154, and 820.179)

Submitter: Allen C. Weidman, The Society of the Plastics Industry, Inc.
Comment on Proposal No: 16-69
Recommendation: Reconsider and accept the proposals.
Substantiation: The Panel erred in applying the Council's directive on NFPA 90A, related to materials exposed to airflow in an air distribution system. The cables in each of the proposals did not have an "R" or "P" as the last letter in the type designation, so would not be permitted to be installed in a riser or air distribution system (air ducts and plenums). The cables would only be permitted as other wiring within buildings.
Panel Meeting Action: Reject
Panel Statement: Cable meeting specifications as described in this comment are not prohibited by the Code, and the panel sees no need for an additional marking.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-57 Log #366 NEC-P16 **Final Action: Accept**
(770.154 & 800.154)

TCC Action: The Technical Correlating Committee directs that these comment changes occur in 770.154(E) and the Table titled with 770.154(E) based on the action taken in Proposal 16-68.
Submitter: S. D. Kahn, Tri-City Electric Company, Inc. / Rep. NECA
Comment on Proposal No: 16-74
Recommendation: Accept this proposal in principle. Continue to accept the recommendation in proposal 16-74 and, in addition, making the following changes and renumbering the titles of the Tables and Figures as shown:

770.154(F) Cable Substitutions. The substitutions for optical fiber cables listed in Table 770.154(F) and illustrated in Figure 770.154(F) shall be permitted.

Renumber Table 770.154 to be Table 770.154(F) and Figure 770.154 to be Figure 770.154(F).

800.154(G) Cable Substitutions. The uses and substitutions for communications cables listed in Table 800.154(G) and illustrated in Figure 800.154(G) shall be permitted.

FPN: For information on Types CMP, CMR, CMG, CM, and CMX cables, see 800.179.

~~FPN: See Figure 800.154, Cable Substitution Hierarchy.~~

Renumber Table 800.154 to be Table 800.154(G) and Figure 800.154 to be Figure 800.154(G).

Substantiation: Section 2.3 of the NEC Style Manual provides for two options for figures, either they are mandatory and can have mandatory language (shall) or they are non-mandatory and are in a fine print note and do not contain mandatory language. This comment will bring the cable substitution figures into compliance with the style manual by making the cable substitution figures part of the mandatory text.

Although Proposal 16-74 did not deal with 800.154, this comment also addresses that section as well for consistency. Similar corrections for Articles 725, 760 and 820 are contained in other Comments.

This Comment has been prepared by a Task Group established by the Technical Correlating Committee. The Task Group includes R. Owen, M. Ode, S. Owen, J. Brunssen, S. Kaufman, S. Johnson, S. L. Stene and S. D. Kahn.

Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-58 Log #741 NEC-P16 **Final Action: Reject**
(770.154, FPN)

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 16-70
Recommendation: This proposal should be Accepted.
Substantiation: The submitter of this proposal to delete the Fine Print Note referencing NFPA 13 is correct in his substantiation. However, CMP-16 rejected this proposal on the basis of the directive from Standards Council D#05-24, to remain "status quo" on issues with respect to NFPA 90A. The Standards Council has recently decided that the Fine Print Notes under the purview of CMP-16 which reference NFPA 13 may be deleted, and such deletion is not in conflict with the Standards Council directive. This final Standards Council decision is titled D#06-03 and is included for your review. It is important to note that, **Standards Council clearly recognizes the 2002 edition of the NEC, in which these Fine Print Notes were not included, as the status quo.**

An appeal was made by Mr. A. Weidman in an attempt to overturn the previous decision by Standards Council to allow CMP-16 to delete the Fine Print Notes referencing NFPA 13. The appeal was soundly denied by Standards Council. The final decision, D#06-19 is also included for your review. It is extremely interesting to note that the last sentence of the decision by Standards Council provides directions for CMP-16 as follows:

"If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC."

These Fine Print Notes are problematic. Following the advice of Standards Council, they should be deleted. These Fine Print Notes exist solely to manipulate, misinform and threaten end users of the NEC. The proponents of flouropolymer products have developed an elaborate, financially driven scheme outlined as follows:

(1) Develop an Association (CFRA), funded by manufacturers, to coordinate and orchestrate unethical marketing plans by manipulation NFPA codes and standards

(2) Place consultants, hired to push flouropolymer interests, on CMP-3 and CMP-16 under the cloak of other organizations

(3) Promote Fine Print Notes referencing NFPA 13 in the NEC

(4) Use the Fine Print Notes to develop deceiving literature and presentations to manipulate the NFPA family of codes and standards to promote products which are not required

(5) Misinform and manipulate building code officials with a propaganda campaign based on Fine Print Notes in the NEC which reference NFPA 13

(6) Label this deceptive literature, designed for building officials, as "Field Guides" and " Inspection Checklists" (See an example field guide that I have submitted)

(7) Provide instructions for building officials to threaten and harass building owners to use the proponents products

In summary, the proponents of retaining these Fine Print Notes are engaged in an effort to misrepresent and manipulate the NFPA Family of Codes and Standards for their own financial gain. Provided for your review is just one many "Field Guides" supplied by the Cable Fire Research Association to Building Officials across the United States. As you read this "field guide" take note of the serious manipulation and misrepresentation of the NEC and NFPA 13, designed specifically to sell products in which the proponents have financial interests.

The efforts of this same group to manipulate the NFPA family of codes and standards in NFPA 90A led to the "return to committee" of the entire document. The NFPA 13 committee has taken serious steps to stop this runaway propaganda campaign by adding informational text explaining ***that usual amounts of cabling do not represent a problem***. This is referenced in the original proposal to delete the Fine Print Note.

CMP-16 has been lied to by the proponents of these Fine Print Notes referencing NFPA 13. The only reason they exist is to fuel a financially driven propaganda campaign. Retaining these Fine Print Note will lead to continued deception, misrepresentation and manipulation which will lead to the lack of adoption of the NEC.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-50.

16-59 Log #742 NEC-P16 **Final Action: Reject**
(770.154, FPN)

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 16-71
Recommendation: This proposal should be Accepted.
Substantiation: The submitter of this proposal to delete the Fine Print Note referencing NFPA 13 is correct in his substantiation. However, CMP-16 rejected this proposal on the basis of the directive from Standards Council D#05-24, to remain "status quo" on issues with respect to NFPA 90A. The Standards Council has recently decided that the Fine Print Notes under the purview of CMP-16 which reference NFPA 13 may be deleted, and such deletion is not in conflict with the Standards Council directive. This final Standards Council decision is titled D#06-03 and is included for your review. It is important to note that, **Standards Council clearly recognizes the 2002 edition of the NEC, in which these Fine Print Notes were not included, as the status quo.**
An appeal was made by Mr. A. Weidman in an attempt to overturn the previous decision by Standards Council to allow CMP-16 to delete the Fine Print Notes referencing NFPA 13. The appeal was soundly denied by Standards Council. The final decision, D#06-19 is also included for your review. It is extremely interesting to note that the last sentence of the decision by Standards Council provides directions for CMP-16 as follows:
"If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC."
These Fine Print Notes are problematic. Following the advice of Standards Council, they should be deleted. These Fine Print Notes exist solely to manipulate, misinform and threaten end users of the NEC. The proponents of flouropolymer products have developed an elaborate, financially driven scheme outlined as follows:

(1) Develop an Association (CFRA), funded by manufacturers, to coordinate and orchestrate unethical marketing plans by manipulation NFPA codes and standards

(2) Place consultants, hired to push flouropolymer interests, on CMP-3 and CMP-16 under the cloak of other organizations

(3) Promote Fine Print Notes referencing NFPA 13 in the NEC

(4) Use the Fine Print Notes to develop deceiving literature and presentations to manipulate the NFPA family of codes and standards to promote products which are not required

(5) Misinform and manipulate building code officials with a propaganda campaign based on Fine Print Notes in the NEC which reference NFPA 13

(6) Label this deceptive literature, designed for building officials, as "Field Guides" and " Inspection Checklists" (See an example field guide that I have submitted)

(7) Provide instructions for building officials to threaten and harass building owners to use the proponents products

In summary, the proponents of retaining these Fine Print Notes are engaged in an effort to misrepresent and manipulate the NFPA Family of Codes and Standards for their own financial gain. Provided for your review is just one many "Field Guides" supplied by the Cable Fire Research Association to Building Officials across the United States. As you read this "field guide" take note of the serious manipulation and misrepresentation of the NEC and NFPA 13, designed specifically to sell products in which the proponents have financial interests.

The efforts of this same group to manipulate the NFPA family of codes and standards in NFPA 90A led to the "return to committee" of the entire document. The NFPA 13 committee has taken serious steps to stop this runaway propaganda campaign by adding informational text explaining ***that usual amounts of cabling do not represent a problem***. This is referenced in the original proposal to delete the Fine Print Note.

CMP-16 has been lied to by the proponents of these Fine Print Notes referencing NFPA 13. The only reason they exist is to fuel a financially driven propaganda campaign. Retaining these Fine Print Note will lead to continued deception, misrepresentation and manipulation which will lead to the lack of adoption of the NEC.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-50.

16-60 Log #743 NEC-P16 **Final Action: Reject**
(770.154, FPN)

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 16-78
Recommendation: This proposal should be Accepted.
Substantiation: The submitter of this proposal to delete the Fine Print Note referencing NFPA 13 is correct in his substantiation. However, CMP-16 rejected this proposal on the basis of the directive from Standards Council D#05-24, to remain "status quo" on issues with respect to NFPA 90A. The Standards Council has recently decided that the Fine Print Notes under the purview of CMP-16 which reference NFPA 13 may be deleted, and such deletion is not in conflict with the Standards Council directive. This final Standards Council decision is titled D#06-03 and is included for your review. It is important to note that, **Standards Council clearly recognizes the 2002 edition of the NEC, in which these Fine Print Notes were not included, as the status quo.**
An appeal was made by Mr. A. Weidman in an attempt to overturn the previous decision by Standards Council to allow CMP-16 to delete the Fine Print Notes referencing NFPA 13. The appeal was soundly denied by Standards Council. The final decision, D#06-19 is also included for your review. It is extremely interesting to note that the last sentence of the decision by Standards Council provides directions for CMP-16 as follows:
"If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC."
These Fine Print Notes are problematic. Following the advice of Standards Council, they should be deleted. These Fine Print Notes exist solely to manipulate, misinform and threaten end users of the NEC. The proponents of flouropolymer products have developed an elaborate, financially driven scheme outlined as follows:

(1) Develop an Association (CFRA), funded by manufacturers, to coordinate and orchestrate unethical marketing plans by manipulation NFPA codes and standards

(2) Place consultants, hired to push flouropolymer interests, on CMP-3 and CMP-16 under the cloak of other organizations

(3) Promote Fine Print Notes referencing NFPA 13 in the NEC

(4) Use the Fine Print Notes to develop deceiving literature and presentations to manipulate the NFPA family of codes and standards to promote products which are not required

(5) Misinform and manipulate building code o
fficials with a propaganda campaign based on Fine Print Notes in the NEC which reference NFPA 13

(6) Label this deceptive literature, designed for building officials, as "Field Guides" and " Inspection Checklists" (See an example field guide that I have submitted)

(7) Provide instructions for building officials to threaten and harass building owners to use the proponents products

In summary, the proponents of retaining these Fine Print Notes are engaged in an effort to misrepresent and manipulate the NFPA Family of Codes and Standards for their own financial gain. Provided for your review is just one many "Field Guides" supplied by the Cable Fire Research Association to Building Officials across the United States. As you read this "field guide" take note of the serious manipulation and misrepresentation of the NEC and NFPA 13, designed specifically to sell products in which the proponents have financial interests.

The efforts of this same group to manipulate the NFPA family of codes and standards in NFPA 90A led to the "return to committee" of the entire document. The NFPA 13 committee has taken serious steps to stop this runaway propaganda campaign by adding informational text explaining ***that usual amounts of cabling do not represent a problem***. This is referenced in the original proposal to delete the Fine Print Note.

CMP-16 has been lied to by the proponents of these Fine Print Notes

referencing NFPA 13. The only reason they exist is to fuel a financially driven propaganda campaign. Retaining these Fine Print Note will lead to continued deception, misrepresentation and manipulation which will lead to the lack of adoption of the NEC.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.
JOHNSON, S.: See my explanation of negative vote on Comment 16-50.
OHDE, H.: See my Explanation of Negative for Comment 16-50.

16-61 Log #744 NEC-P16 **Final Action: Reject**
(770.154, FPN)

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 16-81
Recommendation: This proposal should be Accepted.
Substantiation: The submitter of this proposal to delete the Fine Print Note referencing NFPA 13 is correct in his substantiation. However, CMP-16 rejected this proposal on the basis of the directive from Standards Council D#05-24, to remain "status quo" on issues with respect to NFPA 90A. The Standards Council has recently decided that the Fine Print Notes under the purview of CMP-16 which reference NFPA 13 may be deleted, and such deletion is not in conflict with the Standards Council directive. This final Standards Council decision is titled D#06-03 and is included for your review. It is important to note that, **Standards Council clearly recognizes the 2002 edition of the NEC, in which these Fine Print Notes were not included, as the status quo.**
An appeal was made by Mr. A. Weidman in an attempt to overturn the previous decision by Standards Council to allow CMP-16 to delete the Fine Print Notes referencing NFPA 13. The appeal was soundly denied by Standards Council. The final decision, D#06-19 is also included for your review. It is extremely interesting to note that the last sentence of the decision by Standards Council provides directions for CMP-16 as follows:
"If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC."
These Fine Print Notes are problematic. Following the advice of Standards Council, they should be deleted. These Fine Print Notes exist solely to manipulate, misinform and threaten end users of the NEC. The proponents of flouropolymer products have developed an elaborate, financially driven scheme outlined as follows:
(1) Develop an Association (CFRA), funded by manufacturers, to coordinate and orchestrate unethical marketing plans by manipulation NFPA codes and standards
(2) Place consultants, hired to push flouropolymer interests, on CMP-3 and CMP-16 under the cloak of other organizations
(3) Promote Fine Print Notes referencing NFPA 13 in the NEC
(4) Use the Fine Print Notes to develop deceiving literature and presentations to manipulate the NFPA family of codes and standards to promote products which are not required
(5) Misinform and manipulate building code officials with a propaganda campaign based on Fine Print Notes in the NEC which reference NFPA 13
(6) Label this deceptive literature, designed for building officials, as "Field Guides" and " Inspection Checklists" (See an example field guide that I have submitted)
(7) Provide instructions for building officials to threaten and harass building owners to use the proponents products
In summary, the proponents of retaining these Fine Print Notes are engaged in an effort to misrepresent and manipulate the NFPA Family of Codes and Standards for their own financial gain. Provided for your review is just one many "Field Guides" supplied by the Cable Fire Research Association to Building Officials across the United States. As you read this "field guide" take note of the serious manipulation and misrepresentation of the NEC and NFPA 13, designed specifically to sell products in which the proponents have financial interests.
The efforts of this same group to manipulate the NFPA family of codes and standards in NFPA 90A led to the "return to committee" of the entire document. The NFPA 13 committee has taken serious steps to stop this runaway propaganda campaign by adding informational text explaining ***that usual amounts of cabling do not represent a problem***. This is referenced in the original proposal to delete the Fine Print Note.
CMP-16 has been lied to by the proponents of these Fine Print Notes referencing NFPA 13. The only reason they exist is to fuel a financially driven propaganda campaign. Retaining these Fine Print Note will lead to continued deception, misrepresentation and manipulation which will lead to the lack of adoption of the NEC.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.
JOHNSON, S.: See my explanation of negative vote on Comment 16-50.
OHDE, H.: See my Explanation of Negative for Comment 16-50.

16-62 Log #1585 NEC-P16 **Final Action: Reject**
(770.154, FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-70
Recommendation: This proposal should be accepted.
Substantiation: This FPN should be deleted as the submitter proposed. In the submitter's substantiation he states that this FPN has misled the AHJ to believe and enforce limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?
NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:
8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.
8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)
8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.
A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.
In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.
CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC, therefore, it can and should be deleted.
Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770

are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-50.

16-63 Log #1586 NEC-P16 **Final Action: Reject**
(770.154, FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-71
Recommendation: This proposal should be accepted.
Substantiation: This FPN should be deleted as the submitter proposed. In the submitter's substantiation he states that this FPN has misled the AHJ to believe and enforce limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC, therefore, it can and should be deleted.
Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-50.

16-64 Log #1587 NEC-P16 **Final Action: Reject**
(770.154, FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-78
Recommendation: This proposal should be accepted.
Substantiation: This FPN should be deleted as the submitter proposed. In the submitter's substantiation he states that this FPN has misled the AHJ to believe and enforce limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC, therefore, it can and should be deleted.
Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-50.

16-65 Log #1588 NEC-P16 **Final Action: Reject**
(770.154, FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-81
Recommendation: This proposal should be accepted.
Substantiation: This FPN should be deleted as the submitter proposed. In the submitter's substantiation he states that this FPN has misled the AHJ to believe and enforce limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as

return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC, therefore, it can and should be deleted.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-50.

16-66 Log #241 NEC-P16 **Final Action: Accept in Principle (Figure 770.154)**

TCC Action: The Technical Correlating Committee directs that these comment changes occur to 770.154(E) and the Table titled with 770.154(E) based on the action taken in Proposal 16-68.

Submitter: Stanley Kaufman, CableSafe Inc.

Comment on Proposal No: 16-74

Recommendation: Accept this proposal in principle. Continue to accept the recommendations in proposal 16-74. In addition make the following changes:

770.154(F) Cable Substitutions. The substitutions for optical fiber cables listed in Table 770.154 and illustrated in Figure 770.154 shall be permitted.

800.154(G) Cable Substitutions. The uses and permitted substitutions for communications cables listed in Table 800.154 and illustrated in Figure 800.154 shall be considered suitable for the purpose and shall be permitted.

FPN: For information on Types CMP, CMR, CMG, CM, and CMX cables, see 800.179.

~~FPN: See Figure 800.154, Cable Substitution Hierarchy.~~

Substantiation: Section 2.3 of the NEC Style Manual provides for two options for figures, either they are mandatory and can have mandatory language (shall) or they are nonmandatory and are in a fine print note and do not contain mandatory language. This comment will bring the cable substitution figures into compliance with the style manual by making the cable substitution figures part of the mandatory text.

Similar corrections for Article 820 are in another comment.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 16-57.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-67 Log #164 NEC-P16 **Final Action: Accept (770.154(A) and (B))**

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 16-80

Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal and that further consideration be given to the comments expressed in the voting. This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

The panel accepts the direction of the TCC to clarify the panel action.

The panel action on Proposal 16-80 should have read, "The panel accepts the submitter's deletion in subsection (B)".

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-68 Log #658 NEC-P16 **Final Action: Reject (770.154(A), FPN)**

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council

Comment on Proposal No: 16-71

Recommendation: Revise text to read as follows:

770.154 Applications of Listed Optical Fiber Cables and Raceways. Nonconductive and conductive optical fiber cables shall comply with any of the requirements given in 770.154(A) through 770.154(E) or where cable substitutions are made as shown in 770.154(F).

(A) Plenums. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type OFNP or OFCP. Abandoned cables shall not be permitted to remain. Types OFNR, OFCR, OFNG, OFN, OFCG, and OFC cables installed in compliance with 300.22 shall be permitted. Listed plenum optical fiber raceways shall be permitted to be installed in ducts and plenums as described in 300.22(B) and in other spaces used for environmental air as described in 300.22(C). Only type OFNP and OFCP cables shall be permitted to be installed in these raceways.

~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~

Substantiation: This is one of three references to NFPA 13 (it is repeated identically in articles 770, 800 and 820) included in the code that is a meaningless reference. Other references to NFPA 13, in Article 362, are properly included in mandatory sections of the code (section 362.10). Whenever a jurisdiction adopts NFPA 13 they need to adopt it for mandatory sections and not for an unenforceable FPN in one section, which is intended to mislead the user. In fact, NFPA 13 does not require that sprinklers be installed in plenums of "noncombustible or limited combustible construction", even if "the usual amount of cabling" is present. In fact, there have been several documented examples already of misrepresentation in that authorities having jurisdiction have been told that this means that sprinklers are required in plenum areas unless "limited combustible cable" is installed. I have been personally involved in several cases, and have heard of many more cases where this is being stated.

Section 8.14.1 of NFPA 13 (2006) reads as follows:

8.14.1.2 Concealed Spaces Not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustibles shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc. can be present in concealed spaces constructed of limited or noncombustible materials but should not typically be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

The same change is being proposed to the corresponding Fine Print Notes in articles 800 and 820, all of which deal with the same type of cables.

The committee rejected the proposal based on, and I quote: "NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005 that states, in pertinent part, as follows:

"[S]o as not to inject the problems identified in the 2002 edition of NFPA 90A into the NEC®, and in order to give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues related to plenum cables by processing the issues through the entire upcoming NFPA 90A revision cycle, the Council directs the NEC Project to maintain the status quo in the NEC until the Technical Committee on Air Conditioning has, through the processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A."

However, Standards Council has since issued two new decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006.

These decisions address CMP decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. The question whether the fine print notes should be in the NEC is hardly new. Aside from the fact that their presence was debated in the previous edition cycle, Proposals to remove them were duly filed and rejected by the responsible Code-Making Panel based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is, therefore, clearly open for further consideration and action during the Comment phase."

Thus, clearly these Standards Council decisions directly permit the deletion of the Fine Print Note addressed by this comment.

Technically this Fine Print Note needs to be deleted for two reasons:

1. This Fine Print Note is misleading by pointing the reader to NFPA 13 which does not require the use of sprinklers, as both Bob Jensen and Harry Ohde point out in their negative votes and as is shown by the sections of NFPA 13 reproduced above.

2. This Fine Print Note is identical to the ones in 800.154 (A) and in 820.154 (A), both of which are equally misleading. On the other hand there are no Fine Print Notes in articles 725 and 760. Thus, deleting this Fine Print Note will provide further consistency within the NEC.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-50

16-69 Log #957 NEC-P16 **Final Action: Reject**
(770.154(A), FPN)

Submitter: Donald Hall, Corning Cable Systems

Comment on Proposal No: 16-78

Recommendation: Note: The commenter is also submitting analogous comments to Proposal 16-197 (ROP Log #3097) and Proposal 16-329 (ROP Log #3095) pertaining to FPNs referencing NFPA 13 Section 8.14.1.

Accept the proposal to delete the FPN, leading to the following:

770.154 Applications of Listed Optical Fiber Cables and Raceways. Nonconductive and conductive optical fiber cables shall comply with any of the requirements given in 770.154(A) through 770.154(E) or where cable substitutions are made as shown in 770.154(F).

(A) Plenums. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type OFNP or OFCP. Abandoned cables shall not be permitted to remain. Types OFNR, OFCR, OFNG, OFN, OFCG, and OFC cables installed in compliance with 300.22 shall be permitted. Listed plenum optical fiber raceways shall be permitted to be installed in ducts and plenums as described in 300.22(B) and in other spaces used for environmental air as described in 300.22(C). Only Type OFNP and OFCP cables shall be permitted to be installed in these raceways.

~~FPN: See 8.14.1 of NFPA 13 (2003), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~

Substantiation: The committee rejected this proposal without any consideration of its merits, based on its belief at the time that it fell within the scope of Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005. since that time, however, the Standards Council has issued two new decisions as follows: Decison 06-06 (SC #6-3-18) dated 22 March 2006 states: in petinent part; "The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC Project would not violate the directive by deleting the Fine Print Notes as issue."

Decision 06-19 (SC #06-7-33) dated 28 July 2006 states, in pertinent part:

"If the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this."

And

"It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800 and 820), but not in others (Articles 725 and 760)."

And

"Nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the comment phase of the code development process."

And

"If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC".

In view of the above decisions, the commenter requests that the proposal be considered on its merits as stated in the original proposal substantiation and as further substantiated below.

Since the original proposal was submitted, the following Annex Note was added to the 2007 Edition of NFPA 13:

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic pluming piping, nonstructural wood, etc. can be present in concealed spaces constructed of limited or noncombustible materials but should not typically be viewed as requiring sprinklers (see 8.14.1.1. for example, it is not the intent of this section to require sprinklers which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

Additionally, the standard approach of the NEC is to require the use of listed products which are tested and approved by a Nationally Recognized Test Laboratory (NRTL) as being suitable for use in a particular application. Normal fire hazards associated with an application space and the application of wiring products installed within them are duly anticipated during the establishment of listing criteria for these products. Air handling spaces are no different from any other space in this regard. The inclusion and particular placement of this FPN is suggestive of the idea that the NEC or the NRTLs has failed to adequately recognize the hazards associated with these spaces. The safety record of plenum cables within air handling spaces has been debated extensively and is open to continued debate within the NFPA Code making process, but the FPN in question should not be used as a maens to short circuit this process and lead users around the code. When properly understood, the FPNs of 770.154(A), 800.154(A), and 820.154(A) lead to a dead end. When not properly understood, they lead to an unnecessary encumbrance upon the use of listed products installed in accordance with approved NEC wiring methods.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-50.

16-70 Log #794 NEC-P16 **Final Action: Reject**
(770.154(A), 800.154(A), and 820.154(A), FPN)

Submitter: Allen C. Weidman, The Society of the Plastics Industry, Inc.

Comment on Proposal No: 16-70

Recommendation: Revise the Fine Print Note in 770.154(A), 800.154(A), and 820.154(A) as follows:

FPN: For cable installations in buildings protected by an automatic sprinkler system, see ~~See~~ 8.14.1 and the annex note A.8.14.1.2.1 of NFPA 13 (200~~2~~5), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.

Substantiation: The submitters of these proposals expressed a concern about misinterpretation of the current FPN. With the issuance of the 2005 edition of NFPA 13, the interpretation of the FPN should no longer be an issue because NFPA 13 now includes an annex note. The suggested text includes referencing that annex note. The suggested text also clarifies that the fine print note applies only to buildings with sprinkler systems and applies to the cable installation, not the sprinkler installation.

Annex note A.8.14.1.2.1 of NFPA 13 (2002~~5~~), Installation of Sprinkler Systems, states:

"A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not typically be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined".

NFPA 13 does not require sprinklers in certain interstitial spaces as long as the combustible loading in the space is low. Since NFPA 13 does not define the threshold value of combustibles at which additional sprinklers are required, avoiding the installation of too large a combustible loading of cable in a building with sprinkler protection may require consultation with the appropriate AHJ. Installers of cables in interstitial spaces need to be aware that they may impact the sprinkler system requirements.

Panel Meeting Action: Reject

Panel Statement: NFPA Standards Council Decision (D #06-19) dated 28 July 2006 directed the panel to not make a change in the FPN.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 770 are interchangeable in many applications, yet there is no correlation of such a FPN.

16-71 Log #1460 NEC-P16 **Final Action: Reject**
(770.154(C) (New))

Submitter: Sanford Egesdal, Egesdal Associates PLC

Comment on Proposal No: 16-69

Recommendation: Reconsider proposal 16-69 and revise 770.154(C) as shown.

(C) Other Wiring Within Buildings. Cables installed in building locations other than the locations covered in 770.154(A) and 770.154(B) shall be Type OFNG, OFN, OFCG, or OFC. Such cables shall be permitted to be installed in listed general-purpose optical fiber raceways. Types OFN-FHC and OFC-FHC cables shall be permitted to be installed to provide reduced potential heat release.

Substantiation: The application of the Standards Council's decision on NPFA 90A was an error. The proposed marking on the cable did not include a "P" added to OFN and OFC. Type OFNP or Type OFCP cables are permitted to be installed in plenums.

This comment adds a sentence to 770.154(C) to incorporate fire hazard cable. By adding fire hazard cable to this section, it is clear that the cable is permitted to be installed as "Other Wiring Within Buildings."

To better clarify that the Standards Council's decision on NFPA does not apply and to better clarify where the cable is permitted to be installed, the marking on the cable is changed to Type OFN-FHC and OFC-FHC. The "FHC" suffix stands for fire hazard cable. There is a companion comment to revise the marking found in my comment to Proposal 16-93.

Some installations require large amounts of cable, although typically much less that an installation of metal conductors. A typical application of a fire hazard cable would be above a suspended ceiling or under a raised floor, neither of which is a plenum. The proposed cable has a very low fuel load, as compared to other types of cable insulation. Some cable constructions use one type of insulation on the conductor and another type for the jacket.

The Types OFN-FHC and OFC-FHC cables suggested for listing and marking in 770.179 (comment to proposal 16-93) have parameters (e.g. 3500 BTU/lb) that are standard in the building industry and useful to system designers and fire protection engineers.

To put cable insulation heat release in perspective, here are relative values:

Fire Hazard Cable insulation: less than 8 MJ/kg (3,500 BTU/lb

PVC insulation: As high as 25 MJ/kg (11,000 BTU/lb)

Polyolefin insulation: As high as 46 MJ/kg (20,000 BTU/lb)

Panel Meeting Action: Reject

Panel Statement: Cable meeting specifications as described in this comment is not prohibited by the Code, and the panel sees no need for an additional marking.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-72 Log #2017 NEC-P16 **Final Action: Accept**
(770.154(F), FPN)

Submitter: Harold C. Ohde, IBEW #134

Comment on Proposal No: 16-89

Recommendation: Continue to Reject.

Substantiation: The submitter's recommendation to create a new cable designation (OFN50 and OFC50) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's recommendation to add this FPN to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-73 Log #2271 NEC-P16 **Final Action: Hold**
(770.179(C), FPN)

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.

Submitter: James Daly, Upper Saddle River, NJ

Comment on Proposal No: 16-91

Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN to read:

FPN: One method of determining that the cable is resistant to the spread of fire is the "Vertical Flame Test - Cables in Cable Trays", in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables.*

Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The Proposal as submitted defines the damage and specifies performance requirements.

Panel Meeting Action: Hold

Panel Statement: A technical change in the fine print note as proposed in this comment would be new material that has not had public review.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-74 Log #2273 NEC-P16 **Final Action: Hold**
(770.179(D), FPN)

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-92
Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN to read:

FPN: One method of determining that the cable is resistant to the spread of fire is the UL Flame Exposure, Vertical Tray Flame Test in UL 1685-2000, *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*.

Another method of determining that the cable is resistant to the spread of fire is the "Vertical Flame Test - Cables in Cable Trays", in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*.
Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The Proposal as submitted defines the damage and specifies performance requirements.
Panel Meeting Action: Hold
Panel Statement: A technical change in the fine print note as proposed in this comment would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-75 Log #2274 NEC-P16 **Final Action: Accept**
(770.179(D), FPN)

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-93
Recommendation: The Panel Action should continue to be Reject. The first FPN as proposed should not be accepted.
Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The first FPN in the Proposal defines the damage and specifies performance requirements.
Panel Meeting Action: Accept
Panel Statement: The panel rejected Proposal 16-93 and reaffirms its rejection by accepting Comment 16-78. The panel action does not indicate agreement or disagreement with the substantiation for the comment.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-76 Log #1461 NEC-P16 **Final Action: Reject**
(770.179(E) (New))

Submitter: Sanford Egesdal, Egesdal Associates PLC
Comment on Proposal No: 16-93
Recommendation: Reconsider proposal 16-93 and revise 770.179 as shown.
(E) Optical Fiber Limited Fire Hazard (-FHC) Cable. Cables used to reduce potential heat release shall be listed as fire hazard (-FHC) cable and shall have a low potential heat release. Fire hazard cables specified in 770.154(C), and used to reduce potential heat release shall have an additional classification using the suffix "-FHC".

FPN No. 1: One method of defining a low potential heat release cable is that the cable exhibits a maximum potential heat value of exceeding 8141 kJ/kg (3500 BTU/lb) when tested in accordance with NFPA 259, *Standard Test Method for Potential Heat of Building Materials*, as well as a maximum flame spread index of 25 and a maximum smoke developed index of 50 when tested in accordance with NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*.
Substantiation: The application of the Standards Council's decision on NPFA 90A was an error. The proposed marking on the cable did not include a "P" added to OFN or OFC. Type OFNP or Type OFCP cables are permitted to be installed in plenums.

To better clarify that the Standards Council's decision on NFPA does not apply and to better clarify where the cable is permitted to be installed, the marking on the cable is changed to Type FPL-FHC. The "FHC" suffix stands for fire hazard cable. There is a companion comment to revise the application of fire hazard cable in my comment to Proposal 16-69.

The proposed cable provides listing parameters useful to system designers and fire protection engineers.

The key parameter in the listing requirements is potential heat release.

To put cable heat release in perspective, here are relative values:

Fire Hazard Cable insulation: less than 8 MJ/kg (3,500 BTU/lb

PVC insulation: As high as 25 MJ/kg (11,000 BTU/lb)

Polyolefin insulation: As high as 46 MJ/kg (20,000 BTU/lb)

Polyolefin insulation is sometimes used as insulation on conductors, and is covered by a PVC jacket. Polyolefin insulation provides better electrical properties (dielectric constant) than PVC insulation.

Additionally, flame spread and smoke developed parameters identify the robustness of the cable.

A flame spread index of 25 is found in a number of NFPA publications, for example:

NFPA 13-2007

8.15.1 Concealed Spaces.

8.15.1.2.10 Concealed spaces where rigid materials are used and the exposed surfaces have a flame spread index of 25 or less, and the materials have been demonstrated not to propagate fire when tested in accordance with NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials, extended for an additional 20 minutes in the form in which they are installed, shall not require sprinkler protection.

NFPA 13 use of "concealed spaces" corresponds to a typical dictionary definition: out of sight, hidden. This definition add "spaces" to "concealed" and represents a different meaning from how the NEC defines "concealed." Where both the NEC and NFPA 13 apply, "concealed" cable can be removed from a "concealed space." After removal of the cable, the "concealed space" would remain.

A smoke developed index of 50 is more rigorous than the typical smoke developed index of 450 for interior finishes. Interior finishes can be considered a "fixed" application: one sheet or one coat. Cable installations are a "variable" application: one cable or hundreds of cables. It seems reasonable to establish a robust requirement, due to the variable application. Electronic equipment is susceptible to damage from smoke and heat, both components of a fire.
Panel Meeting Action: Reject
Panel Statement: Cable meeting specifications as described in this comment is not prohibited by the Code, and the panel sees no need for an additional marking.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-77 Log #1573 NEC-P16 **Final Action: Accept**
(770.179(E))

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-95
Recommendation: Continue to reject.
Substantiation: The submitter's recommendation to create a new cable designation (concealed space cable) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's substantiation would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, the confusion and making it impossible to enforce. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-78 Log #2018 NEC-P16 **Final Action: Accept**
(770.179(E))

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-93
Recommendation: Continue to Reject.
Substantiation: The submitter's recommendation to create a new cable designation (OFN50 and OFC50) is nothing more than a marketing ploy. The submitter's recommendation to add these three FPNs to this section is in grave error. FPN No. 1 is a backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The FPN No. 2 would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. The submitter's substantiation references 2002 NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 780 — CLOSED-LOOP AND PROGRAMMED POWER DISTRIBUTION

7-78 Log #68 NEC-P07 **Final Action: Accept**
(780)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 10-59
Recommendation: The Technical Correlating Committee advises that Article Scope statements are the responsibility of the
Technical Correlating Committee and the Technical Correlating Committee accepts the Panel Action of deleting Article 780.

It was the action of the Technical Correlating Committee that this Proposal be correlated with Code-Making Panel 7 for consideration of how to handle the reference to 780.5 in 334.104. This action will be considered by Code-Making Panel 7 as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel 7 concurs with the Action taken by Panel 10 to Accept Proposal 10-59 which deleted Article 780 and takes the following Actions to correlate with the deletion of Article 780.

(1) In 334.104 in the 2005 Code, deletes the second sentence "The signaling conductors shall comply with 780.5."

(2) In 334.104, as amended by the Panel 7 Meeting Action on Proposal 7-78, deletes "(A) Signaling Conductors shall comply with 780.5." and re-identifies (B) and (C) as (A) and (B) respectively.

(3) In 334.116(C) of the 2005 Code, and in accordance with the Panel 7 Meeting Action on Proposal 7-78, deletes "and signaling" from the second sentence and deletes the third and fourth sentences which read "The signaling conductors shall be permitted to be shielded. An optional outer jacket shall be permitted."
Panel Statement: The Panel Action deleted the references to 780.5 and signaling conductors. 334.116(C) was also revised to correlate with the deletion of Article 780.
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

16-79 Log #250 NEC-P16 **Final Action: Accept**
(800.1)

TCC Action: The Technical Correlating Committee directs that the words "For installation requirements" in FPN No. 2 and FPN No. 3 be changed to "For further information" because Articles 725 and 760 refer to Article 800.
Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-98
Recommendation: Accept proposal 16-98 in principle by revising the fine print notes in the proposal.

From:

FPN No. 1: For further information for fire alarm, sprinkler waterflow, and sprinkler supervisory systems, see Article 760.

FPN No. 2: For installation requirements of optical fiber cables, see Article 770.

FPN No. 3: For installation requirements for network-powered broadband communications circuits, see Article 830.

FPN No. 4: For installation requirements for equipment and circuits in an information technology equipment room. see Article 645.

FPN No. 5: For further information on remote-control, signaling. and powerlimited circuits. see Article 725.

To:

FPN No. 1: For installation requirements for information technology equipment and systems in an information technology equipment room, see Article 645.

FPN No. 2: For installation requirements for remote-control, signaling. and power-limited circuits, see Article 725.

FPN No. 3: For installation requirements for fire alarm systems see Article 760.

FPN No. 4: For installation requirements of optical fiber cables and raceways, see Article 770.

FPN No. 5: For installation requirements for network-powered broadband communications circuits, see Article 830.

Substantiation: The current scope of Article 800 and proposal 16-98 text refer to some articles "for installation requirements" and to other articles "for further information".

Section 3.3.5 of the NEC Style Manual states:

3.3.5 Parallel Construction. Parallel construction means stating similar requirements in similar ways for greater consistency. This helps makes the *NEC* clear for users. Lack of consistency often creates confusion, causing users to ask: *Does this difference in wording represent a different requirement? Or is it simply two different ways of trying to say the same thing?* There are several kinds of parallel construction:

Organization and Numbering. If practicable, the subsections of similar articles should be numbered in the same order (see 2.4.1).

Sections. Different sections, within the same article, that reflect similar or closely related subjects, should have similar structures.

Lists. All items in a list should be parallel (that is, singular or plural, written in the same verb tense, using phrases or sentences but not a mix).

This comment would make all the fine print note references consistent and parallel and in the same numerical order as the articles referenced.

Other suggested changes are to use the language of the referenced article so as to improve clarity and consistency and to avoid any confusion between the content of the fine print notes and the scopes of the referenced articles.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:

JENSEN, R.: We disagree with the definition of communications circuit as it clouds the scope of the article with other articles. As an example, a telephone circuit can be extended with 820 cable, or 725 cable. Jurisdictions can then apply different rules such as conduit fill requirements, and electrical protection.

We understand and agree that the TCC has responsibility for Article Scope statements. However, the scope has been released into the hands of a Panel by allowing control over such a definition. Additionally, there will now be jurisdictional issues between Panels.

We ask that there be no change to the current scope and definitions involved. We also propose that a Task Group be assigned to approach this issue. As an example, this article may be focused on utility delivery up to the first connection within a building (today up to 50 ft from the entrance of the cable into a building) and building wiring segmented into other articles for coaxial and twisted pair. Fiber optics is already an Article of its own.

ARTICLE 800 — COMMUNICATIONS CIRCUITS

16-80 Log #1534 NEC-P16 **Final Action: Accept (800.1)**

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-98
Recommendation: Revise the text of the proposed new definition of "communications circuit" for clarification as follows:
"800.2 Communications Circuit. The circuit that extends voice, audio, video, data, interactive services, telegraph (except radio), outside wiring for fire alarm and burglar alarm from the communications utility to the customer's communications equipment up to and including terminal equipment such as a telephone, fax machine or answering machine."
Substantiation: The present text is unclear and may be construed as not including all premises communications wiring and equipment, such as a telephone or fax machine. For example, if a customer has a local telecommunications switch or PBX, the communications circuit would include not only the PBX, but all communications cabling and wiring connecting the customer's terminal equipment to the PBX.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
JENSEN, R.: We disagree with the definition of communications circuit as it clouds the scope of the article with other articles. As an example, a telephone circuit can be extended with 820 cable, or 725 cable. Jurisdictions can then apply different rules such as conduit fill requirements, and electrical protection.
We understand and agree that the TCC has responsibility for Article Scope statements. However, the scope has been released into the hands of a Panel by allowing control over such a definition. Additionally, there will now be jurisdictional issues between Panels.
We ask that there be no change to the current scope and definitions involved. We also propose that a Task Group be assigned to approach this issue. As an example, this article may be focused on utility delivery up to the first connection within a building (today up to 50 ft from the entrance of the cable into a building) and building wiring segmented into other articles for coaxial and twisted pair. Fiber optics is already an Article of its own.

16-81 Log #248 NEC-P16 **Final Action: Accept in Principle (800.2)**

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-98
Recommendation: Revise the definition of communications circuit as follows:
800.2 Communications Circuit. The circuit that extends voice, audio, video, data, interactive services, telegraph (except radio), outside wiring for fire alarm and burglar alarm from the communications utility to the customer's communications equipment, up to and including terminal equipment such a telephone or a fax machine.
Substantiation: The new scope statement for Article 800 relies on the definition of "communications circuit". The recommended definition clarifies that the communications circuit extends up to the terminal equipment which typically is a telephone. Without this revision, Article 800 could be interpreted as ending at a PBX and not including all the cables, communications outlets, fax machines and telephones in a typical office.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-80.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
JENSEN, R.: We disagree with the definition of communications circuit as it clouds the scope of the article with other articles. As an example, a telephone circuit can be extended with 820 cable, or 725 cable. Jurisdictions can then apply different rules such as conduit fill requirements, and electrical protection.
We understand and agree that the TCC has responsibility for Article Scope statements. However, the scope has been released into the hands of a Panel by allowing control over such a definition. Additionally, there will now be jurisdictional issues between Panels.
We ask that there be no change to the current scope and definitions involved. We also propose that a Task Group be assigned to approach this issue. As an example, this article may be focused on utility delivery up to the first connection within a building (today up to 50 ft from the entrance of the cable into a building) and building wiring segmented into other articles for coaxial and twisted pair. Fiber optics is already an Article of its own.

16-82 Log #249 NEC-P16 **Final Action: Accept in Principle (800.2)**

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-98
Recommendation: Revise the definition of communications circuit as follows:
800.2 Communications Circuit. The circuit that extends voice, audio, video, data, interactive services, telegraph (except radio), outside wiring for fire alarm and burglar alarm from the communications utility to the customer's communications equipment, up to and including terminal equipment such a telephone or a fax machine.
Substantiation: The new scope statement for Article 800 relies on the definition of "communications circuit". The recommended definition clarifies that the communications circuit extends up to the terminal equipment which typically is a telephone. Without this revision, Article 800 could be interpreted as ending at a PBX and not including all the cables, communications outlets, fax machines and telephones in a typical office.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-80.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
JENSEN, R.: We disagree with the definition of communications circuit as it clouds the scope of the article with other articles. As an example, a telephone circuit can be extended with 820 cable, or 725 cable. Jurisdictions can then apply different rules such as conduit fill requirements, and electrical protection.
We understand and agree that the TCC has responsibility for Article Scope statements. However, the scope has been released into the hands of a Panel by allowing control over such a definition. Additionally, there will now be jurisdictional issues between Panels.
We ask that there be no change to the current scope and definitions involved. We also propose that a Task Group be assigned to approach this issue. As an example, this article may be focused on utility delivery up to the first connection within a building (today up to 50 ft from the entrance of the cable into a building) and building wiring segmented into other articles for coaxial and twisted pair. Fiber optics is already an Article of its own.

16-83 Log #254 NEC-P16 **Final Action: Accept in Part (800.2)**

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-116
Recommendation: Accept this proposal in principle in part by continuing to accept the modification to the definition of the point of entrance and rejection the addition of the fine print notes. Add the following additional definitions:
Intermediate Metal Conduit (Type IMC). The definition in 342.2 shall apply.
Rigid Metal Conduit (Type RMC). The definition in 344.2 shall apply.
Substantiation: Article 800 uses the terms Intermediate Metal Conduit and Rigid Metal Conduit. These terms are defined in Articles 342 and 344 respectively. Because of 90.3 (excerpted below), these definitions do not apply to Chapter 8. They will apply if this comment is accepted.
"Chapter 8 covers communications systems and is not subject to the requirements of Chapters 1 through 7 except where the requirements are specifically referenced in Chapter 8."
Panel Meeting Action: Accept in Part
Delete FPNs No. 1 and No. 2.
Panel Statement: The panel accepts the deletion of the FPNs and rejects the addition of definitions, as they are covered by references to Chapter 3 within 800.110.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-84 Log #660 NEC-P16 **Final Action: Reject (800.2)**

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-100
Recommendation: Delete the following text:
~~**800.2 Air Duct.** A conduit or passageway for conveying air to or from heating, cooling, air conditioning, or ventilating equipment, but not including the plenum~~.
Substantiation: The term "air duct" is not contained in article 800 and should not, thus, be defined.
The same change is being proposed for the definition of "air duct" in article 820.

The committee rejected the proposal based on, and I quote: "NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005 that states, in pertinent part, as follows:

"[S]o as not to inject the problems identified in the 2002 edition of NFPA 90A into the NEC®, and in order to give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues related to plenum cables by processing the issues through the entire upcoming NFPA 90A revision cycle, the Council directs the NEC Project to maintain the status quo in the NEC until the Technical Committee on Air Conditioning has, through the processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A."

However, Standards Council has since issued two new decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address CMP decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. The question whether the fine print notes should be in the NEC is hardly new. Aside from the fact that their presence was debated in the previous edition cycle, Proposals to remove them were duly filed and rejected by the responsible Code-Making Panel based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is, therefore, clearly open for further consideration and action during the Comment phase."

It would appear to me that these Standards Council decisions by implication would indirectly permit the deletion of definitions that violate the NEC manual of style.

Panel Meeting Action: Reject

Panel Statement: As there was no opportunity for public review and comment the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

JENSEN, R.: We disagree that there was no opportunity for public review. To the contrary, there were nineteen (19) comments received on proposals involving this definition, thereby showing that this proposal was indeed reviewed.

We believe that the interpretation of whether being allowed to address the original proposal in view of the NFPA Standards Council Long Decision 05-24 (SC #05-7-4) was wrong. Indeed, during the writing of the 2005 NEC, all references where 90A issues were involved were to be untouched in the 2005 NEC. One of these issues was "air duct cable" and the definition of "air duct" (as it pertained to air duct cable). Additionally, having a definition where the term is not used in the text of the code is in violation of the Style Guide.

We agree with deleting the term "air duct" as it was evidently an oversight that it was not removed during the last code cycle. Air duct was introduced for use with "air duct cable" which was not to be used in the 2005 code. Additionally, the term is not used within 800. To further not using this term, in proposal 16-29, the panel revised the proposal to not use "air duct", but instead to harmonize code language by using the term "ventilation or air handling ducts".

OHDE, H.: This comment should have been accepted as this is no need for this definition of "air duct". The term "air duct" is not contained in this Article therefore should not be defined.

The panel statement reflects that Standards Council decision relative to NFPA 90A Decision is remain status quo regarding plenum issues. I do not believe that the Standard Council decision would prohibit the definition of air duct from being deleted.

16-85 Log #661 NEC-P16 **Final Action: Reject (800.2)**

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council

Comment on Proposal No: 16-351

Recommendation: Delete the following text:

~~**800.2 Air Duct.** A conduit or passageway for conveying air to or from heating, cooling, air conditioning, or ventilating equipment, but not including the plenum~~.

Substantiation: The term "air duct" is not contained in article 800 and should not, thus, be defined.

The same change is being proposed for the definition of "air duct" in article 820.

The committee rejected the proposal based on, and I quote: "NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005 that states, in pertinent part, as follows:

"[S]o as not to inject the problems identified in the 2002 edition of NFPA 90A into the NEC®, and in order to give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues related to plenum cables by processing the issues through the entire upcoming NFPA 90A revision cycle, the Council directs the NEC Project to maintain the status quo in the NEC until the Technical Committee on Air Conditioning has, through the processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A."

However, Standards Council has since issued two new decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address CMP decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. The question whether the fine print notes should be in the NEC is hardly new. Aside from the fact that their presence was debated in the previous edition cycle, Proposals to remove them were duly filed and rejected by the responsible Code-Making Panel based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is, therefore, clearly open for further consideration and action during the Comment phase."

It would appear to me that these Standards Council decisions by implication would indirectly permit the deletion of definitions that violate the NEC manual of style.

Please note that the original proposal was incorrectly placed in article 830 but referred to article 800.

Panel Meeting Action: Reject

Panel Statement: As there was no opportunity for public review and comment the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

OHDE, H.: See my Explanation of Negative for Comment 16-84.

16-86 Log #1108 NEC-P16 **Final Action: Accept in Part (800.2)**

Submitter: James Daly, Upper Saddle River, NJ

Comment on Proposal No: 16-116

Recommendation: The Panel Action should continue to be Accept in Principle with the following additional revisions to the Panel Action.

In the definition for Point of Entrance, delete the last phrase "connected by a grounding conductor to an electrode in accordance with 800.100(B)."

Delete the two FPNs.

Substantiation: The deletion of the phrase is required to comply with 2.2.2 of the NEC Style Manual which states "Definitions shall not contain requirements or recommendations." and 2.3.2.2 of the Manual of Style for NFPA Technical Committee Documents which states "Definitions shall not contain requirements."
The Technical Correlating Committee has provided a valid reason to delete the FPNs.
Panel Meeting Action: Accept in Part
Panel Statement: The panel accepts the deletion of the FPNs. See panel action and statement on Comments 16-100 and 16-83.

The panel rejects the deletion of the phrase "connected by a grounding conductor to an electrode in accordance with 800.100(B)" because it is an integral and necessary part of the definition. See panel action and statement on Comment 16-87.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-87 Log #1109 NEC-P16 **Final Action: Reject (800.2)**

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-117
Recommendation: The Panel Action should continue to be Accept in Principle with the following additional revision to the Panel Action.
In the definition for Point of Entrance, delete the last phrase "connected by a grounding conductor to an electrode in accordance with 800.100(B)."
Substantiation: The deletion of the phrase is required to comply with 2.2.2 of the NEC Style Manual which states "Definitions shall not contain requirements or recommendations." and 2.3.2.2 of the Manual of Style for NFPA Technical Committee Documents which states "Definitions shall not contain requirements."
Panel Meeting Action: Reject
Panel Statement: A cable emerging from a rigid metal conduit or intermediate metal conduit may be considered as the "point of entrance" only if the metal conduit is properly grounded. Hence, the phase "connected by a grounding conductor to an electrode in accordance with 800.100(B)" is an integral and necessary part of the definition.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-88 Log #1535 NEC-P16 **Final Action: Accept (800.2)**

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-105
Recommendation: Continue to reject this proposal.
Substantiation: This proposal should continue to be rejected as the application of the "block" concept by the telecommunications utilities has resulted in an exemplary safety record. The many reasons for rejecting the proposal as iterated in the Panel Statement accompanying Proposal 16-148 are appropriate and support continued rejection.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-89 Log #1579 NEC-P16 **Final Action: Reject (800.2)**

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-99
Recommendation: This proposal should be accepted.
Substantiation: The term "air duct" is not used in Article 800 and, therefore, it should be deleted from 800.2. Defining a term that is not being used (such as air duct) in that Article is in direct violation with the National Electrical Code Style Manual. CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

I do not believe that this Standards Council decision would prohibit the definition of "air duct" from being deleted. I do believe that expansion of, or a new definition of, air duct in another Article would be a violation of Standards Council Decision D#05-24. Standards Council recently issued another decision (D#06-03) which decided that 770.154(A) FPN, 800.154(A) FPN and 820.154(A) FPN may be deleted and this deletion would not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo.
Panel Meeting Action: Reject
Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

JENSEN, R.: We disagree that there was no opportunity for public review. To the contrary, there were nineteen (19) comments received on proposals involving this definition, thereby showing that this proposal was indeed reviewed.

We believe that the interpretation of whether being allowed to address the original proposal in view of the NFPA Standards Council Long Decision 05-24 (SC #05-7-4) was wrong. Indeed, during the writing of the 2005 NEC, all references where 90A issues were involved were to be untouched in the 2005 NEC. One of these issues was "air duct cable" and the definition of "air duct" (as it pertained to air duct cable). Additionally, having a definition where the term is not used in the text of the code is in violation of the Style Guide.

We agree with deleting the term "air duct" as it was evidently an oversight that it was not removed during the last code cycle. Air duct was introduced for use with "air duct cable" which was not to be used in the 2005 code. Additionally, the term is not used within 800.

To further not using this term, in proposal 16-29, the panel revised the proposal to not use "air duct", but instead to harmonize code language by using the term "ventilation or air handling ducts".

OHDE, H.: See my Explanation of Negative for Comment 16-84.

16-90 Log #1580 NEC-P16 **Final Action: Reject (800.2)**

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-100
Recommendation: This proposal should be accepted.
Substantiation: The term "air duct" is not used in Article 800 and, therefore, it should be deleted from 800.2. Defining a term that is not being used (such as air duct) in that Article is in direct violation with the National Electrical Code Style Manual. CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

I do not believe that this Standards Council decision would prohibit the definition of "air duct" from being deleted. I do believe that expansion of, or a new definition of, air duct in another Article would be a violation of Standards Council Decision D#05-24. Standards Council recently issued another decision (D#06-03) which decided that 770.154(A) FPN, 800.154(A) FPN and 820.154(A) FPN may be deleted and this deletion would not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo.
Panel Meeting Action: Reject
Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

JENSEN, R.: We disagree that there was no opportunity for public review. To the contrary, there were nineteen (19) comments received on proposals involving this definition, thereby showing that this proposal was indeed reviewed.

We believe that the interpretation of whether being allowed to address the original proposal in view of the NFPA Standards Council Long Decision 05-24 (SC #05-7-4) was wrong. Indeed, during the writing of the 2005 NEC, all references where 90A issues were involved were to be untouched in the 2005 NEC. One of these issues was "air duct cable" and the definition of "air duct" (as it pertained to air duct cable). Additionally, having a definition where the term is not used in the text of the code is in violation of the Style Guide.

We agree with deleting the term "air duct" as it was evidently an oversight that it was not removed during the last code cycle. Air duct was introduced for use with "air duct cable" which was not to be used in the 2005 code. Additionally, the term is not used within 800. To further not using this term, in proposal 16-29, the panel revised the proposal to not use "air duct", but instead to harmonize code language by using the term "ventilation or air handling ducts".

OHDE, H.: See my Explanation of Negative for Comment 16-84.

16-91 Log #1688 NEC-P16 **Final Action: Accept (800.2)**

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-110
Recommendation: Continue to Reject.
Substantiation: The submitter's recommendation to add this definition to 800.2 because the term "concealed space" is used 800.154(A) FPN is misleading. This definition does not belong in the NEC. The 800.154(A) FPN provided no guidance to designers, installers or code officials. This FPN has misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirements because of NFPA 13

Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces" therefore the confusion and making it impossible to enforce. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction.

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154 and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC therefore it can and should be deleted. There is no need for the term "concealed spaces" to be defined.

Panel Meeting Action: Accept

Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-92 Log #1775 NEC-P16 **Final Action: Reject (800.2)**

Submitter: Robert W. Jensen, dbi

Comment on Proposal No: 16-99

Recommendation: Accept this proposal.

~~**800.2 Air Duct.** A conduit or passageway for conveying air to or from heating, cooling, air conditioning, or ventilating equipment, but not including the plenum. [NFPA 97:1.2.6]~~

Substantiation: This was an apparent over-sight in the 2005 editorial review under the Standards Council mandate to remove content related to "air duct cable", therefore not under the NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005.

Additionally, "Air duct" is not a term used in Article 800 and therefore a violation of the NFPA Manual of Style.

Panel Meeting Action: Reject

Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

JENSEN, R.: We disagree that there was no opportunity for public review. To the contrary, there were nineteen (19) comments received on proposals involving this definition, thereby showing that this proposal was indeed reviewed.

We believe that the interpretation of whether being allowed to address the original proposal in view of the NFPA Standards Council Long Decision 05-24 (SC #05-7-4) was wrong. Indeed, during the writing of the 2005 NEC, all references where 90A issues were involved were to be untouched in the 2005 NEC. One of these issues was "air duct cable" and the definition of "air duct" (as it pertained to air duct cable). Additionally, having a definition where the term is not used in the text of the code is in violation of the Style Guide.

We agree with deleting the term "air duct" as it was evidently an oversight that it was not removed during the last code cycle. Air duct was introduced for use with "air duct cable" which was not to be used in the 2005 code. Additionally, the term is not used within 800. To further not using this term, in proposal 16-29, the panel revised the proposal to not use "air duct", but instead to harmonize code language by using the term "ventilation or air handling ducts".

OHDE, H.: See my Explanation of Negative for Comment 16-84.

16-93 Log #1777 NEC-P16 **Final Action: Reject (800.2)**

Submitter: Robert W. Jensen, dbi

Comment on Proposal No: 16-100

Recommendation: Accept this proposal.

~~**800.2 Air Duct.** A conduit or passageway for conveying air to or from heating, cooling, air conditioning, or ventilating equipment, but not including the plenum. [NFPA 97:1.2.6]~~

Substantiation: This was an apparent over-sight in the 2005 editorial review under the Standards Council mandate to remove content related to "air duct cable", therefore not under the NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005.

Additionally, "Air duct" is not a term used in Article 800 and therefore a violation of the NFPA Manual of Style.

Panel Meeting Action: Reject

Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

JENSEN, R.: We disagree that there was no opportunity for public review. To the contrary, there were nineteen (19) comments received on proposals involving this definition, thereby showing that this proposal was indeed reviewed.

We believe that the interpretation of whether being allowed to address the original proposal in view of the NFPA Standards Council Long Decision 05-24 (SC #05-7-4) was wrong. Indeed, during the writing of the 2005 NEC, all references where 90A issues were involved were to be untouched in the 2005 NEC. One of these issues was "air duct cable" and the definition of "air duct" (as it pertained to air duct cable). Additionally, having a definition where the term is not used in the text of the code is in violation of the Style Guide.

We agree with deleting the term "air duct" as it was evidently an oversight that it was not removed during the last code cycle. Air duct was introduced for use with "air duct cable" which was not to be used in the 2005 code. Additionally, the term is not used within 800. To further not using this term, in proposal 16-29, the panel revised the proposal to not use "air duct", but instead to harmonize code language by using the term "ventilation or air handling ducts".

OHDE, H.: See my Explanation of Negative for Comment 16-84.

16-94 Log #1778 NEC-P16 **Final Action: Reject (800.2)**

Submitter: Robert W. Jensen, dbi

Comment on Proposal No: 16-118

Recommendation: Accept this proposal.

~~**800.2 Air Duct.** A conduit or passageway for conveying air to or from heating, cooling, air conditioning, or ventilating equipment, but not including the plenum. [NFPA 97:1.2.6]~~

Substantiation: This was an apparent over-sight in the 2005 editorial review under the Standards Council mandate to remove content related to "air duct cable", therefore not under the NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005.

Additionally, "Air duct" is not a term used in Article 800 and therefore a violation of the NFPA Manual of Style.

Panel Meeting Action: Reject

Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

JENSEN, R.: We disagree that there was no opportunity for public review. To the contrary, there were nineteen (19) comments received on proposals involving this definition, thereby showing that this proposal was indeed reviewed.

We believe that the interpretation of whether being allowed to address the original proposal in view of the NFPA Standards Council Long Decision 05-

24 (SC #05-7-4) was wrong. Indeed, during the writing of the 2005 NEC, all references where 90A issues were involved were to be untouched in the 2005 NEC. One of these issues was "air duct cable" and the definition of "air duct" (as it pertained to air duct cable). Additionally, having a definition where the term is not used in the text of the code is in violation of the Style Guide.

We agree with deleting the term "air duct" as it was evidently an oversight that it was not removed during the last code cycle. Air duct was introduced for use with "air duct cable" which was not to be used in the 2005 code. Additionally, the term is not used within 800. To further not using this term, in proposal 16-29, the panel revised the proposal to not use "air duct", but instead to harmonize code language by using the term "ventilation or air handling ducts".

OHDE, H.: See my Explanation of Negative for Comment 16-84.

16-95 Log #2054 NEC-P16 **Final Action: Reject**
(800.2)

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-118
Recommendation: This Proposal should be Accepted.
Substantiation: The term "air duct" is not used in Article 800 and, therefore, it should be deleted from 800.2. Defining a term that is not being used (such as air duct) in that Article is in direct violation with the National Electrical Code Style Manual. CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

I do not believe that this Standards Council decision would prohibit the definition of "air duct" from being deleted. I do believe that expansion of or a new definition of air duct in another Article would be a violation of Standards Council Decision D#05-24. The Standards Council recently issued another decision (D#06-03) which decided that 770.154(A) FPN, 800.154(A) FPN, and 820.154(A) FPN may be deleted and this deletion would not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo.
Panel Meeting Action: Reject
Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

JENSEN, R.: We disagree that there was no opportunity for public review. To the contrary, there were nineteen (19) comments received on proposals involving this definition, thereby showing that this proposal was indeed reviewed.

We believe that the interpretation of whether being allowed to address the original proposal in view of the NFPA Standards Council Long Decision 05-24 (SC #05-7-4) was wrong. Indeed, during the writing of the 2005 NEC, all references where 90A issues were involved were to be untouched in the 2005 NEC. One of these issues was "air duct cable" and the definition of "air duct" (as it pertained to air duct cable). Additionally, having a definition where the term is not used in the text of the code is in violation of the Style Guide.

We agree with deleting the term "air duct" as it was evidently an oversight that it was not removed during the last code cycle. Air duct was introduced for use with "air duct cable" which was not to be used in the 2005 code. Additionally, the term is not used within 800. To further not using this term, in proposal 16-29, the panel revised the proposal to not use "air duct", but instead to harmonize code language by using the term "ventilation or air handling ducts".

OHDE, H.: See my Explanation of Negative for Comment 16-84.

16-96 Log #165 NEC-P16 **Final Action: Accept**
(800.2.Communications Raceway (New))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-108
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Delete the definition of Communications Raceway including the FPN.
Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

Optical fiber raceway and innerduct are not the same. See 770.12(C) "Innerduct. Listed plenum optical fiber raceway, listed riser optical fiber raceway, or listed general-purpose optical fiber raceway installed in accordance with 770.154 shall be permitted to be installed as innerduct in any type of listed raceway permitted in Chapter 3".

The panel deleted the definition of Communications Raceway. The panel rejects Proposal 16-108, which will delete the definition. The listing requirements in 800.182 adequately describe a communications raceway.

The changes satisfy the concerns expressed in the voting.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-97 Log #166 NEC-P16 **Final Action: Accept**
(800.2.Communications Raceway (New))

T**CC Action: The Technical Correlating Committee understands that the panel action on Comment 16-97 is reflected in the panel action on Comment 16-96.**
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-109
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

Optical fiber raceway and innerduct are not the same.

See 770.12(C) "Innerduct. Listed plenum optical fiber raceway, listed riser optical fiber raceway, or listed general-purpose optical fiber raceway installed in accordance with 770.154 shall be permitted to be installed as innerduct in any type of listed raceway permitted in Chapter 3."

Communications raceways are a particular type of raceway and the definition of general raceway does not apply.

See 770.182 for listing requirements for optical fiber raceways, 800.182 for listing requirements for communications raceways, and 820.182 for listing requirements for CATV Raceways.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-98 Log #167 NEC-P16 **Final Action: Accept**
(800.2.Point of Entrance)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-116
Recommendation: It was the action of the Technical Correlating Committee that the panel reconsider the proposal with respect to the Fine Print Notes. It is the intention of Fine Print Notes to provide explanatory information and they are not intended as a vehicle to provide unnecessary cross-references. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider the proposal.

See panel action and statement on Comment 16-83.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-99 Log #168 NEC-P16 **Final Action: Accept**
(800.2.Point of Entrance)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-117
Recommendation: It was the action of the Technical Correlating Committee that the panel reconsider the proposal with respect to the Fine Print Notes. It is the intention of Fine Print Notes to provide explanatory information and they are not intended as a vehicle to provide unnecessary cross-references. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider the proposal.

See panel action and statement on Comment 16-83.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-100 Log #621 NEC-P16 **Final Action: Accept in Part**
(800.2, 820.2, and 830.2)

Submitter: Stanley Kahn, Tri-City Electric Co. Inc.
Comment on Proposal No: 16-116
Recommendation: Accept these proposals in principle. Continue to accept the changes in the definition of point of entrance and do not accept the fine print notes referring to the definitions of Intermediate Metal Conduit and Rigid Metal Conduit. Instead, accept two definitions shown below in 800.2, 820.2 & 830.2:

Intermediate Metal Conduit (Type IMC): The definition in 342.2 shall apply.
Rigid Metal Conduit (Type RMC): The definition in 344.2 shall apply.

Substantiation: The terms Intermediate Metal Conduit and Rigid Metal Conduit are used in Articles 800, 820 without definition. They need to be defined. The definitions in Articles 342 and 344 do not apply to Article 800, 820, and 830 unless they are specifically referenced from these articles.

Since the referenced Proposals are parallel for the three Articles, the same Comment applies to all.
Panel Meeting Action: Accept in Part
Delete FPNs No. 1 and No. 2.
Panel Statement: The panel accepts the deletion of the FPNs and rejects the addition of the two definitions, as they are covered by references to Chapter 3 within 800.110, 820.110, and 830.110.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-101 Log #255 NEC-P16 **Final Action: Reject**
(800.2 and 770.2)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-108
Recommendation: Continue to accept the definition of communications raceway.

Revise the definition of Optical Fiber Raceway as shown:

Optical Fiber Raceway. A raceway ~~designed~~ for enclosing and routing ~~listed~~ optical fiber cables.

Substantiation: The listing requirements for Communications Raceway are in section 800.182. It is appropriate to have a definition in this article.

The listing requirements for Optical fiber Raceways are in section 770.182 and the definition is in section 770.2. The suggested change in the definition of Optical Fiber Raceway will make it parallel to the definition of Communications Raceway that was accepted in proposal 16-108.

See proposal 16-245 where the panel accepted a similar definition for CATV Raceway. The listing requirements for CATV Raceways are in section 820.182.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 16-96.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-102 Log #169 NEC-P16 **Final Action: Accept**
(800.3(A) and (B))

TCC Action: The Technical Correlating Committee directs that item (C) and the FPN in the panel action be deleted to correlate with the action on Proposal 10-59 to delete Article 780 in its entirety.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-121
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting and that this Proposal be reconsidered and correlated with the action on Proposal 16-221.

The Technical Correlating Committee directs that the panel consider not only the division applications, but also the zone applications.

In addition, the Technical Correlating Committee understands that the word "and" in (A) of the Proposal was not "Accepted."
This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Change 800.3 to read as follows:

800.3 Other Articles.

(A) Hazardous (Classified) Locations. Communications circuits and equipment installed in a location that is classified in accordance with 500.5 and 505.5 shall comply with the applicable requirements of Chapter 5.

(B) Equipment in Other Space Used for Environmental Air. Section 300.22(C) shall apply.

(C) Hybrid Power and Communications Cables. The provisions of 780.6 shall apply for listed hybrid power and communications cables in closed-loop and programmed power distribution.

FPN: See 800.179(I) for hybrid power and communications cable in other applications.

Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

Assuming Comments 16-173 and 174 are accepted, the numbering in the panel action on the proposal now becomes correct.

Proposal 16-121 deleted a reference to the entire Article 500 and substituted a reference to 500.5 in order to comply with Section 4.1.1 of the NEC Style Manual.

The panel notes that the text concerning hybrid power and communications cables was mistakenly omitted from the preprint and should be restored as indicated.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-103 Log #170 NEC-P16 **Final Action: Accept**
(800.3(C))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-125
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 16-128. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has reviewed the panel action on Proposal 16-125 and finds no conflict with the panel action on Proposal 16-128. Proposal 16-125 was accepted in part as the information on "spread of fire or products of combustion" was moved to 800.26 (New). Rather than reference 300.21, the information appropriate to communications systems was extracted and placed directly in new 800.26.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-104 Log #1226 NEC-P16 **Final Action: Accept**
(800.3(C))

Submitter: John Burke, Fusion Cable Systems
Comment on Proposal No: 16-123
Recommendation: Continue to Reject this Proposal.
Substantiation: We remove old and unused cable as part of our standard business practice especially in retrofit jobs. The amount of old cable on some jobs has caused damage to the building and created unsafe working conditions for our techs. We support continuing the abandoned cable removal requirement in the Code.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-105 Log #2055 NEC-P16 **Final Action: Reject**
(800.3(C), 800.25, and 800.26)

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-129
Recommendation: This Proposal should have been Rejected.
Substantiation: The submitter's recommendation to add a new 800.26 with this FPN No. 2 to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. The submitter's substantiation references 2002 NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 should have rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154, and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo.

Panel Meeting Action: Reject

Panel Statement: The panel rejected the text that the submitter of the comment objected to.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-106 Log #2056 NEC-P16 **Final Action: Reject**
(800.3(C), 800.25, and 800.26)

Submitter: Harold C. Ohde, IBEW #134

Comment on Proposal No: 16-130

Recommendation: This Proposal should have been Rejected.

Substantiation: The submitter's recommendation to add a new 800.26 with this FPN No. 2 to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. The submitter's substantiation references 2002 NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expan
ded the list of combustibles to provide examples of potential combustible loading.

CMP 16 should have rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154, and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo.

Panel Meeting Action: Reject

Panel Statement: The panel rejected the text that the submitter of the comment objected to.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-107 Log #247 NEC-P16 **Final Action: Accept in Part**
(800.3(D))

TCC Action: The Technical Correlating Committee has revised this comment by changing the accepted text from "(D)" to (C)" to correlate with the action taken by the Technical Correlating Committee in Comment 16-102 and Proposal 10-59.

Submitter: Stanley Kaufman, CableSafe Inc.

Comment on Proposal No: 16-131

Recommendation: Accept proposal 16-131 in principle by continuing to re-letter the current 800.3(D) to 800.3(C) and establishing a new 800.3(D) as follows:

(D) Network-Powered Broadband Communications Systems. Article 830 shall apply to network-powered broadband communications systems.

Substantiation: With the acceptance of proposal 16-98 it may not be clear that Article 830 applies to network-powered broadband communications systems. Addition of the suggested text will add clarity.

Panel Meeting Action: Accept in Part

Add 800.3(D) as follows:

(D) Network-Powered Broadband Communications Systems. Article 830 shall apply to network-powered broadband communications systems.

Panel Statement: The panel rejects the submitter's comment on Proposal 16-131, as it conflicts with the panel action and statement on Comment 16-102. The panel accepts the addition of 800.3(D).

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-107a Log #CC1602 NEC-P16 **Final Action: Accept**
(800.24, 820.24 and 830.24 FPN)

TCC Action: The Technical Correlating Committee understands that the updates apply to the ANSI/BICSI/NECA Standard in the FPN text as accepted by the panel action on Proposal 16-139.

Submitter: Code-Making Panel 16,

Comment on Proposal No:

Recommendation: Revise the Fine Print Note in 800.24, 820.24 and 830.24 to read as follows:

FPN: Accepted industry practices are described in ANSI/NECA/BICSI 568-2006, Standard for Installing Commercial Building Telecommunications Cabling, and other ANSI-approved installation standards

Substantiation: ANSI/NECA/BICSI 568-2006, Standard for Installing Commercial Building Telecommunications Cabling has now been published. The Panel intends to update to the now-current dated document.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-108 Log #171 NEC-P16 **Final Action: Accept**
(800.24)

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 16-135

Recommendation: The Technical Correlating Committee notes that neither the panel statement nor the revised statement shown in the affirmative vote are responsive to the submitter's substantiation for the recommendation. The Technical Correlating Committee directs the panel to act on the merits of the recommendation. This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC to reconsider the comments expressed in the voting and continues to reject the proposal.

The requirements of 300.11 are applicable to communications cables, are not overly restrictive and are appropriate.

Requiring any and all cables to be properly supported is not overly restrictive and is appropriate. Securing an additional cable to an existing properly supported cable does not constitute support. Additional cables must be directly supported by the same structural member that supports the first cable. In such installations, the additional cable is being supported by the same structural member.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

BRUNSSEN, J.: Proposal 16-135 should have been accepted. See my explanation of negative vote on Comment 16-114.

16-109 Log #372 NEC-P16 **Final Action: Reject**
(800.24)

Submitter: S. D. Kahn, Tri-City Electric Company, Inc. / Rep. NECA
Comment on Proposal No: 16-134
Recommendation: Reject the Proposal.
Substantiation: Although I agree with the proposal and the submitter's intent to introduce consistency, the material is used in plenums and other air handling spaces. Consequently, the proposal should have been subjected to the direction given by the Standards Council, as were many other proposals which were rejected.

As Mr. Dorna noted in his "Explanation of Negative Vote", "The UL Directory (2005), shows that category ZODZ covers "cable ties, cable tie mounts and similar types of related hardware". Likewise, Conduit and Fittings, category DWFV covers "cable ties, conduit straps, staples and similar hardware..." Both categories list as "Suitable for use in air handling spaces in accordance with Sec 300.22(C) and (D) of the National Electrical Code."

This proposal should have been rejected because of the Standards Council decision concerning NFPA 90A. Code Making Panels must be consistent in their handling of all submitted proposals.
Panel Meeting Action: Reject
Panel Statement: This is not a 90A issue.

The guide information for ZODZ, Wire Positioning Devices states that:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

The reference to air handling spaces is only a reference and is stated as:

"…for those devices which have been investigated to determine their suitability for use in air handling areas…"

This is a standard statement that is found in a wide variety of listing categories including the category for IT and Telecom equipment to cover situations where a special investigation is done to evaluate a device for air handling spaces. It no way implies that devices in the category are automatically intended for air handling spaces.

Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

Devices are evaluated for properties that we are concerned about. It is NOT a requirement for a listed device to be evaluated for use in air handling spaces.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:

JOHNSON, S.: See my explanation of negative vote on Comment 16-27.

16-110 Log #373 NEC-P16 **Final Action: Reject**
(800.24)

Submitter: S. D. Kahn, Tri-City Electric Company, Inc. / Rep. NECA
Comment on Proposal No: 16-137
Recommendation: Reject the Proposal.
Substantiation: This proposal should be rejected as the term "listed" should not be introduced at this time. The panel accepted moving the abandoned cable requirement but did not accept deleting "The accessible portion of". The panel rejected the remainder of the proposal except for adding the word "listed". Other proposals move the abandoned cable requirement.

I agree with the submitter's intent with reference to "listed" in order to introduce consistency, however the material is used in plenums and other air handling spaces. Consequently, the proposal should have been subjected to the direction given by the Standards Council, as were many other proposals which were rejected because of that direction.

As Mr. Dorna noted in his "Explanation of Negative Vote", "The UL Directory (2005), shows that category ZODZ covers "cable ties, cable tie mounts and similar types of related hardware". Likewise, Conduit and Fittings, category DWFV covers "cable ties, conduit straps, staples and similar hardware..." Both categories list as "Suitable for use in air handling spaces in accordance with Sec 300.22(C) and (D) of the National Electrical Code."

The proposal portion that introduces "listed" should have been rejected because of the Standards Council decision concerning NFPA 90A. Code Making Panels must be consistent in their handling of all submitted proposals.
Panel Meeting Action: Reject
Panel Statement: This is not a 90A issue.

The guide information for ZODZ, Wire Positioning Devices states that:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

The reference to air handling spaces is only a reference and is stated as:

"…for those devices which have been investigated to determine their suitability for use in air handling areas…"

This is a standard statement that is found in a wide variety of listing categories including the category for IT and Telecom equipment to cover situations where a special investigation is done to evaluate a device for air handling spaces. It no way implies that devices in the category are automatically intended for air handling spaces.

Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

Devices are evaluated for properties that we are concerned about. It is NOT a requirement for a listed device to be evaluated for use in air handling spaces.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:

JOHNSON, S.: See my explanation of negative vote on Comment 16-27.

16-111 Log #477 NEC-P16 **Final Action: Reject**
(800.24)

Submitter: Timothy P. McNeive, Thomas & Betts Corporation
Comment on Proposal No: 16-137
Recommendation: Accept the panel action but delete the requirement that hardware be "listed" in 800.24. Add the following sentence before the last sentence in 800.24:

"Cable ties that provide primary support for optical fiber cables and raceways shall have a minimum loop tensile strength of 23 kg (50 lbs)."
Substantiation: Adding a requirement that all hardware be "listed" is far from editorial as asserted in the substantiation accompanying the proposal. The panel is asked to consider the long-standing positions of CMP-7 and CMP-8 that do not require support hardware to be "listed". Above all else, consistency in the NEC seems to be what the original submitter values most. No substantiation has been provided in the proposal that would differentiate treatment of communication circuit cables from other wiring systems with respect to support. The wide variety of hardware used for supporting cables and raceways are called upon to provide both primary support required in the NEC and very often secondary support or wire management functions. All hardware need not be held to the highest standard.

The comment provided by Mr. Dorna with his negative vote, references two UL categories, under which cable ties and other hardware are "listed". The correct UL category for Hardware for Support of Conduit, Tubing and Cable (UL2239) is DWMU, not DWFV. Nevertheless, this standard and UL 1565, Positioning Devices (ZODZ) establishes a 23 kg test load for all support products for flexible conduits and cables in accordance with the requirements for primary support throughout the NEC. For cable ties, "minimum loop tensile strength" is commonly marked on packages. The 23 kg minimum for cable support is well representative of typical straps, hangers and staples listed for flexible conduit and cable support in accordance with UL 2239, Hardware for Support of Conduit, tubing and Cable. The proposed new text will add value to inspectors in acceptance of appropriate cable ties without requiring listing.

Companion comments have been submitted for 640.6; 725.8, 760.8; 770.24; 820.24 and 830.24.
Panel Meeting Action: Reject
Panel Statement: There is more to listing than mechanical strength. Also, the mechanical strength should be based on the use and ratings of the device.

Cable ties can be used for securing and supporting cables in a number of Chapter 3 wiring methods without any requirements for a minimum loop tensile strength of 23 kg (50 Ib) or any particular strength. For example, 334.30 covering securing and supporting of "nonmetallic-sheathed cable requires supporting and securing by staples, cable ties, straps, hangers, or similar fittings designed and installed so as not to damage the cable, at intervals not exceeding 1.4 m (4 1/ 2 ft) and within 300 mm (12 in.) of every outlet box, junction box, cabinet, or fitting." Notice that it does not have any recommendation for the support strength, nor does it need this additional marking or special consideration. The cables may not be providing any support at all where the tie wrap is simply anchoring it to a beam or joist. Types AC and MC cable also give permission to use cable ties for securing and supporting these cables in 320.30 and 330.30, respectively. In addition, this added text could be considered to be new information that has not been reviewed as part of the process.

Listing includes an evaluation of the particular device that goes beyond the ability to support cable. The guide information for ZODZ, Wire Positioning Devices, states:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance, and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

Listed devices are evaluated using UL1565, Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning which may include bundling and securing or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

BOYER, J.: See my explanation of vote on Comment 16-29.

JOHNSON, S.: See my explanation of negative vote on Comment 16-29.

16-112 Log #482 NEC-P16 **Final Action: Reject (800.24)**

Submitter: Timothy P. McNeive, Thomas & Betts Corporation
Comment on Proposal No: 16-134
Recommendation: Accept the panel action, accept in principle, but delete the word "listed". Add the following sentence, as proposed in Mr. Boyer's comment on negative, before the last sentence in 800.24(B):

"Cable ties that provide primary support for optical fiber cables and raceways shall have a minimum loop tensile strength of 23 kg (50 lbs.)"

Substantiation: See my comment on ROP 16-45.

The panel is asked to consider the long-standing positions of CMP-7 and CMP-8 that do not require support hardware to be "listed". No substantiation has been provided in the panel action that would differentiate treatment of fiber optic cables and raceways from other wiring systems with respect to support. The wide variety of hardware used for supporting cables and raceways are called upon to provide both primary support required in the NEC and very often secondary support or wire management functions. All hardware need not be held to the highest standard.

The comment provided by Mr. Dorna with his negative vote on ROP 16-45, references two UL categories under which cable ties and other hardware are "listed". The correct UL category for Hardware for Support of Conduit, Tubing and Cable (UL 2239) is DWMU, not DWFV. Nevertheless, this standard and UL 1565, Positioning Devices (ZODZ) establishes a 23 kg test load for all support products for flexible conduits and cables in accordance with the requirements for primary support throughout the NEC. For cable ties, "minimum loop tensile strength" is commonly marked on packages. The 23 kg minimum for cable support is well representative of typical straps, hangers and staples listed for flexible conduit and cable support in accordance with UL 2239, Hardware for Support of Conduit, Tubing and Cable. The proposed new text will add value to inspectors in acceptance of appropriate cable ties without requiring listing.

Companion comments have been submitted for 640.6, 725.8, 760.8, 770.24, 820.24 and 830.24.

Panel Meeting Action: Reject
Panel Statement: There is more to listing than mechanical strength. Also, the mechanical strength should be based on the use and ratings of the device.

Cable ties can be used for securing and supporting cables in a number of Chapter 3 wiring methods without any requirements for a minimum loop tensile strength of 23 kg (50 Ibs) or any particular strength. For example, Section 334.30 covering securing and supporting of "nonmetallic-sheathed cable requires supporting and securing by staples, cable ties, straps, hangers, or similar fittings designed and installed so as not to damage the cable, at intervals not exceeding 1.4 m (4 1/ 2 ft) and within 300 mm (12 in.) of every outlet box, junction box, cabinet, or fitting." Notice it does not have any recommendation for the support strength, nor does it need this additional marking or special consideration. The cables may not be providing any support at all where the tie wrap is simply anchoring it to a beam or joist. Types AC and MC cable also give permission to use cable ties for securing and supporting these cables in 320.30 and 330.30, respectively. In addition, this added text could be considered to be new information that has not been reviewed as part of the process.

Listing includes an evaluation of the particular device that goes beyond the ability to support cable. The guide information for ZODZ, Wire Positioning Devices states that:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

BOYER, J.: See my explanation of vote on Comment 16-29.

JOHNSON, S.: See my explanation of negative vote on Comment 16-29.

16-113 Log #870 NEC-P16 **Final Action: Reject (800.24)**

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 16-137
Recommendation: The panel is encouraged to continue to Accept in Principle Proposal 16-137.
Substantiation: The reasons to continue to Accept in Principle the Proposal are as follows:

1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Reject
Panel Statement: The action of Proposal 16-137 was to accept in principle in part. This is not consistent with the submitter's request.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:

JOHNSON, S.: See my explanation of negative vote on Comment 16-29.

16-114 Log #1536 NEC-P16 **Final Action: Reject (800.24)**

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-135
Recommendation: Accept this proposal.
Substantiation: This proposal should be accepted. The requirement added by Panel 16 during the 2005 revision cycle is overly restrictive and inappropriate for communications cables. The Fine Print Note associated with 800.24 directs the reader to the appropriate installation standards. The Panel has enhanced the Fine Print Note during this cycle by the addition of three new references covering the installation of communications cables (see Proposal 16-139). These references are all that is necessary and sufficient for such cables without imposing the burdensome requirements of 300.11. Section 300.11 is directed toward power cable assemblies that are heavier and larger than communications cables, operate at much greater power levels, and present a greater risk of injury if not properly installed. If the Panel continues to reject Proposal 16-135 then, at the very least, 300.11(C) should be excepted. See my companion comment on Proposal 16-141.

Panel Meeting Action: Reject
Panel Statement: Securing an additional cable to an existing cable does not constitute support. Additional cables must be directly supported by the same structural member that supports the first cable. In such installations, the additional cable is being supported by the same structural member.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:

BRUNSSEN, J.: This comment should have been accepted, as should the original Proposal 16-135. Lashing (tie-wrapping) of additional communications cables to existing communications cables is accepted industry practice, and has been done extensively without detriment to safety. The communications cables in question are of small diameter, light in weight and operate at very low voltage, current and power levels. The argument is not one of whether to support the additional communications cable, but the adequacy of lashing (tie-wrapping) to existing communications cable(s). For further substantiation, see my explanation of negative on Proposal 16-135 and my substantiation to Comment 16-114. Additionally, the final sentence of the panel statement is unclear.

JOHNSON, S.: See my explanation of negative vote on Comment 16-31.

JONES, R.: The requirement added by Panel 16 during the 2005 revision cycle is overly restrictive and inappropriate for communications cables. The panel has added three new references covering the installation of communications cables in a fine print note. These and the installation requirements in Article 800 are adequate without the requirements of 300.11. The panel has not made any exceptions for small single circuit cables. New technology does not require the heavy multi-conductor cables used in the past.

16-115 Log #1537 NEC-P16 **Final Action: Reject**
(800.24)

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-141
Recommendation: Accept this proposal.
Substantiation: This proposal should be accepted. If the Panel continues to support the addition of the requirements of 300.11 to 800.24, then at the very least, the requirements of 300.11(C) should be waived. Section 300.11(C) is clearly not applicable to communications cables. Installation practice is to lash communications cables together to form a "cable assembly". This frequently occurs during modifications or additions to an existing installation. Communications cables are physically smaller and lighter than power cables, operate at much lower voltages and are power-limited. Application of 300.11(C) is overly restrictive and will preclude lashing of communications cables together to form a cable assembly. Communications cables secured in this manner have adequate support (see 300.11 (A)), are supported independently of the suspended ceiling grid, and are not likely to collapse in the event the suspended ceiling collapses. Such restriction imposes additional installation costs with no improvement in safety. See my companion comment on Proposal 16-135.
Panel Meeting Action: Reject
Panel Statement: Securing an additional cable to an existing cable does not constitute support. Additional cables must be directly supported by the same structural member that supports the first cable. In such installations, the additional cable is being supported by the same structural member.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
BRUNSSEN, J.: This comment should have been accepted, as should the original Proposal 16-141. If the panel continues to support the addition of the securing and supporting requirements of 300.11, then at the very least 300.11(C) should be exempted. It is clearly not applicable to communications cables. For further substantiation, see my explanation of negative on Proposal 16-141 and the substantiation accompanying my Comment 16-115. Additionally, the final sentence of the panel statement is unclear.
JOHNSON, S.: See my explanation of negative vote on Comment 16-31.
JONES, R.: See my Explanation of Negative Vote on Comment 16-114.

16-116 Log #2003 NEC-P16 **Final Action: Reject**
(800.24)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 16-134
Recommendation: This Proposal should have been Accepted without modification by the panel.
Substantiation: Cable ties of different types, materials, and configurations are widely used without problems and probably fall under the existing language "or similar fittings," so they would still continue to be used even if the proposal were rejected. However, much of the hardware that was already specifically permitted are not even available as listed products. For example, most straps, staples, and "hangers" are not listed products. Entire lines of one-hole and two-hole straps, standoff brackets, ring hangers, and the strut-type hardware used for all types of even the most heavy electrical wiring methods are not listed. The requirement should rest on the basic requirement that all such materials be acceptable to the authority having jurisdiction (approved). The proposed wording in the Explanation of Negative by Mr. Boyer would also be usable, as there is a listing standard for the cable ties and this language, since it refers to primary support, would not restrict the use of cable ties that are used only for cable management. The language accepted by the panel would eliminate most of the products currently in use by this industry, without any evidence being provided of a problem with those products.
Panel Meeting Action: Reject
Panel Statement: The guide information for ZODZ, Wire Positioning Devices states that:
"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."
These are all characteristics that we should be concerned about for electrical installations.
Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:
"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."
The evaluation of positioning devices includes:
• Classification by mechanical strength, material, maximum temperature, and environmental conditions
• Required Markings giving critical information to the installer / inspector
• Mechanical strength tests
• Flammability classification of polymeric materials and coatings (NOT air-handling space requirements)
• Relative thermal index
• Material requirements (Including blending and substitution)
• Corrosion resistance
• Sharp edges
• Installation
• Mechanical strength
• Vibration
• Tests for mounting blocks and other mounting hardware and devices
• Environmental conditioning.....
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
JOHNSON, S.: See my explanation of negative vote on Comment 16-29.

16-117 Log #716 NEC-P16 **Final Action: Reject**
(800.24, FPN)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 16-138
Recommendation: The action should be to delete this Fine Print Note.
Substantiation: The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily availble information which must be purchased by the code user. Code Making Panel 16 should consider taking an action to delete this FPN to coordinate with the other technical committees in the NEC project. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). In the action to reject proposal 8-3, one technical committee member promotes NECA standards as "….a tool to assist untrained electricians to make safer and better installations." The TCC should intervene, uphold the provisions of 90.1(C) and prohibit these types of Fine Print Notes. CMP16 should reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Reject
Panel Statement: Proposal 16-138 pertained to updating the FPN and not to delete it.
The comment requests the FPN be deleted. The FPN provides valuable information and the panel intends for it to be retained but the date updated. The references provided in the FPN provide guidance for installation in a neat and workmanship like manner.
See panel action and statement on Comment 16-107a (Log #CC1602).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
PREZIOSO, L.: See my explanation of affirmative vote on Comment 16-34.

16-118 Log #871 NEC-P16 **Final Action: Reject**
(800.24, FPN)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 16-138
Recommendation: The panel is encouraged to continue to Reject Proposal 16-138.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).

6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Reject
Panel Statement: The comment substantiation is inconsistent with the recommended action. The panel does not agree to delete the FPN. The panel did not delete that FPN, as the original proposal was to update the reference date.
See the panel action and statement on Comment 16-107a (Log #CC1602).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
PREZIOSO, L.: See my explanation of affirmative vote on Comment 16-34.

16-119 Log #872 NEC-P16 **Final Action: Reject**
(800.24, FPN)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 16-140
Recommendation: The panel is encouraged to continue to Accept Proposal 16-138.
Substantiation: The reasons to continue to Accept the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Reject
Panel Statement: The submitter commented on Proposal 16-140, but states that the panel should continue to accept Proposal 16-138. The panel has previously rejected both Proposals 16-138 and 16-140.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
PREZIOSO, L.: See my explanation of affirmative vote on Comment 16-34.

16-120 Log #172 NEC-P16 **Final Action: Accept**
(800.24 Exception)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-141
Recommendation: The Technical Correlating Committee notes that neither the panel statement nor the revised statement shown in the affirmative vote are responsive to the submitter's substantiation for the recommendation. The Technical Correlating Committee directs the panel to act on the merits of the recommendation. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider the comments expressed in the voting and continues to reject the proposal.
The requirements of 300.11(C) are applicable to communications cables, are not overly restrictive and are appropriate.
Requiring any and all cables to be properly supported is not overly restrictive and is appropriate. Securing an additional cable to an existing properly supported cable does not constitute support. Additional cables must be directly supported by the same structural member that supports the first cable. In such installations, the additional cable is being supported by the same structural member.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
BRUNSSEN, J.: Proposal 16-141 should have been accepted. See my explanation of negative vote on Comment 16-115.

16-121 Log #1539 NEC-P16 **Final Action: Accept**
(800.47(B))

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-144
Recommendation: Continue to reject this proposal.
Substantiation: Where communications distribution circuits are run underground and contained within a block so that the likelihood of contact with power conductors or exposure to lightning is minimal, no improvement in safety would be achieved by requiring such circuits to meet the insulation requirements of 800.50(A) and (C).
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-122 Log #1540 NEC-P16 **Final Action: Accept**
(800.90)

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-148
Recommendation: Continue to reject this proposal.
Substantiation: This proposal should continue to be rejected as the existing protection practices employed by the telecommunications utilities have resulted in an exemplary safety record. The many reasons for rejecting the proposal as iterated in the Panel Statement are appropriate and support continued rejection.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-123 Log #1262 NEC-P16 **Final Action: Accept**
(800.90(A)(1)(b))

TCC Action: The Technical Correlating Committee directs that the FPN should appear following 800.90(A)(1)(e).
Submitter: Neil F. LaBrake, Jr., Syracuse, NY
Comment on Proposal No: 16-97
Recommendation: Accept the Panel's action and add a new FPN to 800.90(A)(1):
FPN: Section 9 of ANSI C2-2007, *National Electrical Safety Code*, provides an example of methods of protective grounding that can achieve effective grounding of telecommunications cable sheaths for cables from which communications circuits are extended.
Substantiation: CMP 16 rejected the deletion of the term "effectively" in this section because the National Electrical Safety Code uses this term in Section 215(C)(I). This comment proposed a FPN to help explain the meaning of the term "effectively" in this context. Note, that besides NESC, there are other state regulations or utility practices that can also accomplish "effective grounding." Placement of the FPN is such that it will refer to "effectively grounded" where it appears in both subsections (b) and (e) of 800.90(A)(1).
This Comment was developed by a Task Group assigned by the NEC Technical Correlating Committee to address actions that were other than "accept" taken by Code-Making Panels on proposals from the TCC to resolve 2005 NEC Proposal 5-1 and Comment 5-1. Members of the Task Group on Grounding and Bonding for this Comment included: C. Douglas White; Michael Johnston; Jeffrey Boksiner; Daleep Mohla; Phil Simmons; Christopher Hutchings; James Carroll; Alan Rebeck; Richard Loyd; Paul Dobrowsky; and Neil F. LaBrake, Jr.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-124 Log #245 NEC-P16 **Final Action: Accept in Principle**
(800.93)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-157
Recommendation: Accept this proposal in principle by revising 800.93 as shown below:
~~The metallic sheath of communications cables entering buildings shall be grounded as close as practicable to the point of entrance or shall be interrupted as close to the point of entrance as practicable by an insulating joint or equivalent device.~~
Communications cables entering buildings or attaching to buildings shall comply with (A) or (B).
(A) Entering Buildings. In installations where the communications cable enters the building, the metallic sheath of the cable shall be either grounded, or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point of entrance.
(B) Terminating Outside of the Building. In installations where the communications cable is terminated outside of the building, the metallic sheath

of the cable shall be either grounded or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point the point of attachment or termination of the cable.
Substantiation: The suggested text is an editorial clarification. The text the panel accepted deals with two scenarios, installations where the cable enters the building and installations where the cable is terminated outside of the building. It is clearer to deal with each scenario in a separate sentence. The suggested text retains these options.
The suggested text is an editorial clarification intended to bring this section into compliance with section 3.3.1(2) of the NEC Style Manual which states:
2. Use simple declarative sentence structure, and keep sentences short. Writing rules in long sentences full of commas, dependent clauses, and parenthetical expressions often creates confusion and misunderstanding. The requirement can be written in two or more short sentences, expressed using a list or table, or both.
The existing paragraph deals with two scenarios, 1) installations where the cable enters the building and 2) installations where the cable is terminated outside of the building. It is clearer to deal with each scenario in a separate subsection.
This comment includes deletion of the current fine print note because it is no longer needed.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-126.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-125 Log #257 NEC-P16 **Final Action: Accept in Principle (800.93)**

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-158
Recommendation: Accept this proposal in principle by revising 800.93 as shown below:
~~The metallic sheath of communications cables entering buildings shall be grounded as close as practicable to the point of entrance or shall be interrupted as close to the point of entrance as practicable by an insulating joint or equivalent device.~~
Communications cables entering buildings or attaching to buildings shall comply with (A) or (B).
(A) Entering Buildings. In installations where the communications cable enters the building, the metallic sheath of the cable shall be either grounded, or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point of entrance.
(B) Terminating Outside of the Building. In installations where the communications cable is terminated outside of the building, the metallic sheath of the cable shall be either grounded or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point the point of attachment or termination of the cable.
Substantiation: The suggested text is an editorial clarification. The text the panel accepted deals with two scenarios, installations where the cable enters the building and installations where the cable is terminated outside of the building. It is clearer to deal with each scenario in a separate sentence. The suggested text retains these options.
The suggested text is an editorial clarification intended to bring this section into compliance with section 3.3.1(2) of the NEC Style Manual which states:
2. Use simple declarative sentence structure, and keep sentences short. Writing rules in long sentences full of commas, dependent clauses, and parenthetical expressions often creates confusion and misunderstanding. The requirement can be written in two or more short sentences, expressed using a list or table, or both.
The existing paragraph deals with two scenarios, 1) installations where the cable enters the building and 2) installations where the cable is terminated outside of the building. It is clearer to deal with each scenario in a separate subsection.
This comment includes deletion of the current fine print note because it is no longer needed.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-126.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-126 Log #1541 NEC-P16 **Final Action: Accept (800.93)**

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-158
Recommendation: Accept this proposal in principle by revising 800.93 as shown below:
~~The metallic sheath of communications cables entering buildings shall be grounded as close as practicable to the point of entrance or shall be interrupted as close to the point of entrance as practicable by an insulating joint or equivalent device.~~
Communications cables entering the building or terminating on the outside of the building shall comply with (A) or (B).
(A) Entering Buildings. In installations where the communications cable enters the building, the metallic sheath members of the cable shall be either grounded as specified in 800.100, or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point of entrance.
(B) Terminating On the Outside of the Building. In installations where the communications cable is terminated on the outside of the building, the metallic sheath members of the cable shall be either grounded as specified in 800.100, or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point of termination of the cable.
Substantiation: The Panel, in revising this section, recognized that the communications cable does not always enter the building. In many cases it is terminated on the outside of the building in a Network Interface Device (NID) or similar device. In attempting to accommodate this scenario, the Panel added the text "or attached" and "point of attachment". However, the addition of this text is misleading and will result in impractical and unwieldy grounding and interruption requirements. The suggested text provides editorial clarification by addressing the two scenarios, cables entering the building and cables terminating on the outside of the building, separately. Further, the suggested text eliminates any confusion that may result from the use of the terms "attached" and "point of attachment", and addresses the issue directly: cables that are terminated on the outside of the building.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-127 Log #173 NEC-P16 **Final Action: Accept (800.100(A)(6))**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-166
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 16-164. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has reconsidered this proposal with respect to the panel action on Proposal 16-164. The panel action to 'accept' Proposal 16-166 is correct. The panel action to 'accept' Proposal 16-164 is incorrect; the panel action should have been "accept in principle" with a panel statement referencing the panel action and statement on Proposal 16-166.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-128 Log #174 NEC-P16 **Final Action: Accept (800.100(B))**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-167
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal with respect to the use of the word "and" in the sentence "The grounding conductor shall be connected in accordance with 800.100(B)(1), (B)(2), and (B)(3)."
It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 5-20. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise 800.100(B) as follows:
"(B) Electrode. The grounding conductor shall be connected in accordance with 800.100(B)(1), (B)(2), and or(B)(3)."
Revise 800.100(B)(1) as follows:
"(1) In Buildings or Structures with an Intersystem Grounding Bonding Termination. If the building or structure served has an intersystem grounding bonding termination, the grounding conductor shall be connected to the intersystem grounding bonding termination."
Revise 800.100(B)(2) as follows:
"(2) In Buildings or Structures with Grounding Means. If the building or structure served has no intersystem grounding bonding termination, the grounding conductor shall be connected to the nearest accessible location on the following:"
Retain existing list and text
Revise 800.100(B)(3) as follows:

"(3) In Buildings or Structures Without Intersystem Grounding Bonding Termination or Grounding Means. If the building or structure served has no intersystem grounding bonding termination or grounding means, as described ….".

Revise 800.100(B)(3)(2) as follows:

"(2) If the building or structure served has no intersystem grounding bonding termination or has no grounding means, as described in 800.100(B)(2) or …".

Panel Statement: The panel accepts the direction of the TCC to review clarification of the panel action.

The panel has clarified the panel action on Proposal 16-167 with respect to the word "and" as indicated in the panel action on this comment. It is not the intent to accomplish the grounding connections of 800.100 (B)(1), (B)(2), and (B)(3) simultaneously.

The panel has reconsidered Proposal 16-167 in light of the panel action on Proposal 5-20 as directed by the TCC and has revised "intersystem grounding termination" to "intersystem bonding termination" as indicated in the panel action on this comment.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

BRUNSSEN, J.: The underlined and strikeout text (legislative format) as developed by Panel 16 does not appear in the panel meeting action text. Revise the text to read as follows:

Revise 800.100(B) to read: "(B) Electrode. The grounding conductor shall be connected in accordance with 800.100(B)(1), (B)(2) or (B)(3)".

Revise 800.100(B)(1) to read:

"(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination, the grounding conductor shall be connected to the intersystem bonding termination."

Revise 800.100(B)(2) to read:

"(2) In Buildings or Structures with Grounding Means. If the building or structure served has no intersystem bonding termination, the grounding conductor shall be connected to the nearest accessible location on the following:".

Revise 800.100(B)(3) to read:

"(3) In Buildings or Structures without Intersystem Bonding Termination or Grounding Means. If the building or structure served has no intersystem bonding termination or grounding means, as described...".

Revise 800.100(B)(3)(2) to read:

"(2) If the building or structure served has no intersystem bonding termination or has no grounding means, as described in 800.100(B)(2) or...".

16-129 Log #175 NEC-P16 **Final Action: Accept**
(800.100(B))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-168
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 16-167 and the comments expressed in the voting on 16-168. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Relocate the text as new paragraph to follow 800.100(B)(2)(7) and revise as follows: "A bonding device intended to provide a termination point for the grounding conductor (inter-system bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is non-removable."

Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

The panel action on Proposal 16-168 to 'accept in principle' is correct. The panel has reviewed the comment expressed in the voting and determined that the proper location of the text is following 800.100(B)(2)(7), not 800.100(B)(5) as indicated in the comment. That is where equipment (service) enclosures are discussed. The panel has also added editorial clarification as indicated in the panel action on this comment. The panel notes that the text is presently located incorrectly in the preprint.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-130 Log #1528 NEC-P16 **Final Action: Accept**
(800.100(B))

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-167
Recommendation: Continue to accept the proposal, but change the term "Intersystem Grounding Termination" to "Intersystem Bonding Termination."
Substantiation: This is a correlating comment to correlating with the actions of CMP-5 taken on proposal 5-20 as directed by the TCC. CMP-5 changed the term "Intersystem Grounding Termination" to "Intersystem Bonding Termination."
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 16-128.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-131 Log #1542 NEC-P16 **Final Action: Accept**
(800.100(B))

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-167
Recommendation: Revise the text of 800.100(B) as follows:

"**(B) Electrode.** The grounding conductor shall be connected in accordance with 800.100 (B) (1), (B) (2) ~~and~~ or (B) (3)."

Substantiation: The present text is incorrect as 800.100 (B) refers to three individual requirements that are appropriate under three separate circumstances. They are not to be done simultaneously. Hence, "and" should be replaced by "or".
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 16-128.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-132 Log #176 NEC-P16 **Final Action: Accept**
(800.110)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-171
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

See panel action and statement on Comment 16-137.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-133 Log #177 NEC-P16 **Final Action: Accept**
(800.110)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-173
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 16-171. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider and correlate with the action on Proposal 16-171.

See panel action and statement on Comment 16-137.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-134 Log #256 NEC-P16 **Final Action: Accept in Principle**
(800.110)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-171
Recommendation: Continue to accept this proposal in principle. Accept the correction mentioned in the ballot comments submitted by Messers. Brunssen, Dorna and Kahn.

Substantiation: Acceptance of this comment will correct a typographical error.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-137.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-135 Log #1287 NEC-P16 **Final Action: Hold**
(800.110)

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-171
Recommendation: The panel action on the Proposal should continue to be Accept in Principle, however, the following additional changes should be made to the panel action:

Revise 800.110 as shown:

800.110 Raceways for Communications Wires and Cables. Where communications wires and cables are installed in a raceway, the raceway shall be either of a type permitted in Chapter 3 and installed in accordance with Chapter 3 or a ~~listed plenum~~ communications raceway listed in accordance with 800.182 and~~, listed riser communications raceway, or listed general-purpose communications raceway~~ installed in accordance with 800.154~~, and a listed nonmetallic raceway complying with 800.182,~~ and ~~installed in accordance with 362.24~~ 362.22 through 362.56, where the requirements applicable to electrical nonmetallic tubing apply. ~~The raceway fill tables of Chapter 3 and Chapters shall not apply.~~

Substantiation: The revisions in the first sentence clarify that the listing requirements are specified in 800.182 and the installation requirements in 800.154. 362.22 should also apply if the requirements for ENT are to be utilized.

Revising the text as proposed will still permit the installation of communications wires and cables in communications raceways (plenum riser, or general-purpose) or in any type of listed raceway permitted in Chapter 3 without adding additional text to the Code.

Using the term "listed communications raceways" will also permit the installation of other types of listed communications raceways that may be included in future Codes without having to revise 800.110.

The Exception should have been deleted rather than including it as positive text in the last sentence.

No substantiation was submitted to support the deletion of the conduit fill restrictions or raceway fill tables of Chapters 3 and 9. The fill restrictions are based on the physical limitations of being able to pull conductors or cables into raceways without damaging the conductors or cables, particularly when there are bends in the run, and to avoid conductor/cable jamming. The maximum percentage fill requirements are independent of whether they are electrical conductors or not.

The maximum percentage fill requirements in Chapters 3 and 9 are an integral part of the permitted uses of the raceways contained in Chapter 3 and if conductors or cables are to be installed in a Chapter 3 raceway, then the maximum percentage fill requirements must also apply.

The first sentence in 800.110, as modified by the panel action, already states "installed in accordance with Chapter 3" which would include all of Chapter 3 requirements pertaining to raceways including the maximum percentage fill limitations in Chapter 9. The proposal introduces conflicting requirements between the two sentences in 800.110.

Chapter 9, Table 1 permits 53 percent fill when one conductor or cable is installed in a raceway; 31 percent for two; and 40 percent for three or more.

The panel action to change "conduit" to "raceway" was appropriate since raceway is defined in Article 100 and includes, but is not limited to, conduit and tubing. Also, 800.110 references the applicable Sections of Article 362 which addresses Electrical Nonmetallic Tubing (ENT).
Panel Meeting Action: Hold
Panel Statement: Changing the installation requirements for raceways is new material.

The proposed revision(s) constitute new material that have not had the benefit of public review and cannot be considered at this stage of the Code-making cycle. Refer to 4.4.6.2.2 of the Regulations Governing Committee Projects.

See panel action and statement on Comment 16-26.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-136 Log #1288 NEC-P16 **Final Action: Hold**
(800.110)

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-173
Recommendation: The Proposal should have been Accepted in Principle and the panel action revised as stated in my Comment on Proposal 16-171.
Substantiation: See substantiation on my Comment on Proposal 16-171.
Panel Meeting Action: Hold
Panel Statement: Changing the
installation requirements for raceways is new material.

The proposed revision(s) constitute new material that have not had the benefit of public review and cannot be considered at this stage of the Code-making cycle. Refer to 4.4.6.2.2 of the Regulations Governing Committee Projects.

See panel action and statement on Comment 16-26.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-137 Log #1543 NEC-P16 **Final Action: Accept**
(800.110)

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-171
Recommendation: Revise the text of 800.110 Raceways for Communications Wires and Cables as follows:

"…general-purpose communications raceway installed in accordance with 800.154~~, and a listed nonmetallic raceway complying with 800.182(A), (B), or (C), as applicable,~~ and installed in accordance with 362.24 through 362.56, where …".

Substantiation: This text is in error and is redundant. Section 800.182 contains the listing requirements for plenum, riser and general-purpose communications raceways.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-138 Log #450 NEC-P16 **Final Action: Reject**
(800.110 Exception)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-174
Recommendation: Accept revised:

Exception: Communication wires and cables shall not be required to comply with raceway fill restrictions specified elsewhere in this code.

Substantiation: If conduit fill restrictions do not apply, why would the restrictions of 372.11, 374.5, 376.22, 378.22, 384.22, 386.22, 388.22, 390.5, Chapter 9 Tables for Articles 358 and 362 not be covered by the exception?
Panel Meeting Action: Reject
Panel Statement: Raceway fill restrictions are already covered in 800.110. The text as requested by the submitter would be redundant to current text.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-139 Log #1289 NEC-P16 **Final Action: Reject**
(800.110 Exception)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-174
Recommendation: The panel action should have been Accept.
Substantiation: The submitter's substantiation is correct and the panel action on Proposal 16-171 did exactly what the submitter requested.

See definition of "raceway" in Article 100.
Panel Meeting Action: Reject
Panel Statement: Raceway fill restrictions are already covered in 800.110. The action as requested would be redundant with text of 800.110 as modified by the panel action of Proposal 16-171.

Due to familiarity of the Code usage, problems may arise by making the change as requested and would add confusion rather than clarify.

The fill tables of Chapter 9 only apply to conduit and tubing. The fill limitations for other types of raceways are included in Chapter 3. Retaining the exception makes clear that both are covered by 800.110 (text and exception).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-140 Log #178 NEC-P16 **Final Action: Accept**
(800.113, 800.179 and Table 800.179)

TCC Action: The Technical Correlating Correlating directs that the new Exception be written as a complete sentence in accordance with Section 3.1.4.1 of the NEC Style Manual as follows:
"Exception: Communications cables that comply with 800.48 shall not be required to be listed."
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-178
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposals 16-145 and 16-209. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The panel clarifies that the text of 800.48, 800.113 and the first two paragraphs of 800.179 should be as follows:

800.48. Unlisted Cables Entering Buildings. Unlisted outside plant communications cables shall be permitted to be installed in locations as described in 800.154(C) where the length of the cable within the building, measured from its point of entrance, does not exceed 15 m (50 ft) and the cable

enters the building from the outside and is terminated in an enclosure or on a listed primary protector.

FPN No. 1: Splice cases or terminal boxes, both metallic and nonmetallic types, are typically used as enclosures for splicing or terminating telephone cables.

FPN No. 2: This section limits the length of unlisted outside plant cable to 15 m (50 ft), while 800.90(B) requires that the primary protector be located as close as practicable to the point at which the cable enters the building. Therefore, in installations requiring a primary protector, the outside plant cable may not be permitted to extend 15 m (50 ft) into the building if it is practicable to place the primary protector closer than 15 m (50 ft) to the entrance point.

FPN No. 3: See 800.2 for the definition of point of entrance.

800.113 Installation of Communications Wires and Cables. Communications cables installed in buildings shall be listed.

Exception: As permitted in 800.48.

800.179 Communications Wires and Cables. Communications wires and cables shall be listed in accordance with 800.179(A) through 800.179(J) and marked in accordance with Table 800.179. Conductors in communications cables, other than in a coaxial cable, shall be copper.

Communications wires and cables shall have a voltage rating of not less than 300 volts. The insulation for the individual conductors, other than the outer conductor of a coaxial cable, shall be rated for 300 volts minimum. The cable voltage rating shall not be marked on the cable or on the undercarpet communications wire.

Exception: Voltage markings shall be permitted where the cable has multiple listings and voltage marking is required for one or more of the listings.

FPN No. 1: Voltage markings on cables may be misinterpreted to suggest that the cables may be suitable for Class 1, electric light, and power applications.

FPN No. 2: See 800.170 for listing requirement for equipment.

Panel Statement: The panel accepts the direction of the TCC to reconsider and correlate with the action on Proposals 16-145 and 16-209.

The panel also correlated the text of Proposal 16-187 renumbering.

Section 800.113 has been revised to establish parallelism between sections. The text of Proposal 16-209 has been changed to exempt the outer conductor of a coaxial cable from the requirement to have 300 V insulation because the outer conductor of a coaxial cable is always grounded.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-141 Log #447 NEC-P16 **Final Action: Accept in Part**
(800.113 and 800.179)

TCC Action: The Technical Correlating Committee understands that the effect of the panel action is to add the following new sentence to the second paragraph of 800.179 shown in the panel action on comment 16-140:

"Communications wires and cables shall have a temperature rating of not less than 60°C."

Submitter: Allen C. Weidman, The Society of the Plastics Industry, Inc.

Comment on Proposal No: 16-177

Recommendation: Accept these proposals in principle by modifying the second paragraph in 800.179 as shown below. (Note- CMP 16 action on proposal 16-178 introduced a second paragraph.)

Communications wires and cables shall have a voltage rating of not less than 300 volts. The cable voltage rating shall not be marked on the cable or on the undercarpet communications wire. Communications wires and cables shall have a temperature rating of not less than 60° C. When the temperature rating of the cable is greater than 60°C, the temperature rating shall be marked on the cable.

Also, add the following text to 800.133. (Note-The current 800.133(D) was renumbered by panel action on proposal 16-185.)

800.133(D). **Temperature Limitation of Communications Wires and Cables.** Communications wires and cables shall be used in such a manner that their operating temperature does not exceed their temperature rating.

Substantiation: Traditional telecommunications involves minimal powering over communications cables. However, Power over Ethernet (POE) applications are proliferating and using communications cables for powering as well as signaling. Overheating of communications cables is a real concern.

Since Chapter 8 is independent of the rest of the code, section 310.10 does not apply.

"310.10 Temperature Limitation of Conductors. No conductor shall be used in such a manner that its operating temperature exceeds that designated for the type of insulated conductor involved. In no case shall conductors be associated together in such a way, with respect to type of circuit, the wiring method employed, or the number of conductors, that the limiting temperature of any conductor is exceeded."

The suggested text for 800.133(E) is a common-sense requirement to use cables consistently with their temperature rating; it correlates with 310.10.

The suggested text for 800.179 is consistent with the UL standard for listing of communications cables (UL 444), which requires a minimum temperature rating of 60 °C and no temperature marking unless a higher temperature rating is obtained.

It is important for system designers, installers, local authorities and building owners to know the temperature rating of cables so they can assure that cables are used consistently with their temperature rating.

Panel Meeting Action: Accept in Part

Add the following text as the second paragraph of 800.179:

Communications wires and cables shall have a voltage rating of not less than 300 volts. The cable voltage rating shall not be marked on the cable or on the undercarpet communications wire. Communications wires and cables shall have a temperature rating of not less than 60°C.

Panel Statement: The panel rejects the text for 800.133(D) because it is unenforceable.

The panel rejects second suggested sentence in the second paragraph of 800.179.

The panel retained the recommended text that states that the minimum temperature rating is 60°C and deleted the recommended text related to temperature marking for cables rated higher than 60°C. If a manufacturer has a higher temperature rating than 60°C, the manufacturer will ordinarily mark the cable to differentiate it.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-142 Log #1957 NEC-P16 **Final Action: Reject**
(800.133(A)(1)(c) Exception No. 1)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Comment on Proposal No: 16-183

Recommendation: Accept the proposal as submitted.

Substantiation: The submitter is well aware of the differences between circuit separation as covered in this location and as covered for adjacent snap switches. However, the CMP 9 approach will accommodate CMP 16's requirements without disadvantaging one segment of the market. By using the term "identified" as the standard of product acceptance (See Article 100), you can have a plastic divider in a plastic box (both will be listed because nonmetallic boxes must be listed); or you have a steel divider in a steel box (the box will likely be listed but doesn't have to be and the divider probably won't be listed.) The CMP 16 conclusion that this wording would allow a barrier to be installed such that it would void a box listing is untrue. The identification requirement means that the partitions will be covered on factory cut sheets, etc. describing the boxes for which they were designed. You will not find a divider that will meet this standard and be unsuitable for this application. And, in the case of nonmetallic boxes, all identified products will also be listed, so any improper barrier would provoke a citation under 110.3(B). In the case of steel boxes, the barriers will probably not be listed, but the anchoring methods are obvious to any installer and inspector, and they can easily be made secure for obvious reasons. The submitter has been an electrician for a long time, and has never encountered any problems securely installing steel dividers into the boxes for which they are identified.

Panel Meeting Action: Reject

Panel Statement: The listing of dividers is important given current trends and wiring methods.

"Identified" is not the same as "listed" which means that some sort of evaluation for suitability of the divider and its installation has been performed. Mounting, compatibility, material type and thickness, maintenance of spacings, etc. are all items of concern that a listing would address.

In recent years there has been a flood of devices and configurations utilizing standard outlet box dimensions and configurations for mix and matching of ac outlets, Ethernet, CATV and telecom connectors and receptacles. There is great concern regarding the separation of circuits, "storage" of excess cabling, routing of cables through or within the box, lack of expertise related to the installation of non-power cabling, and the like.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-143 Log #873 NEC-P16 **Final Action: Reject**
(800.154)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.

Comment on Proposal No: 16-189

Recommendation: The panel is encouraged to continue to Accept Proposal 16-189.

Substantiation: The reasons to continue to Accept the Proposal are as follows:

1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.

2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.

3. These standards are also covered by a Fine Print Note in 110.12.

4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.

5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).

6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.
JOHNSON, S.: See my explanation of negative vote on Comment 16-50.
OHDE, H.: See my Explanation of Negative for Comment 16-144.

16-144 Log #1780 NEC-P16 **Final Action: Reject**
(800.154)

Submitter: Robert W. Jensen, dbi
Comment on Proposal No: 16-189
Recommendation: Accept proposal to delete Fine Print Note__
~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~
Substantiation: The Standards Council issued two decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address Code Making Panel (CMP) decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. Proposals to the fine print notes were filed and rejected by the responsible CMP based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is clearly open for further consideration and action during the Comment phase."
This FPN is being misinterpret and used in aggressive marketing attempts to require the installation of "limited combustible cable" (one such example is found at http://www.dupont.com/cablingsolutions/products/codes.html). The FPN has had a profound effect in which it is used in misleading the AHJ to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
As an example, an AHJ Massachusetts would not provide a certificate of occupancy until the communications cabling was either replaced with limited combustible cable, the CMP cable was placed in conduit, or a sprinkler system installed above the suspended ceiling.. Although the installer had met the requirements of the NEC, the FPN misled the AHJ causing project delays and the potential of inordinate cost to the project. A plea to the NFPA aided the communications installer in which clarification was given that the CMP cabling was indeed sufficient to meet code and that NFPA 13 allowed some quantities (which is not defined) of communications cabling within concealed spaces. The installation of the CMP cable was allowed.
To further the removal of this FPN, the Report on Proposals A2006 from NFPA 13 (copy provided), the NFPA committee specifically added an annex A.8.14.1.2.1 in 13-284 log #551 stating that, "Some minor quantities of combustible materials, such as communication wiring, can be present in some concealed spaces but should not typically be viewed as requiring sprinklers (see 8.14.1.1). The threshold value at which sprinklers become necessary in the concealed space is not defined. For example, the usual amounts of data or telephone wiring found above a ceiling would not typically constitute a threat. If bundles of unsheathed computer wiring are installed above the ceiling or beneath the floor in a manner where fire propagation in all directions is likely, then the concealed space should be treated the same as a combustible space, thereby requiring appropriate sprinkler protection."
In addition to the above, Panel 3 rejected the last minute introduction of this proposal that was made in the ROC stage. BICSI, which represents 24,000 installers, designers and manufacturers, feels that this last minute interjection of a FPN was not sufficiently vetted to industry and that the TCC should review this matter.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.
JOHNSON, S.: See my explanation of negative vote on Comment 16-50.
OHDE, H.: This comment should have been accepted as this FPN does not provide useful guidance as indicated in the Panel Statement. This FPN which references 8.14.1 of NFPA 13 (2002) Installation of Sprinkler Systems has shown to be problematic and therefore should be deleted as allowed per Standards Council Decision D#06-03. If the FPN were to be deleted this would in effect restore the NEC to the 2002 edition.
The panel statement also included that the 2007 Edition of NFPA 13 would automatically eliminate the possibilities of misinterpretation. There was no opportunity for CMP 16 or the public to review the new proposed edition to see if this would eliminate the possibilities of misinterpretation. The 2007 edition of NFPA 13 also could be in violation of Standards Council Decision D#05-24 to remain status quo on these issues.

16-145 Log #2019 NEC-P16 **Final Action: Accept**
(800.154)

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-188
Recommendation: Continue to Reject.
Substantiation: The submitter's recommendation to create a new cable designation (CM50) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's substantiation would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. The submitter's substantiation references 2002 NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?
NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:
8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.
8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).
8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.
A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc...can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.
In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.
CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-146 Log #745 NEC-P16 **Final Action: Reject**
(800.154, FPN)

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 16-189
Recommendation: This proposal should be Accepted.
Substantiation: The submitter of this proposal to delete the Fine Print Note referencing NFPA 13 is correct in his substantiation. However, CMP-16 rejected this proposal on the basis of the directive from Standards Council D#05-24, to remain "status quo" on issues with respect to NFPA 90A. The Standards Council has recently decided that the Fine Print Notes under the purview of CMP-16 which reference NFPA 13 may be deleted, and such deletion is not in conflict with the Standards Council directive. This final Standards Council decision is titled D#06-03 and is included for your review. It is important to note that, **Standards Council clearly recognizes the 2002 edition of the NEC, in which these Fine Print Notes were not included, as the status quo.**
An appeal was made by Mr. A. Weidman in an attempt to overturn the previous decision by Standards Council to allow CMP-16 to delete the Fine Print Notes referencing NFPA 13. The appeal was soundly denied by Standards Council. The final decision, D#06-19 is also included for your review. It is extremely interesting to note that the last sentence of the decision by Standards Council provides directions for CMP-16 as follows:
"If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC."
These Fine Print Notes are problematic. Following the advice of Standards Council, they should be deleted. These Fine Print Notes exist solely to manipulate, misinform and threaten end users of the NEC. The proponents of flouropolymer products have developed an elaborate, financially driven scheme outlined as follows:
(1) Develop an Association (CFRA), funded by manufacturers, to coordinate and orchestrate unethical marketing plans by manipulation NFPA codes and standards
(2) Place consultants, hired to push flouropolymer interests, on CMP-3 and CMP-16 under the cloak of other organizations
(3) Promote Fine Print Notes referencing NFPA 13 in the NEC
(4) Use the Fine Print Notes to develop deceiving literature and presentations to manipulate the NFPA family of codes and standards to promote products which are not required
(5) Misinform and manipulate building code officials with a propaganda campaign based on Fine Print Notes in the NEC which reference NFPA 13
(6) Label this deceptive literature, designed for building officials, as "Field Guides" and " Inspection Checklists" (See an example field guide that I have submitted)
(7) Provide instructions for building officials to threaten and harass building owners to use the proponents products
In summary, the proponents of retaining these Fine Print Notes are engaged in an effort to misrepresent and manipulate the NFPA Family of Codes and Standards for their own financial gain. Provided for your review is just one many "Field Guides" supplied by the Cable Fire Research Association to Building Officials across the United States. As you read this "field guide" take note of the serious manipulation and misrepresentation of the NEC and NFPA 13, designed specifically to sell products in which the proponents have financial interests.
The efforts of this same group to manipulate the NFPA family of codes and standards in NFPA 90A led to the "return to committee" of the entire document. The NFPA 13 committee has taken serious steps to stop this runaway propaganda campaign by adding informational text explaining ***that usual amounts of cabling do not represent a problem***. This is referenced in the original proposal to delete the Fine Print Note.
CMP-16 has been lied to by the proponents of these Fine Print Notes referencing NFPA 13. The only reason they exist is to fuel a financially driven propaganda campaign. Retaining these Fine Print Note will lead to continued deception, misrepresentation and manipulation which will lead to the lack of adoption of the NEC.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.
JOHNSON, S.: See my explanation of negative vote on Comment 16-50.
OHDE, H.: See my Explanation of Negative for Comment 16-144.

16-147 Log #746 NEC-P16 **Final Action: Reject**
(800.154, FPN)

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 16-195
Recommendation: This proposal should be Accepted.
Substantiation: The submitter of this proposal to delete the Fine Print Note referencing NFPA 13 is correct in his substantiation. However, CMP-16 rejected this proposal on the basis of the directive from Standards Council D#05-24, to remain "status quo" on issues with respect to NFPA 90A. The Standards Council has recently decided that the Fine Print Notes under the purview of CMP-16 which reference NFPA 13 may be deleted, and such deletion is not in conflict with the Standards Council directive. This final Standards Council decision is titled D#06-03 and is included for your review. It is important to note that, **Standards Council clearly recognizes the 2002 edition of the NEC, in which these Fine Print Notes were not included, as the status quo.**
An appeal was made by Mr. A. Weidman in an attempt to overturn the previous decision by Standards Council to allow CMP-16 to delete the Fine Print Notes referencing NFPA 13. The appeal was soundly denied by Standards Council. The final decision, D#06-19 is also included for your review. It is extremely interesting to note that the last sentence of the decision by Standards Council provides directions for CMP-16 as follows:
"If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC."
These Fine Print Notes are problematic. Following the advice of Standards Council, they should be deleted. These Fine Print Notes exist solely to manipulate, misinform and threaten end users of the NEC. The proponents of flouropolymer products have developed an elaborate, financially driven scheme outlined as follows:
(1) Develop an Association (CFRA), funded by manufacturers, to coordinate and orchestrate unethical marketing plans by manipulation NFPA codes and standards
(2) Place consultants, hired to push flouropolymer interests, on CMP-3 and CMP-16 under the cloak of other organizations
(3) Promote Fine Print Notes referencing NFPA 13 in the NEC
(4) Use the Fine Print Notes to develop deceiving literature and presentations to manipulate the NFPA family of codes and standards to promote products which are not required
(5) Misinform and manipulate building code officials with a propaganda campaign based on Fine Print Notes in the NEC which reference NFPA 13
(6) Label this deceptive literature, designed for building officials, as "Field Guides" and " Inspection Checklists" (See an example field guide that I have submitted)
(7) Provide instructions for building officials to threaten and harass building owners to use the proponents products
In summary, the proponents of retaining these Fine Print Notes are engaged in an effort to misrepresent and manipulate the NFPA Family of Codes and Standards for their own financial gain. Provided for your review is just one many "Field Guides" supplied by the Cable Fire Research Association to Building Officials across the United States. As you read this "field guide" take note of the serious manipulation and misrepresentation of the NEC and NFPA 13, designed specifically to sell products in which the proponents have financial interests.
The efforts of this same group to manipulate the NFPA family of codes and standards in NFPA 90A led to the "return to committee" of the entire document. The NFPA 13 committee has taken serious steps to stop this runaway propaganda campaign by adding informational text explaining ***that usual amounts of cabling do not represent a problem***. This is referenced in the original proposal to delete the Fine Print Note.
CMP-16 has been lied to by the proponents of these Fine Print Notes referencing NFPA 13. The only reason they exist is to fuel a financially driven propaganda campaign. Retaining these Fine Print Note will lead to continued deception, misrepresentation and manipulation which will lead to the lack of adoption of the NEC.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-144.

16-148 Log #747 NEC-P16 **Final Action: Reject**
(800.154, FPN)

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 16-197
Recommendation: This proposal should be Accepted.
Substantiation: The submitter of this proposal to delete the Fine Print Note referencing NFPA 13 is correct in his substantiation. However, CMP-16 rejected this proposal on the basis of the directive from Standards Council D#05-24, to remain "status quo" on issues with respect to NFPA 90A. The Standards Council has recently decided that the Fine Print Notes under the purview of CMP-16 which reference NFPA 13 may be deleted, and such deletion is not in conflict with the Standards Council directive. This final Standards Council decision is titled D#06-03 and is included for your review. It is important to note that, **Standards Council clearly recognizes the 2002 edition of the NEC, in which these Fine Print Notes were not included, as the status quo.**
An appeal was made by Mr. A. Weidman in an attempt to overturn the previous decision by Standards Council to allow CMP-16 to delete the Fine Print Notes referencing NFPA 13. The appeal was soundly denied by Standards Council. The final decision, D#06-19 is also included for your review. It is extremely interesting to note that the last sentence of the decision by Standards Council provides directions for CMP-16 as follows:
"If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC."
These Fine Print Notes are problematic. Following the advice of Standards Council, they should be deleted. These Fine Print Notes exist solely to manipulate, misinform and threaten end users of the NEC. The proponents of flouropolymer products have developed an elaborate, financially driven scheme outlined as follows:

(1) Develop an Association (CFRA), funded by manufacturers, to coordinate and orchestrate unethical marketing plans by manipulation NFPA codes and standards

(2) Place consultants, hired to push flouropolymer interests, on CMP-3 and CMP-16 under the cloak of other organizations

(3) Promote Fine Print Notes referencing NFPA 13 in the NEC

(4) Use the Fine Print Notes to develop deceiving literature and presentations to manipulate the NFPA family of codes and standards to promote products which are not required

(5) Misinform and manipulate building code officials with a propaganda campaign based on Fine Print Notes in the NEC which reference NFPA 13

(6) Label this deceptive literature, designed for building officials, as "Field Guides" and " Inspection Checklists" (See an example field guide that I have submitted)

(7) Provide instructions for building officials to threaten and harass building owners to use the proponents products

In summary, the proponents of retaining these Fine Print Notes are engaged in an effort to misrepresent and manipulate the NFPA Family of Codes and Standards for their own financial gain. Provided for your review is just one many "Field Guides" supplied by the Cable Fire Research Association to Building Officials across the United States. As you read this "field guide" take note of the serious manipulation and misrepresentation of the NEC and NFPA 13, designed specifically to sell products in which the proponents have financial interests.

The efforts of this same group to manipulate the NFPA family of codes and standards in NFPA 90A led to the "return to committee" of the entire document. The NFPA 13 committee has taken serious steps to stop this runaway propaganda campaign by adding informational text explaining ***that usual amounts of cabling do not represent a problem***. This is referenced in the original proposal to delete the Fine Print Note.

CMP-16 has been lied to by the proponents of these Fine Print Notes referencing NFPA 13. The only reason they exist is to fuel a financially driven propaganda campaign. Retaining these Fine Print Note will lead to continued deception, misrepresentation and manipulation which will lead to the lack of adoption of the NEC.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-144.

16-149 Log #748 NEC-P16 **Final Action: Reject**
(800.154, FPN)

Submitter: James T. Dollard, Jr., IBEW Local 98
Comment on Proposal No: 16-200
Recommendation: This proposal should be Accepted.
Substantiation: The submitter of this proposal to delete the Fine Print Note referencing NFPA 13 is correct in his substantiation. However, CMP-16 rejected this proposal on the basis of the directive from Standards Council D#05-24, to remain "status quo" on issues with respect to NFPA 90A. The Standards Council has recently decided that the Fine Print Notes under the purview of CMP-16 which reference NFPA 13 may be deleted, and such deletion is not in conflict with the Standards Council directive. This final Standards Council decision is titled D#06-03 and is included for your review. It is important to note that, **Standards Council clearly recognizes the 2002 edition of the NEC, in which these Fine Print Notes were not included, as the status quo.**
An appeal was made by Mr. A. Weidman in an attempt to overturn the previous decision by Standards Council to allow CMP-16 to delete the Fine Print Notes referencing NFPA 13. The appeal was soundly denied by Standards Council. The final decision, D#06-19 is also included for your review. It is extremely interesting to note that the last sentence of the decision by Standards Council provides directions for CMP-16 as follows:
"If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC."
These Fine Print Notes are problematic. Following the advice of Standards Council, they should be deleted. These Fine Print Notes exist solely to manipulate, misinform and threaten end users of the NEC. The proponents of flouropolymer products have developed an elaborate, financially driven scheme outlined as follows:

(1) Develop an Association (CFRA), funded by manufacturers, to coordinate and orchestrate unethical marketing plans by manipulation NFPA codes and standards

(2) Place consultants, hired to push flouropolymer interests, on CMP-3 and CMP-16 under the cloak of other organizations

(3) Promote Fine Print Notes referencing NFPA 13 in the NEC

(4) Use the Fine Print Notes to develop deceiving literature and presentations to manipulate the NFPA family of codes and standards to promote products which are not required

(5) Misinform and manipulate building code officials with a propaganda campaign based on Fine Print Notes in the NEC which reference NFPA 13

(6) Label this deceptive literature, designed for building officials, as "Field Guides" and " Inspection Checklists" (See an example field guide that I have submitted)

(7) Provide instructions for building officials to threaten and harass building owners to use the proponents products

In summary, the proponents of retaining these Fine Print Notes are engaged in an effort to misrepresent and manipulate the NFPA Family of Codes and Standards for their own financial gain. Provided for your review is just one many "Field Guides" supplied by the Cable Fire Research Association to Building Officials across the United States. As you read this "field guide" take note of the serious manipulation and misrepresentation of the NEC and NFPA 13, designed specifically to sell products in which the proponents have financial interests.

The efforts of this same group to manipulate the NFPA family of codes and standards in NFPA 90A led to the "return to committee" of the entire document. The NFPA 13 committee has taken serious steps to stop this runaway propaganda campaign by adding informational text explaining ***that usual amounts of cabling do not represent a problem***. This is referenced in the original proposal to delete the Fine Print Note.

CMP-16 has been lied to by the proponents of these Fine Print Notes referencing NFPA 13. The only reason they exist is to fuel a financially driven propaganda campaign. Retaining these Fine Print Note will lead to continued deception, misrepresentation and manipulation which will lead to the lack of adoption of the NEC.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.
JOHNSON, S.: See my explanation of negative vote on Comment 16-50.
OHDE, H.: See my Explanation of Negative for Comment 16-144.

16-150 Log #1589 NEC-P16 **Final Action: Reject**
(800.154, FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-189
Recommendation: This proposal should be accepted.
Substantiation: This FPN should be deleted as the submitter proposed. In the submitter's substantiation he states that this FPN has misled the AHJ to believe and enforce limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?
NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:
8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.
8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)
8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.
A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc...can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.
In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.
CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC, therefore, it can and should be deleted.
Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.
JOHNSON, S.: See my explanation of negative vote on Comment 16-50.
OHDE, H.: See my Explanation of Negative for Comment 16-144.

16-151 Log #1590 NEC-P16 **Final Action: Reject**
(800.154, FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-195
Recommendation: This proposal should be accepted.
Substantiation: This FPN should be deleted as the submitter proposed. In the submitter's substantiation he states that this FPN has misled the AHJ to believe and enforce limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?
NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:
8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.
8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)
8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.
A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc...can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.
In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.
CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC, therefore, it can and should be deleted.
Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.
JOHNSON, S.: See my explanation of negative vote on Comment 16-50.
OHDE, H.: See my Explanation of Negative for Comment 16-144.

16-152 Log #1591 NEC-P16 **Final Action: Reject**
(800.154, FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-197
Recommendation: This proposal should be accepted.
Substantiation: This FPN should be deleted as the submitter proposed. In the submitter's substantiation he states that this FPN has misled the AHJ to believe and enforce limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it

impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc...can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC, therefore, it can and should be deleted.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-144.

16-153 Log #1592 NEC-P16 **Final Action: Reject**
(800.154, FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-200
Recommendation: This proposal should be accepted.
Substantiation: This FPN should be deleted as the submitter proposed. In the submitter's substantiation he states that this FPN has misled the AHJ to believe and enforce limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc...can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC, therefore, it can and should be deleted.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-144.

16-154 Log #1783 NEC-P16 **Final Action: Reject**
(800.154(A))

Submitter: Robert W. Jensen, dbi
Comment on Proposal No: 16-195
Recommendation: Accept proposal to delete Fine Print Note__
~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~
Substantiation: The Standards Council issued two decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address Code Making Panel (CMP) decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. Proposals to the fine print notes were filed and rejected by the responsible CMP based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is clearly open for further consideration and action during the Comment phase."

This FPN is being misinterpret and used in aggressive marketing attempts to require the installation of "limited combustible cable" (one such example is found at http://www.dupont.com/cablingsolutions/products/codes.html). The FPN has had a profound effect in which it is used in misleading the AHJ to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

As an example, an AHJ Massachusetts would not provide a certificate of occupancy until the communications cabling was either replaced with limited combustible cable, the CMP cable was placed in conduit, or a sprinkler system installed above the suspended ceiling.. Although the installer had met the requirements of the NEC, the FPN misled the AHJ causing project delays and the potential of inordinate cost to the project. A plea to the NFPA aided the communications installer in which clarification was given that the CMP cabling was indeed sufficient to meet code and that NFPA 13 allowed some quantities (which is not defined) of communications cabling within concealed spaces. The installation of the CMP cable was allowed.

To further the removal of this FPN, the Report on Proposals A2006 from NFPA 13 (copy provided), the NFPA committee specifically added an annex A.8.14.1.2.1 in 13-284 log #551 stating that, "Some minor quantities of combustible materials, such as communication wiring, can be present in some concealed spaces but should not typically be viewed as requiring sprinklers (see 8.14.1.1). The threshold value at which sprinklers become necessary in the concealed space is not defined. For example, the usual amounts of data or telephone wiring found above a ceiling would not typically constitute a threat. If bundles of unsheathed computer wiring are installed above the ceiling or beneath the floor in a manner where fire propagation in all directions is likely, then the concealed space should be treated the same as a combustible space, thereby requiring appropriate sprinkler protection."
In addition to the above, Panel 3 rejected the last minute introduction of this proposal that was made in the ROC stage. BICSI, which represents 24,000 installers, designers and manufacturers, feels that this last minute interjection of a FPN was not sufficiently vetted to industry and that the TCC should review this matter.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 820 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-144.

16-155 Log #1785 NEC-P16 **Final Action: Reject (800.154(A))**

Submitter: Robert W. Jensen, dbi
Comment on Proposal No: 16-197
Recommendation: Accept proposal to delete Fine Print Note__
~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~
Substantiation: The Standards Council issued two decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address Code Making Panel (CMP) decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. Proposals to the fine print notes were filed and rejected by the responsible CMP based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is clearly open for further consideration and action during the Comment phase."

This FPN is being misinterpret and used in aggressive marketing attempts to require the installation of "limited combustible cable" (one such example is found at http://www.dupont.com/cablingsolutions/products/codes.html). The FPN has had a profound effect in which it is used in misleading the AHJ to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
As an example, an AHJ Massachusetts would not provide a certificate of occupancy until the communications cabling was either replaced with limited combustible cable, the CMP cable was placed in conduit, or a sprinkler system installed above the suspended ceiling.. Although the installer had met the requirements of the NEC, the FPN misled the AHJ causing project delays and the potential of inordinate cost to the project. A plea to the NFPA aided the communications installer in which clarification was given that the CMP cabling was indeed sufficient to meet code and that NFPA 13 allowed some quantities (which is not defined) of communications cabling within concealed spaces. The installation of the CMP cable was allowed.
To further the removal of this FPN, the Report on Proposals A2006 from NFPA 13 (copy provided), the NFPA committee specifically added an annex A.8.14.1.2.1 in 13-284 log #551 stating that, "Some minor quantities of combustible materials, such as communication wiring, can be present in some concealed spaces but should not typically be viewed as requiring sprinklers (see 8.14.1.1). The threshold value at which sprinklers become necessary in the concealed space is not defined. For example, the usual amounts of data or telephone wiring found above a ceiling would not typically constitute a threat. If bundles of unsheathed computer wiring are installed above the ceiling or beneath the floor in a manner where fire propagation in all directions is likely, then the concealed space should be treated the same as a combustible space, thereby requiring appropriate sprinkler protection."
In addition to the above, Panel 3 rejected the last minute introduction of this proposal that was made in the ROC stage. BICSI, which represents 24,000 installers, designers and manufacturers, feels that this last minute interjection of a FPN was not sufficiently vetted to industry and that the TCC should review this matter.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-144.

16-156 Log #1787 NEC-P16 **Final Action: Reject (800.154(A))**

Submitter: Robert W. Jensen, dbi
Comment on Proposal No: 16-200
Recommendation: Accept proposal to delete Fine Print Note
~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~
Substantiation: The Standards Council issued two decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address Code Making Panel (CMP) decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. Proposals to the fine print notes were filed and rejected by the responsible CMP based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is clearly open for further consideration and action during the Comment phase."

This FPN is being misinterpret and used in aggressive marketing attempts to require the installation of "limited combustible cable" (one such example is found at http://www.dupont.com/cablingsolutions/products/codes.html). The FPN has had a profound effect in which it is used in misleading the AHJ to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
As an example, an AHJ Massachusetts would not provide a certificate of occupancy until the communications cabling was either replaced with limited combustible cable, the CMP cable was placed in conduit, or a sprinkler system installed above the suspended ceiling.. Although the installer had met the requirements of the NEC, the FPN misled the AHJ causing project delays and the potential of inordinate cost to the project. A plea to the NFPA aided the

communications installer in which clarification was given that the CMP cabling was indeed sufficient to meet code and that NFPA 13 allowed some quantities (which is not defined) of communications cabling within concealed spaces. The installation of the CMP cable was allowed.
To further the removal of this FPN, the Report on Proposals A2006 from NFPA 13 (copy provided), the NFPA committee specifically added an annex A.8.14.1.2.1 in 13-284 log #551 stating that, "Some minor quantities of combustible materials, such as communication wiring, can be present in some concealed spaces but should not typically be viewed as requiring sprinklers (see 8.14.1.1). The threshold value at which sprinklers become necessary in the concealed space is not defined. For example, the usual amounts of data or telephone wiring found above a ceiling would not typically constitute a threat. If bundles of unsheathed computer wiring are installed above the ceiling or beneath the floor in a manner where fire propagation in all directions is likely, then the concealed space should be treated the same as a combustible space, thereby requiring appropriate sprinkler protection."
In addition to the above, Panel 3 rejected the last minute introduction of this proposal that was made in the ROC stage. BICSI, which represents 24,000 installers, designers and manufacturers, feels that this last minute interjection of a FPN was not sufficiently vetted to industry and that the TCC should review this matter.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-144.

16-157 Log #179 NEC-P16 **Final Action: Accept**
(800.154(A) and (B))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-199
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal and that further consideration be given to the comments expressed in the voting. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

The panel accepts the direction of the TCC to clarify the panel action.

The panel action on Proposal 16-199 should have read, "The panel accepts the submitter's deletion in subsection (B)".
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-158 Log #659 NEC-P16 **Final Action: Reject**
(800.154(A), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-195
Recommendation: Revise text to read as follows:

800.154 Applications of Listed Communications Wires and Cables and Communications Raceways. Communications wires and cables shall comply with the requirements of 800.154(A) through 800.154(F) or where cable substitutions are made in accordance with 800.154(G).

(A) Plenum. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type CMP. Abandoned cables shall not be permitted to remain. Types CMP, CMR, CMG, CM, and CMX and communications wire installed in compliance with 300.22 shall be permitted. Listed plenum communications raceways shall be permitted to be installed in ducts and plenums as described in 300.22(B) and in other spaces used for environmental air as described in 300.22(C). Only Type CMP cable shall be permitted to be installed in raceways.
~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~
Substantiation: This is one of three references to NFPA 13 (it is repeated identically in articles 770, 800 and 820) included in the code that is a meaningless reference. Other references to NFPA 13, in Article 362, are properly included in mandatory sections of the code (section 362.10). Whenever a jurisdiction adopts NFPA 13 they need to adopt it for mandatory sections and not for an unenforceable FPN in one section, which is intended to mislead the user. In fact, NFPA 13 does not require that sprinklers be installed in plenums of "noncombustible or limited combustible construction", even if "the usual amount of cabling" is present. In fact, there have been several documented examples already of misrepresentation in that authorities having jurisdiction have been told that this means that sprinklers are required in plenum areas unless "limited combustible cable" is installed. I have been personally involved in several cases, and have heard of many more cases where this is being stated.

Section 8.14.1 of NFPA 13 (2006) reads as follows:

8.14.1.2 Concealed Spaces Not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustibles shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc. can be present in concealed spaces constructed of limited or noncombustible materials but should not typically be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

The same change is being proposed to the corresponding Fine Print Notes in articles 770 and 820, all of which deal with the same type of cables.

The committee rejected the proposal based on, and I quote: "NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005 that states, in pertinent part, as follows:

"[S]o as not to inject the problems identified in the 2002 edition of NFPA 90A into the NEC®, and in order to give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues related to plenum cables by processing the issues through the entire upcoming NFPA 90A revision cycle, the Council directs the NEC Project to maintain the status quo in the NEC until the Technical Committee on Air Conditioning has, through the processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A."

However, Standards Council has since issued two new decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address CMP decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. The question whether the fine print notes should be in the NEC is hardly new. Aside from the fact that their presence was debated in the previous edition cycle, Proposals to remove them were duly filed and rejected by the responsible Code-Making Panel based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is, therefore, clearly open for further consideration and action during the Comment phase."

Thus, clearly these Standards Council decisions directly permit the deletion of the Fine Print Note addressed by this comment.

Technically this Fine Print Note needs to be deleted for two reasons:

1. This Fine Print Note is misleading by pointing the reader to NFPA 13 which does not require the use of sprinklers, as both Bob Jensen and Harry Ohde point out in their negative votes and as is shown by the sections of NFPA 13 reproduced above.

2. This Fine Print Note is identical to the ones in 770.154 (A) and in 820.154 (A), both of which are equally misleading. On the other hand there are no Fine Print Notes in articles 725 and 760. Thus, deleting this Fine Print Note will provide further consistency within the NEC.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-144

16-159 Log #956 NEC-P16 **Final Action: Reject**
(800.154(A), FPN)

Submitter: Donald Hall, Corning Cable Systems

Comment on Proposal No: 16-197

Recommendation: Note: The commenter is also submitting analogous comments to Proposal 16-78 (ROP Log #3098) and Proposal 16-329 (ROP Log #3095) pertaining to FPNs referencing NFPA 13 Section 8.14.1 Accept the proposal to delete the FPN, leading to the following:

770.154 Applications of Listed Communications Wires and Cables and Communications Raceways. Communications wires and cables shall comply with any of the requirements of 800.154(A) through 800.154(F) or where cable substitutions are made in accordance with 800.154(G).

(A) Plenum. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type CMP. Abandoned cables shall not be permitted to remain. Types CMP, CMR, CMG, CM and CMX cables installed in compliance with 300.22 shall be permitted. Listed plenum communications raceways shall be permitted to be installed in ducts and plenums as described in 300.22(B) and in other spaces used for environmental air as described in 300.22(C). Only type CMP cable shall be permitted to be installed in these raceways.

~~FPN: See 8.14.1 of NFPA 13 (2202), Installation of Sprinkler Systems, for requirements for sprinklers in concealed space containing exposed combustibles.~~

Substantiation: The committee rejected this proposal without any consideration of its merits, based on its belief at the time that it fell within the scope of Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005. since that time, however, the Standards Council has issued two new decisions as follows: Decison 06-06 (SC #6-3-18) dated 22 March 2006 states: in petinent part; "The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC Project would not violate the directive by deleting the Fine Print Notes as issue."

Decision 06-19 (SC #06-7-33) dated 28 July 2006 states, in pertinent part:

"If the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this."

And

"It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800 and 820), but not in others (Articles 725 and 760)."

And

"Nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the comment phase of the code development process."

And

"If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC".

In view of the above decisions, the commenter requests that the proposal be considered on its merits as stated in the original proposal substantiation and as further substantiated below.

Since the original proposal was submitted, the following Annex Note was added to the 2007 Edition of NFPA 13:

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic pluming piping, nonstructural wood, etc. can be present in concealed spaces constructed of limited or noncombustible materials but should not typically be viewed as requiring sprinklers (see 8.14.1.1. for example, it is not the intent of this section to require sprinklers which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

Additionally, the standard approach of the NEC is to require the use of listed products which are tested and approved by a Nationally Recognized Test Laboratory (NRTL) as being suitable for use in a particular application. Normal fire hazards associated with an application space and the application of wiring products installed within them are duly anticipated during the establishment of listing criteria for these products. Air handling spaces are no different from any other space in this regard. The inclusion and particular placement of this FPN is suggestive of the idea that the NEC or the NRTLs has failed to adequately recognize the hazards associated with these spaces. The safety record of plenum cables within air handling spaces has been debated extensively and is open to continued debate within the NFPA Code making process, but the FPN in question should not be used as a maens to short circuit this process and lead users around the code. When properly understood, the FPNs of 770.154(A), 800.154(A), and 820.154(A) lead to a dead end. When not properly understood, they lead to an unnecessary encumbrance upon the use of listed products installed in accordance with approved NEC wiring methods.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-144.

16-160 Log #238 NEC-P16 **Final Action: Reject**
(800.154(B))

Submitter: Stanley Kaufman, CableSafe Inc.

Comment on Proposal No: 16-187

Recommendation: Accept this proposal in principle. Continue to accept the recommendation in proposal 16-187. In addition make the following change:

800.154(B)(2) Metal Raceways or Fireproof Shafts. Listed communications cables shall be <u>permitted to be</u> encased in a metal raceway or located in a fireproof shaft having firestops at each floor.

Substantiation: The purpose of proposal 18-187 is to establish parallelism between sections 770.154, 800.154 and 820.154.

770.154(B)(2) Type OFNG, OFN, OFCG, and OFC cables **shall be permitted to be encased** in a metal raceway or located in a fireproof shaft having firestops at each floor.

800.154(B)(2) Metal Raceways or Fireproof Shafts. Listed communications cables **shall be encased** in a metal raceway or located in a fireproof shaft having firestops at each floor.

820.154(B)(2) Metal Raceways or Fireproof Shafts. Types CATV and CATVX cables **shall be permitted to be encased** in a metal raceway or located in a fireproof shaft having fire-stops at each floor.

830.154(C)(2) Metal Raceways or Fireproof Shafts. Type BLX cables **shall be permitted to be encased** in a metal raceway or located in a fireproof shaft having firestops at each floor.

The words "shall be permitted" were omitted from the text in 800.154(B)(2). Acceptance of this comment will correct that typographical error.

Panel Meeting Action: Reject

Panel Statement: The submitter intended to establish parallelism between CMP-16 Articles, however, upon careful scrutiny of the text, it appears that greater clarity can be achieved by rejection of the comment.

If the language of the comment is accepted, cables could be installed without protection.

The submitter is encouraged to submit a new proposal.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-161 Log #180 NEC-P16 **Final Action: Accept**
(800.154(D)(1))

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 16-203

Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal and that further consideration be given to the comments expressed in the affirmative comments on voting. This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

The reference in the proposal print line was incorrect. The panel agrees the reference from 800.15(D)(1) should be 800.154(E)(1). The preprint is correct.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-162 Log #2052 NEC-P16 **Final Action: Accept**
(800.154(G), FPN)

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-206
Recommendation: Continue to Reject.
Substantiation: The submitter's recommendation to create a new cable designation (CMP50) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's recommendation to add this FPN to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. The submitter's substantiation references 2002 NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-163 Log #1462 NEC-P16 **Final Action: Reject**
(800.154(H) (New))

Submitter: Sanford Egesdal, Egesdal Associates PLC
Comment on Proposal No: 16-188
Recommendation: Reconsider Proposal 16-188 and revise 800.154 as shown below.
(H) Communications Fire Hazard (FHC) Cable. Communications Fire hazard (FHC) cable shall be permitted for use in communications systems as other wiring within buildings in accordance with 800.154(E) to provide reduced potential heat release.
Substantiation: The application of the Standards Council's decision on NPFA 90A was an error. The proposed marking on the cable did not include a "P" added to CM. Type CMP cable is permitted to be installed in plenums.

This comment creates a new section for the fire hazard cable. The new section provides a requirement that clearly identifies that the fire hazard cable is permitted to be installed as "Other Wiring Within Buildings."

To better clarify that the Standards Council's decision on NFPA does not apply and to better clarify where the cable is permitted to be installed, the marking on the cable is changed to Type CM-FHC. The "FHC" suffix stands for fire hazard cable. There is a companion comment to revise the marking found in my comment to Proposal 16-223.

Some installations require large amounts of cable. A typical application of a fire hazard cable would be above a suspended ceiling or under a raised floor, neither of which is a plenum. The proposed cable has a very low fuel load, as compared to other types of cable insulation. Some cable constructions use one type of insulation on the conductor and another type for the jacket.
The Type CM-FHC cable suggested for listing and marking in 800.179(K) (comment to proposal 16-223) has parameters (e.g. 3500 BTU/lb) that are standard in the building industry, and useful to system designers and fire protection engineers.

To put cable insulation heat release in perspective, here are relative values:
Fire Hazard Cable insulation: less than 8 MJ/kg (3,500 BTU/lb)
PVC insulation: As high as 25 MJ/kg (11,000 BTU/lb)
Polyolefin insulation: As high as 46 MJ/kg (20,000 BTU/lb)
Panel Meeting Action: Reject
Panel Statement: Cable meeting specifications as described in this comment is not prohibited by the Code, and the panel sees no need for an additional marking.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-164 Log #1514 NEC-P16 **Final Action: Reject**
(800.156)

Submitter: Donad Ganiere, Ottawa, IL
Comment on Proposal No: 16-207
Recommendation: Reject this proposal.
Substantiation: Proposal is too vague to be enforceable and covers design issues not code issues. Many people have no need for any type of hard wired communication connection in their dwelling units.
Panel Meeting Action: Reject
Panel Statement: The commenter did not provide sufficient technical substantiation. The panel continues to agree with the proposer's intent.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-165 Log #2100 NEC-P16 **Final Action: Reject**
(800.156)

Submitter: James H. Maxfield, Dover, NH
Comment on Proposal No: 16-207
Recommendation: Delete the following text:
~~800.156 Dwelling Unit Communications Outlets. For new construction, a minimum of two communications outlet shall be installed; one within the master bedroom and one within the living room or kitchen, and cabled to the service provider demarcation point.~~
Substantiation: This proposal appears to be a matter of design convenience. The resident of a dwelling unit may act choose to subscribe to a land line communication provider. They may choose a wireless system. The addition of this section does not appear to be in harmony with Section 90.1 of NFPA 70, NEC, 2005 edition. The addition of this proposal does not appear to solve any problem while mandating communication services and location of services which may not be desired.
Panel Meeting Action: Reject
Panel Statement: See the panel action and statement on Comment 16-164.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-166 Log #2277 NEC-P16 **Final Action: Reject**
(800.179(A))

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-211
Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN to read:

FPN: One method of determining that the cable has fire-resistant and low-smoke-producing characteristics is NFPA 262-2002, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.*
Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The FPN defines the damage and specifies performance requirements.
Panel Meeting Action: Reject
Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-167 Log #2275 NEC-P16 **Final Action: Hold**
(800.179(B))

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-213
Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN as shown:

FPN: One method of determining ~~defining~~ fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is ~~that the raceways pass the requirements of the test for Flame Propagation (riser) in~~ ANSI/UL 1666-2002, *Standard Test for Flame Propagation Height of Electrical and Optical-Fiber Cable Installed Vertically in Shafts.*
Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The FPN defines the damage and specifies performance requirements.
Panel Meeting Action: Hold
Panel Statement: The proposal was editorial, seeking no changes to the fine print note. A technical change in the fine print note would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-168 Log #2279 NEC-P16 **Final Action: Hold**
(800.179(C), FPN)

T**CC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.**
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-214
Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN to read:

FPN: One method of determining that the cable is resistant to the spread of fire is the "Vertical Flame Test - Cables in Cable Trays," in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*.
Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The Proposal as submitted defines the damage and specifies performance requirements.
Panel Meeting Action: Hold
Panel Statement: The proposal was editorial, seeking only to update the edition of the referenced document in the fine print note. A technical change in the fine print note would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-169 Log #2280 NEC-P16 **Final Action: Hold**
(800.179(D))

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-215
Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN to read:

FPN: One method of determining that the cable is resistant to the spread of fire is ANSI/UL 1581-2001, *Reference Standard for Electrical Wires, Cables and Flexible Cords.*

Another method of determining that the cable is resistant to the spread of fire is the "Vertical Flame Test - Cables in Cable Trays," in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*.
Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The Proposal as submitted defines the damage and specifies performance requirements.

The date of the latest edition of the UL standard was corrected from 1991 to 2001 and for the CSA standard from 1985 to 2001.
Panel Meeting Action: Hold
Panel Statement: The proposal was editorial, seeking no changes to the fine print note. A technical change in the fine print note would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-170 Log #2281 NEC-P16 **Final Action: Hold**
(800.179(D))

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-216
Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN to read:

FPN: One method of determining that the cable is resistant to the spread of fire is ANSI/UL 1581-2001, *Reference Standard for Electrical Wires, Cables and Flexible Cords.*

Another method of determining that the cable is resistant to the spread of fire is the "Vertical Flame Test - Cables in Cable Trays," in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*.
Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The Proposal as submitted defines the damage and specifies performance requirements.

The date of the latest edition of the UL standard was corrected from 1991 to 2001 and for the CSA standard from 1985 to 2001.
Panel Meeting Action: Hold
Panel Statement: The proposal was editorial, seeking no changes to the fine print note. A technical change in the fine print note would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-171 Log #2282 NEC-P16 **Final Action: Hold**
(800.179(D), 800.179(I) and 800.179(J) FPNs,)

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-217
Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN to read:

FPN: One method of determining that the cable is resistant to the spread of fire is the UL Flame Exposure, Vertical Tray Flame Test in UL1685-2000 *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables.*

Another method of determining that the cable is resistant to the spread of fire is the "Vertical Flame Test - Cables in Cable Trays," in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*.
Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The Proposal as submitted defines the damage and specifies performance requirements.
Panel Meeting Action: Hold
Panel Statement: A technical change in the fine print note as proposed in this comment would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-172 Log #2283 NEC-P16 **Final Action: Hold**
(800.179(F))

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-219
Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN to read:

FPN: One method of determining that the cable is resistant to flame spread is the VW-1 (vertical-wire) flame test in ANSI/UL 1581-2001, *Reference Standard for Electrical Wires, Cables and Flexible Cords.*
Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The FPN as submitted in the Proposal includes mandatory language by requiring that the cable be tested to UL 1581. The revised wording provides explanatory information without any requirements.

The date of the latest edition of the UL standard was corrected from 1991 to 2001.
Panel Meeting Action: Hold
Panel Statement: The proposal was editorial, seeking no changes to the fine print note. A technical change in the fine print note would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-173 Log #370 NEC-P16 **Final Action: Accept**
(800.179(G))

Submitter: S. D. Kahn, Tri-City Electric Company, Inc. / Rep. NECA
Comment on Proposal No: 16-220
Recommendation: Accept the Proposal in Principle and refer to Proposal 16-221 and Comment submitted by S.D. Kahn.
Substantiation: It is questionable whether the Standards Council directives apply to this Proposal. The Standards Council directive was to maintain the status quo with respect to plenum cables; this Proposal does not alter that status quo. The original Substantiation is correct and the Proposal is essentially editorial in that multipurpose cables are no longer recognized. Listing requirements for multipurpose cables were only permitted until July 1, 2003.

If section 800.179(G) remains in the Code there will be no new multipurpose cable listings. If proposal 16-221 is accepted there still will not be any new multipurpose cable listings, but we will have a better code. Since the outcome is the same, i.e., no multipurpose cable listings regardless of whether or not this proposal is accepted, it should be clear that accepting the proposal does not violate the Standards Council directive to maintain the status quo relative to plenum cables. The status quo is that there have been no new multipurpose cable listings since July 1, 2003.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-174 Log #371 NEC-P16 **Final Action: Accept**
(800.179(G))

Submitter: S. D. Kahn, Tri-City Electric Company, Inc. / Rep. NECA
Comment on Proposal No: 16-221
Recommendation: Accept the Proposal.
Substantiation: It is questionable whether the Standards Council directives apply to this Proposal. The Standards Council directive was to maintain the status quo with respect to plenum cables; this Proposal does not alter that status quo. The original Substantiation is correct and the Proposal is essentially editorial in that multipurpose cables are no longer recognized. Listing requirements for multipurpose cables were only permitted until July 1, 2003.

If section 800.179(G) remains in the Code there will be no new multipurpose cable listings. If proposal 16-221 is accepted there still will not be any new multipurpose cable listings, but we will have a better code. Since the outcome is the same, i.e., no multipurpose cable listings regardless of whether or not this proposal is accepted, it should be clear that accepting the proposal does not violate the Standards Council directive to maintain the status quo relative to plenum cables. The status quo is that there have been no new multipurpose cable listings since July 1, 2003.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-175 Log #2284 NEC-P16 **Final Action: Hold**
(800.179(G))

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-221
Recommendation: The Panel Action should have been to Accept in Principle in Part by accepting and rewording the FPNs in the sections indicated to read as shown below. The balance of the Proposal should be Rejected in accordance with the Panel Statement.

(G) – FPN: One method of determining circuit integrity is ANSI/UL 2196-2001, *Standard for Safety for Tests for Fire Resistive Cables.*

(H) – FPN: One method of determining that the cable is resistant to the spread of fire is the UL Flame Exposure, Vertical Tray Flame Test in UL1685-2000 *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables.*

Another method of determining that the cable is resistant to the spread of fire is the "Vertical Flame Test - Cables in Cable Trays," in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables.*

(I) – same text as (H) above.
Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The Proposal as submitted defines the damage and specifies performance requirements.

The number, title, and the date of the latest edition of the UL standard were corrected to reflect the current applicable standard. The reference in the CSA standard and the date of the CSA standard were also corrected.
Panel Meeting Action: Hold
Panel Statement: The proposed revision(s) constitutes new material that has not had the benefit of public review and so cannot be considered at this stage of the code-making cycle. Refer to Section 4.4.6.2.2 of the Regulations Governing Committee Projects.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-176 Log #2285 NEC-P16 **Final Action: Hold**
(800.179(J))

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-222
Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN to read:

FPN: One method of determining that the cable is resistant to the spread of fire is the UL Flame Exposure, Vertical Tray Flame Test in UL1685-2000 *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables.*

Another method of determining that the cable is resistant to the spread of fire is the "Vertical Flame Test - Cables in Cable Trays," in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables.*
Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The Proposal as submitted defines the damage and specifies performance requirements.

The number, title, and the date of the latest edition of the UL standard were corrected to reflect the current applicable standard. The reference in the CSA standard and the date of the CSA standard were also corrected.
Panel Meeting Action: Hold
Panel Statement: The proposal was editorial, seeking no changes to the fine print note. A technical change in the fine print note would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-177 Log #1463 NEC-P16 **Final Action: Reject**
(800.179(K) (New))

Submitter: Sanford Egesdal, Egesdal Associates PLC
Comment on Proposal No: 16-223
Recommendation: Reconsider proposal 16-223 and revise 800.179 as shown below.
(K) Communications Limited Fire Hazard (-FHC) Cable. Cables used to reduce potential heat release shall be listed as fire hazard (-FHC) cable and shall have a low potential heat release. Fire hazard cables specified in 800.154(E), and used to reduce potential heat release shall have an additional classification using the suffix "-FHC".

FPN No. 1: One method of defining a low potential heat release cable is that the cable exhibits a maximum potential heat value of exceeding 8141 kJ/kg (3500 BTU/lb) when tested in accordance with NFPA 259, *Standard Test Method for Potential Heat of Building Materials*, as well as a maximum flame spread index of 25 and a maximum smoke developed index of 50 when tested in accordance with NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*.
Substantiation: The application of the Standards Council's decision on NPFA 90A was an error. The proposed marking on the cable did not include a "P" added to CM. Type CMP cable is permitted to be installed in plenums.

To better clarify that the Standards Council's decision on NFPA does not apply and to better clarify where the cable is permitted to be installed, the marking on the cable is changed to Type CM-FHC. The "FHC" suffix stands for fire hazard cable. There is a companion comment to revise the application of fire hazard cable in my comment to Proposal 16-188.

The proposed cable provides listing parameters useful to system designers and fire protection engineers.

The key parameter in the listing requirements is potential heat release.

To put cable heat release in perspective, here are relative values:

Fire Hazard Cable insulation: less than 8 MJ/kg (3,500 BTU/lb

PVC insulation: As high as 25 MJ/kg (11,000 BTU/lb)

Polyolefin insulation: As high as 46 MJ/kg (20,000 BTU/lb)

Polyolefin insulation is sometimes used as insulation on conductors, and is covered by a PVC jacket. Polyolefin insulation provides better electrical properties (dielectric constant) than PVC insulation.

Additionally, flame spread and smoke developed parameters identify the robustness of the cable.

A flame spread index of 25 is found in a number of NFPA publications, for example:

NFPA 13-2007

8.15.1 Concealed Spaces.

8.15.1.2.10 Concealed spaces where rigid materials are used and the exposed surfaces have a flame spread index of 25 or less, and the materials have been demonstrated not to propagate fire when tested in accordance with NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials, extended for an additional 20 minutes in the form in which they are installed, shall not require sprinkler protection.

NFPA 13 use of "concealed spaces" corresponds to a typical dictionary definition: out of sight, hidden. This definition add "spaces" to "concealed" and represents a different meaning from how the NEC defines "concealed." Where both the NEC and NFPA 13 apply, "concealed" cable can be removed from a "concealed space." After removal of the cable, the "concealed space" would remain.

A smoke developed index of 50 is more rigorous than the typical smoke developed index of 450 for interior finishes. Interior finishes can be considered a "fixed" application: one sheet or one coat. Cable installations are a "variable" application: one cable or hundreds of cables. It seems reasonable to establish a robust requirement, due to the variable application. Electronic equipment is susceptible to damage from smoke and heat, both components of a fire.

Panel Meeting Action: Reject
Panel Statement: Cable meeting specifications as described in this comment is not prohibited by the Code, and the panel sees no need for an additional marking.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-178 Log #1574 NEC-P16 **Final Action: Accept (800.179(K))**

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-225
Recommendation: Continue to reject.
Substantiation: The submitter's recommendation to create a new cable designation (concealed space cable) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's substantiation would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, the confusion and making it impossible to enforce. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-179 Log #2053 NEC-P16 **Final Action: Accept (800.179(K))**

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-223
Recommendation: Continue to Reject.
Substantiation: The submitter's recommendation to create a new cable designation (CMP50) is nothing more than a marketing ploy. The submitter's recommendation to add these three FPN's to this section is in grave error. FPN No. 1 is a backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The FPN No. 2 would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. The submitter's substantiation references 2002 NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 810 — RADIO AND TELEVISION EQUIPMENT

16-180 Log #181 NEC-P16 **Final Action: Accept (810)**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-227
Recommendation: The Technical Correlating Committee understands that the revisions in 810.54, Exception were to be made to the existing Exception text.

The Technical Correlating Committee directs the panel to correct the Exceptions to 810.57 to make them into complete sentences. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise 810.54 Exception as follows:

"Exception: Where the lead-in conductors are enclosed in a continuous metallic shield that is grounded with a conductor in accordance with 810.58, they shall not be required to comply with these requirements. Where grounded, the metallic shield shall also be permitted to be used as a conductor."

Revise 810.57 Exception Nos. 1 and 2 as follows:

"Exception No. 1: Where the lead-in is protected by a continuous metallic shield that is grounded with a conductor in accordance with 810.58, an antenna discharge unit or other suitable means shall not be required."

"Exception No. 2: Where the antenna is grounded with a conductor in accordance with 810.58, an antenna discharge unit or other suitable means shall not be required."
Panel Statement: The panel accepts the direction of the TCC to revise the exceptions to 810.54 and 810.57.

The exception to 810.54 is derived from the existing text. The panel understands that 810.54 is to have only one exception, as it only had one exception in the original text.

The panel has revised the text into complete sentences as indicated in the panel action on this comment.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-181 Log #1110 NEC-P16 **Final Action: Reject (810)**

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-227
Recommendation: The Panel Action should be to Accept in Principle with the following additional revision.
In 810.21(F)(3)(b), change "has no" to "does not have a".
Substantiation: This is a grammatical change that makes the sentence read better and does not change any requirements.
Panel Meeting Action: Reject
Panel Statement: The requirements are clear as presented and are not improved by the submitter's suggested editorial revision.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-182 Log #776 NEC-P16 **Final Action: Reject**
(810.15 Exception (New))

Submitter: David Lettkeman, Dish Network Service, LLC
Comment on Proposal No: 16-230
Recommendation: Add new text to read as follows:
810.15 Grounding. Masts and metal structures supporting antennas shall be grounded in accordance with 810.21.
Exception: In installations where dish antennas are one point two (1.2) meters or less in diameter, and the masts and metal structures supporting antennas are not electrically connected to lead-in conductors and are mounted to a non conductive surface material, grounding of the mast or supporting metal structure is not required.
Substantiation: Problem: As stated in the Code, 90.1 Purpose (A) Practical Safeguarding, the purpose of this Code is the practical safeguarding of persons and property from hazards arising from the use of electricity. The purpose of 810.15 is to help prevent the introduction of voltage and current which may be the result of lightning or surge, by requiring masts and metal structures supporting antennas to be grounded in accordance with 810.21. This section was originally written to provide protection for masts and antennas which were made of metal and had a direct connection to the lead in cables. The word Dish was added to Section 810 in 1999 to include the many new installations which were not covered in other sections. The technology of these dishes and the mounting procedures are not the same as the old transmitting and receiving antennas, for which this section seems to be written. These small antennas are not mounted on masts which extend many feet above the supporting structure which made the antennas of old more susceptible to making contact with wiring of higher voltages and at times could be perceived as an attractant to lightning.
Substantiation: The proposed addition of the exception to 810.15, would allow the mast or metal supporting structure which is mounted on a non-conductive surface and all electrical components are electrically isolated from the mast to be excluded from this requirement. The grounding of these types of antennas actually increases the likelihood of lightning or surge voltage and current being introduced into the structure, thereby endangering the customer and their structure.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The panel reiterates the concern expressed in the panel statement to Proposal 16-230. A metallic structure (mast, metallic supports, etc.) that is exposed to a potential lightning strike should be grounded.
The physical separation between the dish and supporting metalwork and the coaxial conductors is of little significance when it comes to lightning.
Mounting on a non-conductive surface (such as wood or vinyl siding, roofing) does not preclude arcing and flash-over to other conductive media in the structure (plumbing, electrical and communications wiring) and the accompanying fire hazard.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-183 Log #778 NEC-P16 **Final Action: Reject**
(810.15 Exception (New))

Submitter: Steve C. Hill, Satellite Broadcast and Communications Association
Comment on Proposal No: 16-230
Recommendation: Add new text to read as follows:
810.15 Grounding. Masts and metal structures supporting antennas shall be grounded in accordance with 810.21.
Exception: In installations where masts and metal structures supporting antennas are not electrically connected to lead-in conductors and are mounted to a non-conductive surface material, grounding of the mast or supporting metal structure is not required.
Substantiation: Problem: The type of satellite antenna and mast used in residential installations are electrically isolated from the power source. Therefore, grounding these components to current code creates a potential ground source for lightning or electrical surge.
Substantiation: During the installation process on dishes that are 1.2 meters in diameter or less, when the mast and/or metal mounting plate is mounted on a non-conductive surface such as wood or brick the dish is effectively isolated from the power source. In addition, all other electrical components are electrically isolated from the mast and antenna. This design (if left ungrounded) provides no conduit for high voltage electrical current to enter the residence.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 16-182.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-184 Log #780 NEC-P16 **Final Action: Reject**
(810.15 Exception (New))

Submitter: Steve C. Hill, Satellite Broadcast and Communications Association
Comment on Proposal No: 16-230
Recommendation: Add new text to read as follows:
810.15 Grounding. Masts and metal structures supporting antennas shall be grounded in accordance with 810.21.
Exception: In installations where masts and metal structures supporting antennas are not electrically connected to lead-in conductors and are mounted to a non conductive surface material, grounding of the mast or supporting metal structure is not required.
Substantiation: Problem: The type of satellite antenna and mast used in residential installations are electrically isolated from the power source. Therefore, grounding these components to current code creates a potential ground source for lightning or electrical surge.
Substantiation: During the installation process on dishes that are 1.2 meters in diameter or less, when the mast and/or metal mounting plate is mounted on a non-conductive surface such as wood or brick the dish is effectively isolated from the power source. In addition, all other electrical components are electrically isolated from the mast and antenna. This design (if left ungrounded) provides no conduit for high voltage electrical current to enter the residence.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 16-182.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-185 Log #1134 NEC-P16 **Final Action: Reject**
(810.15 Exception (New))

Submitter: George Bish, Mastec
Comment on Proposal No: 16-230
Recommendation: Insert:
Exception: Installation where dish antennas are 1.2 meters or less in diameter and all lead in conductors are electrically isolated from the dish.
Substantiation: This will help prevent the introduction of voltage to the receiver due to lighting strikes reducing the chance of damage to the receiver that is located in the premises.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 16-182.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-186 Log #1391 NEC-P16 **Final Action: Reject**
(810.15 Exception (New))

Submitter: Raymond D. Edwards, DIRECTV, Inc.
Comment on Proposal No: 16-230
Recommendation: Revise text to read as follows:
810.15 Grounding. Masts and metal structures supporting antennas shall be grounded in accordance with 810.21.
Exception: In installations where masts and metal structures supporting antennas are not electrically connected to lead-in conductors and are mounted to a nonconductive surface material, grounding of the mast or supporting metal structure is not required.
Substantiation: Problem: Since the satellite antenna and mast are electrically isolated from the power source they pose no threat of becoming a ground source for lightning or surges until they are grounded to current code.
Substantiation: If the mast or metal supporting structure is mounted on a nonconductive surface and all electrical components are electrically isolated from the mast and antenna there is no path for high voltage and current to enter the structure.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 16-182.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-187 Log #182 NEC-P16 **Final Action: Accept**
(810.21(F))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-236
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 5-20. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept
Revise the text of 810.21(F) as follows:
"(F) Electrode. The grounding conductor shall be connected as follows:
(1) In Buildings or Structures with an Intersystem ~~Grounding~~ Bonding Termination. If the building or structure served has an intersystem ~~grounding~~ bonding termination, the grounding conductor shall be connected to the intersystem ~~grounding~~ bonding termination.
(2) In Buildings or Structures with Grounding Means. If the building or structure served has no intersystem ~~grounding~~ bonding termination, the grounding conductor shall be connected to the nearest accessible location on the following:"
Retain existing list and text:
"(3) In Buildings or Structures Without Intersystem ~~Grounding~~ Bonding Termination or Grounding Means. If the building or structure served has no intersystem ~~grounding~~ bonding termination or grounding means, as described in 810.21(F)(1)."
Panel Statement: The panel has reconsidered this proposal per the TCC comment and has revised the text as indicated to correlate with the panel action on Proposal 5-20.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-188 Log #183 NEC-P16 **Final Action: Accept (810.21(F))**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-237
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 16-236. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Relocate the text to follow 810.21(F)(2)(f) and revise as follows:
"A bonding device intended to provide a termination point for the grounding conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is non-removable."
Panel Statement: The panel has reconsidered Proposal 16-188 and has also considered the affirmative comment expressed in the voting. The panel has determined that the proper location of the text is 810.21(F)(2)(f), not 810.21(F)(e), as indicated in the affirmative comment. That is where equipment (service) enclosures are discussed. The panel has also added editorial clarification as indicated in the panel action on this comment. The panel notes that the text is presently located incorrectly in the preprint.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-189 Log #1111 NEC-P16 **Final Action: Reject (810.21(F))**

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-236
Recommendation: The Panel Action should be to Accept in Principle with the following additional revisions to the Proposal.
Change "has no" to "does not have a" in 810.21(F)(2), 810.21(F)(3), and 810.21(F)(3)(b).
Substantiation: This is a grammatical change that makes the sentences read better and does not change any of the requirements.
Panel Meeting Action: Reject
Panel Statement: The requirements are clear as presented and are not improved by the submitter's suggested editorial revision.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-190 Log #1527 NEC-P16 **Final Action: Accept (810.21(F))**

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-236
Recommendation: Continue to accept the proposal, but change the term "Intersystem Grounding Termination" to "Intersystem Bonding Termination."
Substantiation: This is a correlating comment to correlating with the actions of CMP-5 taken on proposal 5-20 as directed by the TCC. CMP-5 changed the term "Intersystem Grounding Termination" to "Intersystem Bonding Termination."
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 16-187.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 820 — COMMUNITY ANTENNA TELEVISION AND RADIO DISTRIBUTION SYSTEMS

16-191 Log #252 NEC-P16 **Final Action: Accept in Part (820.2)**

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-250
Recommendation: Accept this proposal in principle in part by continuing to accept the modification to the definition of the point of entrance and rejection the addition of the fine print notes. Add the following additional definitions:
Intermediate Metal Conduit (Type IMC). The definition in 342.2 shall apply.
Rigid Metal Conduit (Type RMC). The definition in 344.2 shall apply.
Substantiation: Article 820 uses the terms Intermediate Metal Conduit and Rigid Metal Conduit. These terms are defined in Articles 342 and 344 respectively. Because of 90.3 (excerpted below), these definitions do not apply to Chapter 8. They will apply if this comment is accepted.
"Chapter 8 covers communications systems and is not subject to the requirements of Chapters 1 through 7 except where the requirements are specifically referenced in Chapter 8."
Panel Meeting Action: Accept in Part
Delete FPNs No. 1 and No. 2.
Panel Statement: The panel accepts the deletion of the FPNs and rejects the addition of the two definitions, as they are covered by references to Chapter 3 within 820.110.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-192 Log #253 NEC-P16 **Final Action: Reject (820.2)**

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-245
Recommendation: Continue to accept the definition of CATV raceway.
Substantiation: The listing requirements for CATV Raceway are in section 820.182. It is appropriate to have a definition in this article.
The listing requirements for Optical fiber Raceways are in section 770.182 and the definition is in section 770.2.
See proposal 16-108 where the panel accepted a similar definition for Communications Raceway. The listing requirements for CATV Raceways are in section 800.182.
Panel Meeting Action: Reject
Panel Statement: The panel rejects Proposal 16-245. The panel intends to delete the definition. The listing requirements in 820.182 adequately describe a CATV raceway. See Comment 16-280a (Log #CC1603).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-193 Log #663 NEC-P16 **Final Action: Reject (820.2)**

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-252
Recommendation: Delete text to read as follows:
~~**820.2 Air Duct.** A conduit or passageway for conveying air to or from heating, cooling, air conditioning, or ventilating equipment, but not including the plenum~~.
Substantiation: The term "air duct" is not contained in Article 820 and should not, thus, be defined in the Article.
The same change is being proposed for the definition of "air duct" in article 800.
The committee rejected the proposal based on, and I quote: "NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005 that states, in pertinent part, as follows:
"[S]o as not to inject the problems identified in the 2002 edition of NFPA 90A into the NEC®, and in order to give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues related to plenum cables by processing the issues through the entire upcoming NFPA 90A revision cycle, the Council directs the NEC Project to maintain the status quo in the NEC until the Technical Committee on Air Conditioning has, through the processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A."
However, Standards Council has since issued two new decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address CMP decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154.

The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. The question whether the fine print notes should be in the NEC is hardly new. Aside from the fact that their presence was debated in the previous edition cycle, Proposals to remove them were duly filed and rejected by the responsible Code-Making Panel based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is, therefore, clearly open for further consideration and action during the Comment phase."

It would appear to me that these Standards Council decisions by implication would indirectly permit the deletion of definitions that violate the NEC manual of style.

Panel Meeting Action: Reject

Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

JENSEN, R.: We disagree that there was no opportunity for public review. To the contrary, there were nineteen (19) comments received on proposals involving this definition, thereby showing that this proposal was indeed reviewed.

We believe that the interpretation of whether being allowed to address the original proposal in view of the NFPA Standards Council Long Decision 05-24 (SC #05-7-4) was wrong. Indeed, during the writing of the 2005 NEC, all references where 90A issues were involved were to be untouched in the 2005 NEC. One of these issues was "air duct cable" and the definition of "air duct" (as it pertained to air duct cable). Additionally, having a definition where the term is not used in the text of the code is in violation of the Style Guide.

We agree with deleting the term "air duct" as it was evidently an oversight that it was not removed during the last code cycle. Air duct was introduced for use with "air duct cable" which was not to be used in the 2005 code. Additionally, the term is not used within 800. To further not using this term, in proposal 16-29, the panel revised the proposal to not use "air duct", but instead to harmonize code language by using the term "ventilation or air handling ducts".

OHDE, H.: This comment should have been accepted as this is no need for this definition of "air duct". The term "air duct" is not contained in this Article therefore should not be defined.

The panel statement reflects that Standards Council decision relative to NFPA 90A Decision is remain status quo regarding plenum issues. I do not believe that the Standard Council decision would prohibit the definition of air duct from being deleted.

16-194 Log #1581 NEC-P16 **Final Action: Reject (820.2)**

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-239
Recommendation: This proposal should be accepted.
Substantiation: The term "air duct" is not used in Article 800 and, therefore, it should be deleted from 800.2. Defining a term that is not being used (such as air duct) in that Article is in direct violation with the National Electrical Code Style Manual. CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

I do not believe that this Standards Council decision would prohibit the definition of "air duct" from being deleted. I do believe that expansion of, or a new definition of, air duct in another Article would be a violation of Standards Council Decision D#05-24. Standards Council recently issued another decision (D#06-03) which decided that 770.154(A) FPN, 800.154(A) FPN and 820.154(A) FPN may be deleted and this deletion would not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo.

Panel Meeting Action: Reject

Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

JENSEN, R.: We disagree that there was no opportunity for public review. To the contrary, there were nineteen (19) comments received on proposals involving this definition, thereby showing that this proposal was indeed reviewed.

We believe that the interpretation of whether being allowed to address the original proposal in view of the NFPA Standards Council Long Decision 05-24 (SC #05-7-4) was wrong. Indeed, during the writing of the 2005 NEC, all references where 90A issues were involved were to be untouched in the 2005 NEC. One of these issues was "air duct cable" and the definition of "air duct" (as it pertained to air duct cable). Additionally, having a definition where the term is not used in the text of the code is in violation of the Style Guide.

We agree with deleting the term "air duct" as it was evidently an oversight that it was not removed during the last code cycle. Air duct was introduced for use with "air duct cable" which was not to be used in the 2005 code. Additionally, the term is not used within 800. To further not using this term, in proposal 16-29, the panel revised the proposal to not use "air duct", but instead to harmonize code language by using the term "ventilation or air handling ducts".

OHDE, H.: See my Explanation of Negative for Comment 16-193.

16-195 Log #1582 NEC-P16 **Final Action: Reject (820.2)**

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-243
Recommendation: This proposal should be accepted.
Substantiation: The term "air duct" is not used in Article 800 and, therefore, it should be deleted from 800.2. Defining a term that is not being used (such as air duct) in that Article is in direct violation with the National Electrical Code Style Manual. CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

I do not believe that this Standards Council decision would prohibit the definition of "air duct" from being deleted. I do believe that expansion of, or a new definition of, air duct in another Article would be a violation of Standards Council Decision D#05-24. Standards Council recently issued another decision (D#06-03) which decided that 770.154(A) FPN, 800.154(A) FPN and 820.154(A) FPN may be deleted and this deletion would not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo.

Panel Meeting Action: Reject

Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

JENSEN, R.: We disagree that there was no opportunity for public review. To the contrary, there were nineteen (19) comments received on proposals involving this definition, thereby showing that this proposal was indeed reviewed.

We believe that the interpretation of whether being allowed to address the original proposal in view of the NFPA Standards Council Long Decision 05-24 (SC #05-7-4) was wrong. Indeed, during the writing of the 2005 NEC, all references where 90A issues were involved were to be untouched in the 2005 NEC. One of these issues was "air duct cable" and the definition of "air duct" (as it pertained to air duct cable). Additionally, having a definition where the term is not used in the text of the code is in violation of the Style Guide.

We agree with deleting the term "air duct" as it was evidently an oversight that it was not removed during the last code cycle. Air duct was introduced for use with "air duct cable" which was not to be used in the 2005 code. Additionally, the term is not used within 800. To further not using this term, in proposal 16-29, the panel revised the proposal to not use "air duct", but instead to harmonize code language by using the term "ventilation or air handling ducts".

OHDE, H.: See my Explanation of Negative for Comment 16-193.

16-196 Log #1583 NEC-P16 **Final Action: Reject (820.2)**

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-252
Recommendation: This proposal should be accepted.
Substantiation: The term "air duct" is not used in Article 800 and, therefore, it should be deleted from 800.2. Defining a term that is not being used (such as air duct) in that Article is in direct violation with the National Electrical Code Style Manual. CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

I do not believe that this Standards Council decision would prohibit the definition of "air duct" from being deleted. I do believe that expansion of, or a

new definition of, air duct in another Article would be a violation of Standards Council Decision D#05-24. Standards Council recently issued another decision (D#06-03) which decided that 770.154(A) FPN, 800.154(A) FPN and 820.154(A) FPN may be deleted and this deletion would not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo.

Panel Meeting Action: Reject

Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

JENSEN, R.: We disagree that there was no opportunity for public review. To the contrary, there were nineteen (19) comments received on proposals involving this definition, thereby showing that this proposal was indeed reviewed.

We believe that the interpretation of whether being allowed to address the original proposal in view of the NFPA Standards Council Long Decision 05-24 (SC #05-7-4) was wrong. Indeed, during the writing of the 2005 NEC, all references where 90A issues were involved were to be untouched in the 2005 NEC. One of these issues was "air duct cable" and the definition of "air duct" (as it pertained to air duct cable). Additionally, having a definition where the term is not used in the text of the code is in violation of the Style Guide.

We agree with deleting the term "air duct" as it was evidently an oversight that it was not removed during the last code cycle. Air duct was introduced for use with "air duct cable" which was not to be used in the 2005 code. Additionally, the term is not used within 800. To further not using this term, in proposal 16-29, the panel revised the proposal to not use "air duct", but instead to harmonize code language by using the term "ventilation or air handling ducts".

OHDE, H.: See my Explanation of Negative for Comment 16-193.

16-197 Log #1689 NEC-P16 **Final Action: Accept (820.2)**

Submitter: Harold C. Ohde, IBEW #134

Comment on Proposal No: 16-247

Recommendation: Continue to Reject.

Substantiation: The submitter's recommendation to add this definition to 820.2 because the term "concealed space" is used 820.154(A) FPN is misleading. This definition does not belong in the NEC. The 820.154(A) FPN provided no guidance to designers, installers or code officials. This FPN has misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirements because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces" therefore the confusion and making it impossible to enforce. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction.

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154 and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC therefore it can and should be deleted. There is no need for the term "concealed spaces" to be defined.

Panel Meeting Action: Accept

Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-198 Log #1788 NEC-P16 **Final Action: Reject (820.2)**

Submitter: Robert W. Jensen, dbi

Comment on Proposal No: 16-243

Recommendation: Accept this proposal.

~~**800.2 Air Duct.** A conduit or passageway for conveying air to or from heating, cooling, air conditioning, or ventilating equipment, but not including the plenum. [NFPA 97:1.2.6]~~

Substantiation: This was an apparent over-sight in the 2005 editorial review under the Standards Council mandate to remove content related to "air duct cable", therefore not under the NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005.

Additionally, "Air duct" is not a term used in Article 820 and therefore a violation of the NFPA Manual of Style.

Panel Meeting Action: Reject

Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

JENSEN, R.: We disagree that there was no opportunity for public review. To the contrary, there were nineteen (19) comments received on proposals involving this definition, thereby showing that this proposal was indeed reviewed.

We believe that the interpretation of whether being allowed to address the original proposal in view of the NFPA Standards Council Long Decision 05-24 (SC #05-7-4) was wrong. Indeed, during the writing of the 2005 NEC, all references where 90A issues were involved were to be untouched in the 2005 NEC. One of these issues was "air duct cable" and the definition of "air duct" (as it pertained to air duct cable). Additionally, having a definition where the term is not used in the text of the code is in violation of the Style Guide.

We agree with deleting the term "air duct" as it was evidently an oversight that it was not removed during the last code cycle. Air duct was introduced for use with "air duct cable" which was not to be used in the 2005 code. Additionally, the term is not used within 800. To further not using this term, in proposal 16-29, the panel revised the proposal to not use "air duct", but instead to harmonize code language by using the term "ventilation or air handling ducts".

OHDE, H.: See my Explanation of Negative for Comment 16-193.

16-199 Log #1789 NEC-P16 **Final Action: Reject (820.2)**

Submitter: Robert W. Jensen, dbi

Comment on Proposal No: 16-239

Recommendation: Accept this proposal.

~~**800.2 Air Duct.** A conduit or passageway for conveying air to or from heating, cooling, air conditioning, or ventilating equipment, but not including the plenum. [NFPA 97:1.2.6]~~

Substantiation: This was an apparent over-sight in the 2005 editorial review under the Standards Council mandate to remove content related to "air duct cable", therefore not under the NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005.

Additionally, "Air duct" is not a term used in Article 820 and therefore a violation of the NFPA Manual of Style.

Panel Meeting Action: Reject

Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

JENSEN, R.: We disagree that there was no opportunity for public review. To the contrary, there were nineteen (19) comments received on proposals involving this definition, thereby showing that this proposal was indeed reviewed.

We believe that the interpretation of whether being allowed to address the original proposal in view of the NFPA Standards Council Long Decision 05-24 (SC #05-7-4) was wrong. Indeed, during the writing of the 2005 NEC, all

references where 90A issues were involved were to be untouched in the 2005 NEC. One of these issues was "air duct cable" and the definition of "air duct" (as it pertained to air duct cable). Additionally, having a definition where the term is not used in the text of the code is in violation of the Style Guide.

We agree with deleting the term "air duct" as it was evidently an oversight that it was not removed during the last code cycle. Air duct was introduced for use with "air duct cable" which was not to be used in the 2005 code. Additionally, the term is not used within 800. To further not using this term, in proposal 16-29, the panel revised the proposal to not use "air duct", but instead to harmonize code language by using the term "ventilation or air handling ducts".

OHDE, H.: See my Explanation of Negative for Comment 16-193.

16-200 Log #1791 NEC-P16 **Final Action: Reject**
(820.2)

Submitter: Robert W. Jensen, dbi
Comment on Proposal No: 16-252
Recommendation: Accept this proposal.
~~**800.2 Air Duct.** A conduit or passageway for conveying air to or from heating, cooling, air conditioning, or ventilating equipment, but not including the plenum. [NFPA 97:1.2.6]~~
Substantiation: This was an apparent over-sight in the 2005 editorial review under the Standards Council mandate to remove content related to "air duct cable", therefore not under the NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005.

Additionally, "Air duct" is not a term used in Article 820 and therefore a violation of the NFPA Manual of Style.
Panel Meeting Action: Reject
Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:

JENSEN, R.: We disagree that there was no opportunity for public review. To the contrary, there were nineteen (19) comments received on proposals involving this definition, thereby showing that this proposal was indeed reviewed.

We believe that the interpretation of whether being allowed to address the original proposal in view of the NFPA Standards Council Long Decision 05-24 (SC #05-7-4) was wrong. Indeed, during the writing of the 2005 NEC, all references where 90A issues were involved were to be untouched in the 2005 NEC. One of these issues was "air duct cable" and the definition of "air duct" (as it pertained to air duct cable). Additionally, having a definition where the term is not used in the text of the code is in violation of the Style Guide.

We agree with deleting the term "air duct" as it was evidently an oversight that it was not removed during the last code cycle. Air duct was introduced for use with "air duct cable" which was not to be used in the 2005 code. Additionally, the term is not used within 800. To further not using this term, in proposal 16-29, the panel revised the proposal to not use "air duct", but instead to harmonize code language by using the term "ventilation or air handling ducts".

OHDE, H.: See my Explanation of Negative for Comment 16-193.

16-201 Log #1114 NEC-P16 **Final Action: Accept in Part**
(820.2.Point of Entrance)

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-250
Recommendation: The Panel Action should continue to be Accept in Principle with the following additional revisions to the Panel Action.
In the definition for Point of Entrance, delete the last phrase in the Proposal "grounded to an electrode in accordance with 820.100(B)"
Delete the two FPNs.
Substantiation: The deletion of the phrase is required to comply with 2.2.2 of the NEC Style Manual which states "Definitions shall not contain requirements or recommendations." and 2.3.2.2 of the Manual of Style for NFPA Technical Committee Documents which states "Definitions shall not contain requirements."
The comments expressed by the Technical Correlating Committee on Proposals 16-116 and 16-117 provide valid reasons for the deletion of the FPNs.
It is assumed that the Panel Action on Proposal 16-251 supersedes the Panel Action on this Proposal.
Panel Meeting Action: Accept in Part
Panel Statement: The panel accepts the deletion of the FPNs. See panel action and statement on Comments 16-100 and 16-191.

The panel rejects the deletion of the phrase "connected by a grounding conductor to an electrode in accordance with 820.100(B)" because it is an integral and necessary part of the definition. See panel action and statement on Comment 16-87.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-202 Log #1116 NEC-P16 **Final Action: Accept in Part**
(820.2.Point of Entrance)

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-251
Recommendation: The Panel Action should continue to be Accept in Principle with the following additional revisions to the Panel Action.
In the definition for Point of Entrance, delete the last phrase "connected by a grounding conductor to an electrode in accordance with 820.100(B)"
Delete the two FPNs.
Substantiation: The deletion of the phrase is required to comply with 2.2.2 of the NEC Style Manual which states "Definitions shall not contain requirements or recommendations." and 2.3.2.2 of the Manual of Style for NFPA Technical Committee Documents which states "Definitions shall not contain requirements."
The comments expressed by the Technical Correlating Committee on Proposals 16-116 and 16-117 provide valid reasons for the deletion of the FPNs.
Panel Meeting Action: Accept in Part
Panel Statement: The panel accepts the deletion of the FPNs. See panel action and statement on Comments 16-100 and 16-191.

The panel rejects deletion of the phrase "connected by a grounding conductor to an electrode in accordance with 820.100(B)" because it is an integral and necessary part of the definition. See panel action and statement on Comment 16-87.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-203 Log #184 NEC-P16 **Final Action: Accept**
(820.3(A))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-256
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 16-257. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has reconsidered the panel action on Proposal 16-256 and determines that it is correct and correlates with the panel action on Proposal 16-257. The panel desires to relocate the text on abandoned cable removal to a more appropriate section as indicated in the panel statement for Proposal 16-257. The panel did not intend to delete the text.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-204 Log #1230 NEC-P16 **Final Action: Accept**
(820.3(A))

Submitter: John Burke, Fusion Cable Systems
Comment on Proposal No: 16-256
Recommendation: Continue to Reject this Proposal.
Substantiation: We remove old and unused cable as part of our standard business practice especially in retrofit jobs. The amount of old cable on some jobs has caused damage to the building and created unsafe working conditions for our techs. We support continuing the abandoned cable removal requirement in the Code.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-205 Log #185 NEC-P16 **Final Action: Accept**
(820.3(A), 820.25 (new) & 820.26 (new))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-259
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal regarding what is meant by "reorder subsections of 820.3." This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review clarification of the panel action.

The panel accepted the deletion of 800.3(A), which was moved to 820.26. Hence, the remaining subsections of 820.3 had to be reordered, i.e., (B) becomes (A), (C) becomes (B), etc.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-206 Log #186 NEC-P16 **Final Action: Accept**
(820.3(A), 820.25 (new) & 820.26 (new))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-260
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

See panel action and statement on Comment 16-207.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-207 Log #187 NEC-P16 **Final Action: Accept**
(820.3(A), 820.25 (new) & 820.26 (new))

TCC Action: The Technical Correlating Committee understands that 820.3(C) should not be deleted.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-261
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Revise the panel meeting action for Proposal 16-261 as follows: "The panel accepts the submitter's deletion of 820.3(C), and 820.3(A), the addition of 820.25 (new), and the addition of 820.26 (new), but revises "air ducts" to "ventilation or air-handling duct" in keeping with the existing NEC text. The panel accepts FPN No. 1 but rejects the addition of FPN No 2.
Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

The action corrects a typographical error.

The substantiation for the change to 300.21 is in Proposal 16-259.

The panel took parallel action in Articles 770, 800, and 830.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-208 Log #2058 NEC-P16 **Final Action: Reject**
(820.3(A), 820.25, and 820.26)

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-260
Recommendation: This Proposal should have been Rejected.
Substantiation: The submitter's recommendation to add a new 800.26 with this FPN No. 2 to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. The submitter's substantiation references 2002 NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 should have rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154, and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo.
Panel Meeting Action: Reject
Panel Statement: The panel rejected the text that the submitter of the comment objected to.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-209 Log #2059 NEC-P16 **Final Action: Reject**
(820.3(A), 820.25, and 820.26)

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-261
Recommendation: This Proposal should have been Rejected.
Substantiation: The submitter's recommendation to add a new 800.26 with this FPN No. 2 to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. The submitter's substantiation references 2002 NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 should have rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154, and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo.

Panel Meeting Action: Reject
Panel Statement: The panel rejected the text that the submitter of the comment objected to.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-210 Log #188 NEC-P16 **Final Action: Accept (820.24)**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-273
Recommendation: The Technical Correlating Committee notes that neither the panel statement nor the revised statement shown in the affirmative vote are responsive to the submitter's substantiation for the recommendation. The Technical Correlating Committee directs the panel to act on the merits of the recommendation. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider the comments expressed in the voting and continues to reject the proposal.

The requirements of 300.11(C) are applicable to CATV cables, are not overly restrictive and are appropriate.

Requiring any and all cables to be properly supported is not overly restrictive and is appropriate. Securing an additional cable to an existing properly supported cable does not constitute support. Additional cables must be directly supported by the same structural member that supports the first cable. In such installations, the additional cable is being supported by the same structural member.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:

BRUNSSEN, J.: Proposal 16-273 should have been accepted. See my explanation of negative vote on Comment 16-216.

16-211 Log #189 NEC-P16 **Final Action: Accept (820.24)**

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-274
Recommendation: The Technical Correlating Committee notes that neither the panel statement nor the revised statement shown in the affirmative vote are responsive to the submitter's substantiation for the recommendation. The Technical Correlating Committee directs the panel to act on the merits of the recommendation. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider the comments expressed in the voting and continues to reject the proposal.

The requirements of 300.11 are applicable to CATV cables, are not overly restrictive and are appropriate.

Requiring any and all cables to be properly supported is not overly restrictive and is appropriate. Securing an additional cable to an existing properly supported cable does not constitute support. Additional cables must be directly supported by the same structural member that supports the first cable. In such installations, the additional cable is being supported by the same structural member.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:

BRUNSSEN, J.: Proposal 16-274 should have been accepted. See my explanation of negative vote on Comment 16-217.

16-212 Log #374 NEC-P16 **Final Action: Reject (820.24)**

Submitter: S. D. Kahn, Tri-City Electric Company, Inc. / Rep. NECA
Comment on Proposal No: 16-272
Recommendation: Reject the Proposal.
Substantiation: Although I agree with the proposal and the submitter's intent to introduce consistency, the material is used in plenums and other air handling spaces. Consequently, the proposal should have been subjec
ted to the direction given by the Standards Council, as were many other proposals which were rejected.

As Mr. Dorna noted in his "Explanation of Negative Vote", "The UL Directory (2005), shows that category ZODZ covers "cable ties, cable tie mounts and similar types of related hardware". Likewise, Conduit and Fittings, category DWFV covers "cable ties, conduit straps, staples and similar hardware..." Both categories list as "Suitable for use in air handling spaces in accordance with Sec 300.22(C) and (D) of the National Electrical Code."

This proposal should have been rejected because of the Standards Council decision concerning NFPA 90A. Code Making Panels must be consistent in their handling of all submitted proposals.
Panel Meeting Action: Reject
Panel Statement: This is not a 90A issue.

The guide information for ZODZ, Wire Positioning Devices states that:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

The reference to air handling spaces is only a reference and is stated as:

"…for those devices which have been investigated to determine their suitability for use in air handling areas…"

This is a standard statement that is found in a wide variety of listing categories including the category for IT and Telecom equipment to cover situations where a special investigation is done to evaluate a device for air handling spaces. It no way implies that devices in the category are automatically intended for air handling spaces.

Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

Devices are evaluated for properties that we are concerned about. It is NOT a requirement for a listed device to be evaluated for use in air handling spaces.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-213 Log #478 NEC-P16 **Final Action: Reject (820.24)**

Submitter: Timothy P. McNeive, Thomas & Betts Corporation
Comment on Proposal No: 16-272
Recommendation: Delete the word "listed".
Substantiation: Refer to my comment in ROP 16-275. The use of the word "listed" is redundant whether or not my comment in 16-275 is accepted. I agree with Mr. Boyer's comment accompanying his negative vote. His suggested additional text is not needed, however, in this section, if adopted in 820.24 according to my comment in ROP 16-275.
Panel Meeting Action: Reject
Panel Statement: The guide information for ZODZ, Wire Positioning Devices states that:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

The evaluation of positioning devices includes:

- Classification by mechanical strength, material, maximum temperature, and environmental conditions
- Required Markings giving critical information to the installer / inspector
- Mechanical strength tests
- Flammability classification of polymeric materials and coatings (NOT air-handling space requirements)
- Relative thermal index
- Material requirements (Including blending and substitution)
- Corrosion resistance
- Sharp edges
- Installation
- Mechanical strength
- Vibration
- Tests for mounting blocks and other mounting hardware and devices
- Environmental conditioning.....

Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:

BOYER, J.: See my explanation of vote on Comment 16-29.

16-214 Log #479 NEC-P16 **Final Action: Reject**
(820.24)

Submitter: Timothy P. McNeive, Thomas & Betts Corporation
Comment on Proposal No: 16-275
Recommendation: Accept the panel action but delete the requirement that hardware be "listed" in 820.24. Add the following sentence before the last sentence in 820.24:

"Cable ties that provide primary support for optical fiber cables and raceways shall have a minimum loop tensile strength of 23 kg (50 lbs).

Substantiation: Adding a requirement that all hardware be "listed" is far from editorial as asserted in the substantiation accompanying the proposal. The panel is asked to consider the long-standing positions of CMP-7 and CMP-8 that do not require support hardware to be "listed". Above all else, consistency in the NEC seems to be what the original submitter values most. No substantiation has been provided in the proposal that would differentiate treatment of antenna television and radio distribution cables from other wiring systems with respect to support. The wide variety of hardware used for supporting cables and raceways are called upon to provide both primary support required in the NEC and very often secondary support or wire management functions. All hardware need not be held to the highest standard.

The comment provided by Mr. Dorna with his negative vote references two UL categories under which cable ties and other hardware are "listed". The correct UL category for Hardware for Support of Conduit, Tubing and Cable (UL 2239) is DWMU, not DWFV. Nevertheless, this standard and UL 1565, Positioning Devices (ZODZ) establishes a 23 kg test load for all support products for flexible conduits and cables in accordance with the requirements for primary support throughout the NEC. For cable ties, "minimum loop tensile strength" is commonly marked on packages. The 23 kg minimum for cable support is well representative of typical straps, hangers and staples listed for flexible conduit and cable support in accordance with UL 2239, Hardware for Support of Conduit, Tubing and Cable. The proposed new text will add value to inspectors in acceptance of appropriate cable ties without requiring lists.

Companion proposals have been submitted for 640.6, 725.8, 760.8, 770.24, 800.24 and 830.24.

Panel Meeting Action: Reject
Panel Statement: There is more to listing than mechanical strength. Also, the mechanical strength should be based on the use and ratings of the device.

Cable ties can be used for securing and supporting cables in a number of Chapter 3 wiring methods without any requirements for a minimum loop tensile strength of 23 kg (50 Ibs) or any particular strength. For example, Section 334.30 covering securing and supporting of "nonmetallic-sheathed cable requires supporting and securing by staples, cable ties, straps, hangers, or similar fittings designed and installed so as not to damage the cable, at intervals not exceeding 1.4 m (4 1/ 2 ft) and within 300 mm (12 in.) of every outlet box, junction box, cabinet, or fitting." Notice it does not have any recommendation for the support strength, nor does it need this additional marking or special consideration. The cables may not be providing any support at all where the tie wrap is simply anchoring it to a beam or joist. Types AC and MC cable also give permission to use cable ties for securing and supporting these cables in 320.30 and 330.30, respectively. In addition, this added text could be considered to be new information that has not been reviewed as part of the process.

Listing includes an evaluation of the particular device that goes beyond the ability to support cable. The guide information for ZODZ, Wire Positioning Devices states that:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:

BOYER, J.: See my explanation of vote on Comment 16-29.

16-215 Log #874 NEC-P16 **Final Action: Reject**
(820.24)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 16-275
Recommendation: The panel is encouraged to continue to Accept in Principle Proposal 16-275 and continue to Reject the addition of the FPN.
Substantiation: The reasons to continue to Accept in Principle the Proposal and the addition of the FPN are as follows:

1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Reject
Panel Statement: The action on Proposal 16-275 was to accept in principle in part. This is not consistent with the submitter's request.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-216 Log #1544 NEC-P16 **Final Action: Reject**
(820.24)

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-273
Recommendation: Accept this proposal.
Substantiation: This proposal should be accepted. If the Panel continues to support the addition of the requirements of 300.11 to 820.24, then at the very least, the requirements of 300.11(C) should be waived. Section 300.11(C) is clearly not applicable to CATV cables. Installation practice is to lash CATV cables together to form a "cable assembly". This frequently occurs during modifications or additions to an existing installation. CATV cables are physically smaller and lighter than power cables and typically contain no electrical power. Application of 300.11(C) is overly restrictive and will preclude lashing of CATV cables together to form a cable assembly. CATV cables secured in this manner have adequate support (see 300.11 (A)), are supported independently of the suspended ceiling grid, and are not likely to collapse in the event the suspended ceiling collapses. Such restriction imposes additional installation costs with no improvement in safety. See my companion comment on proposal 16-274.
Panel Meeting Action: Reject
Panel Statement: Securing an additional cable to an existing cable does not constitute support. Additional cables must be directly supported by the same structural member that supports the first cable. In such installations, the additional cable is being supported by the same structural member.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:

BRUNSSEN, J.: This comment should have been accepted, as should the original Proposal 16-273. If the panel continues to support the addition of the securing and supporting requirements of 300.11, then at the very least 300.11(C) should be exempted. It is clearly not applicable to CATV coaxial cables. For further substantiation, see my explanation of negative on Proposal 16-273 and the substantiation accompanying my Comment 16-216. Additionally, the final sentence of the panel statement is unclear.

JOHNSON, S.: See my explanation of negative vote on Comment 16-31.

JONES, R.: The requirement added by Panel 16 during the 2005 revision cycle is overly restrictive and inappropriate for CATV cables. CATV cables are physically smaller and lighter than power cables and typically contain no electrical power. Application of 300.11 (C) is overly restrictive and will preclude lashing of CATV cables together to form a cable assembly. The Panel has enhanced the Fine Print Note during this cycle by the addition of three new references covering the installation of CATV cables, these and the installation requirements in Article 820 are adequate without the requirements of 300.11.

16-217 Log #1545 NEC-P16 **Final Action: Reject**
(820.24)

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-274
Recommendation: Accept this proposal.
Substantiation: This proposal should be accepted. The requirement added by Panel 16 during the 2005 revision cycle is overly restrictive and inappropriate for CATV cables. The Fine Print Note associated with 820.24 directs the reader to the appropriate installation standards. The Panel has enhanced the Fine Print Note during this cycle by the addition of three new references covering the installation of CATV cables (see Proposal 16-277). These references are all that is necessary and sufficient for such cables without imposing the burdensome requirements of 300.11. Section 300.11 is directed toward power cable

assemblies that are heavier and larger than communications cables, operate at much greater power levels (CATV cables often contain no power), and present a greater risk of injury if not properly installed. If the Panel continues to reject Proposal 16-274 then, at the very least, 300.11(C) should be excepted. See my companion comment on Proposal 16-273.
Panel Meeting Action: Reject
Panel Statement: Securing an additional cable to an existing cable does not constitute support. Additional cables must be directly supported by the same structural member that supports the first cable. In such installations, the additional cable is being supported by the same structural member.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
BRUNSSEN, J.: This comment should have been accepted, as should the original Proposal 16-274. Lashing (tie-wrapping) of additional CATV coaxial cables to existing CATV coaxial cables is accepted industry practice, and has been done extensively without detriment to safety. The CATV coaxial cables in question are of small diameter, light in weight and operate at very low voltage, current and power levels. The argument is not one of whether to support the additional CATV coaxial cable, but the adequacy of lashing (tie-wrapping) to existing CATV coaxial cable(s). For further substantiation, see my explanation of negative on Proposal 16-274 and my substantiation to Comment 16-217. Additionally, the final sentence of the panel statement is unclear.
JOHNSON, S.: See my explanation of negative vote on Comment 16-31.
JONES, R.: See my Explanation of Negative Vote on Comment 16-216.

16-218 Log #2009 NEC-P16 **Final Action: Reject**
(820.24)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 16-272
Recommendation: This Proposal should have been Accepted without modification by the panel.
Substantiation: Cable ties of different types, materials, and configurations are widely used without problems and probably fall under the existing language "or similar fittings," so they would still continue to be used even if the proposal were rejected. However, much of the hardware that was already specifically permitted are not even available as listed products. For example, most straps, staples, and "hangers" are not listed products. Entire lines of one-hole and two-hole straps, standoff brackets, ring hangers, and the strut-type hardware used for all types of even the most heavy electrical wiring methods are not listed. The requirement should rest on the basic requirement that all such materials be acceptable to the authority having jurisdiction (approved). The proposed wording in the Explanation of Negative by Mr. Boyer would also be usable, as there is a listing standard for the cable ties and this language, since it refers to primary support, would not restrict the use of cable ties that are used only for cable management. The language accepted by the panel would eliminate most of the products currently in use by this industry, without any evidence being provided of a problem with those products.
Panel Meeting Action: Reject
Panel Statement: The guide information for ZODZ, Wire Positioning Devices states that:
"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."
These are all characteristics that we should be concerned about for electrical installations.
Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:
"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."
The evaluation of positioning devices includes:
- Classification by mechanical strength, material, maximum temperature, and environmental conditions
- Required Markings giving critical information to the installer / inspector
- Mechanical strength tests
- Flammability classification of polymeric materials and coatings (NOT air-handling space requirements)
- Relative thermal index
- Material requirements (Including blending and substitution)
- Corrosion resistance
- Sharp edges
- Installation
- Mechanical strength
- Vibration
- Tests for mounting blocks and other mounting hardware and devices
- Environmental conditioning.....

Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

16-219 Log #715 NEC-P16 **Final Action: Reject**
(820.24, FPN)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 16-276
Recommendation: The action should be to delete this Fine Print Note.
Substantiation: The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. Code Making Panel 16 should consider taking an action to delete this FPN to coordinate with the other technical committees in the NEC project. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). In the action to reject proposal 8-3, one technical committee member promotes NECA standards as "….a tool to assist untrained electricians to make safer and better installations." The TCC should intervene, uphold the provisions of 90.1(C) and prohibit these types of Fine Print Notes. CMP16 should reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Reject
Panel Statement: Proposal 16-276 pertained to updating the FPN, not to delete it.
The comment requests that the FPN be deleted. The FPN provides valuable information and the panel intends for it to be retained but the date updated. The references provided in the FPN provide guidance for installation in a neat and workmanship like manner.
See panel action and statement on Comment 16- 107a (Log #CC1602).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
PREZIOSO, L.: See my explanation of affirmative vote on Comment 16-34.

16-220 Log #875 NEC-P16 **Final Action: Reject**
(820.24, FPN)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 16-276
Recommendation: The panel is encouraged to continue to Reject Proposal 16-276.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Reject
Panel Statement: The comment substantiation is inconsistent with the recommended action. The panel does not agree to delete the FPN. The panel did not delete that FPN, as the original proposal was to update the reference date.
See panel action and statement on Comment 16-107a (Log #CC1602).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
PREZIOSO, L.: See my explanation of affirmative vote on Comment 16-34.

16-221 Log #876 NEC-P16 **Final Action: Reject**
(820.24, FPN)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 16-278
Recommendation: The panel is encouraged to continue to Accept Proposal 16-278.
Substantiation: The reasons to continue to Accept the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Reject
Panel Statement: The panel rejected Proposal 16-278 for the reason given in the panel statement accompanying the proposal. The submitter of this comment encourages the panel to continue to accept Proposal 16-278, which is inconsistent with the panel action on Proposal 16-278.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
PREZIOSO, L.: See my explanation of affirmative vote on Comment 16-34.

16-222 Log #190 NEC-P16 **Final Action: Accept**
(820.93)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-287
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 16-286. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider and correlate with the action on Proposal 16-286.
See panel action and statement on Comment 16-223.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-223 Log #246 NEC-P16 **Final Action: Accept in Principle**
(820.93)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-286
Recommendation: Accept this proposal in principle by revising 820.93 and 820.100 as shown below:
~~**820.93 Grounding of Outer Conductive Shield of a Coaxial Cable.**~~
~~The outer conductive shield of the coaxial cable shall be grounded at the building premises as close to the point of cable entrance or attachment as practicable.~~
~~For purposes of this section, grounding located at mobile home service equipment located in sight from, and not more than 9.0 m (30 ft) from, the exterior wall of the mobile home it serves, or at a mobile home disconnecting means grounded in accordance with 250.32 and located in sight from and not more than 9.0 m (30 ft) from the exterior wall of the mobile home it serves, shall be considered to meet the requirements of this section.~~
~~FPN: Selecting a grounding location to achieve the shortest practicable grounding conductor helps limit potential differences between CATV and other metallic systems.~~
~~**(A) Shield Grounding.** Where the outer conductive shield of a coaxial cable is grounded, no other protective devices shall be required.~~
~~**(B) Shield Protection Devices.** Grounding of a coaxial drop cable shield by means of a protective device that does not interrupt the grounding system within the premises shall be permitted.~~
820.93 Grounding of the Outer Conductive Shield of Coaxial Cables.
Coaxial cables entering buildings or attaching to buildings shall comply with (A), (B) or (C). Where the outer conductive shield of a coaxial cable is grounded, no other protective devices shall be required.
(A) Entering Buildings. In installations where the coaxial cable enters the building, the outer conductive shield shall be grounded as close as practicable to the point of entrance.
(B) Terminating Outside of the Building. In installations where the coaxial cable is terminated outside of the building, the outer conductive shield shall be grounded as close as practicable to the point of attachment or termination.
(C) Mobile Homes. For purposes of this section, grounding located at mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, or at a mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, shall be considered to meet the requirements of this section.
FPN: Selecting a grounding location to achieve the shortest practicable grounding conductor helps limit potential differences between CATV and other metallic systems.
Move the current 820.93(B) to 820.100 and renumber it to be 820.100(E).
Substantiation: The suggested text is an editorial clarification intended to bring this section into compliance with section 3.3.1(2) of the NEC Style Manual which states:
2. Use simple declarative sentence structure, and keep sentences short. Writing rules in long sentences full of commas, dependent clauses, and parenthetical expressions often creates confusion and misunderstanding. The requirement can be written in two or more short sentences, expressed using a list or table, or both.
The existing paragraph deals with three scenarios, 1) installations where the cable enters the building, 2) installations where the cable is terminated outside of the building and 3) cables serving mobile homes. It is clearer to deal with each scenario in a separate subsection. The suggested text retains these options. The current 820.93(A) is merged into the opening paragraph of the recommended text. The current 820.93(B) should be moved to 820.100(E).
The changes accepted in proposal 16-287 are incorporated into (C).
Panel Meeting Action: Accept in Principle
Move the current 820.93(B) to 820.100 and renumber it to 820.100(E).
Revise 820.93 to read as follows:
"820.93 Grounding of the Outer Conductive Shield of Coaxial Cables.
Coaxial cables entering buildings or attached to buildings shall comply with (A) or (B). Where the outer conductive shield of a coaxial cable is grounded, no other protective devices shall be required. For purposes of this section, grounding located at mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, or at a mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, shall be considered to meet the requirements of this section.
FPN: Selecting a grounding location to achieve the shortest practicable grounding conductor helps limit potential differences between CATV and other metallic systems.
(A) Entering Buildings. In installations where the coaxial cable enters the building, the outer conductive shield shall be grounded in accordance with 820.100. The grounding shall be as close as practicable to the point of entrance.
(B) Terminating Outside of the Building. In installations where the coaxial cable is terminated outside of the building, the outer conductive shield shall be grounded in accordance with 820.100. The grounding shall be as close as practicable to the point of attachment or termination."
Panel Statement: This revised text achieves the submitter's purpose with improved clarity and achieves parallelism with the text the panel accepted in Comments 16-40 and 16-126. Section 820.93(B) Shield Protection Devices in Part III Protection is moved to 820.100 Cable Grounding in Part IV Grounding Methods because a shield protection device is a grounding method.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-224 Log #1112 NEC-P16 **Final Action: Accept**
(820.93, FPN (New))

TCC Action: The Technical Correlating Committee directs that this comment be reported as "Accept" to correlate with the action taken on Comment 16-223.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-288
Recommendation: The Panel Action on the Proposal should be Reject.
Substantiation: I agree with the Explanation of Negative submitted by H. Ohde.
Also, the Technical Correlating Committee action on Proposals 16-116 and 16-117, which states in part "It is the intention of Fine Print Notes to provide explanatory information and they are not intended as a vehicle to provide unnecessary cross-references." provides a valid reason to not include the FPN.
Panel Meeting Action: Reject
Panel Statement: This FPN provides additional information that improves usability of the Code.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

16-225 Log #191 NEC-P16 **Final Action: Accept**
(820.94 (New))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-289
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal. The first sentence in new (C) references compliance with (B)(1) and there is not a (B)(1). This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review clarification of the panel action.

The panel was in error to include the first sentence of (C). It refers back to (B)(1) of the text which was not accepted by the panel. Hence, the first sentence should be deleted, and the text identified with (1) should be identified as (C) Location.

See panel action and statement on Comment 16-227.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-226 Log #192 NEC-P16 **Final Action: Accept**
(820.94 (New))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-290
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal. The first sentence in new (C) references compliance with (B)(1) and there is not a (B)(1). This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to review clarification of the panel action.

The panel is unable to make a change as it was a rejected Proposal.

The panel rejected Proposal 16-290 as the submitter neither provided text for the new section nor justification for the proposed new requirements.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-227 Log #563 NEC-P16 **Final Action: Accept in Principle**
(820.94 (New))

TCC Action: The Technical Correlating Committee directs that 820.93(C) be revised to correct an error in the panel action as follows:

"820.93(C) Location. Where installed, a listed primary protector shall be applied on each community antenna and radio distribution the CATV cable external to the premises. The listed primary protector shall be located as close as practicable to the entrance point of the cable on either side or integral to the ground block."

Submitter: Steven C. Johnson, Time Warner Cable / Rep. National Cable & Telecommunications Assoc.
Comment on Proposal No: 16-289
Recommendation: Correct the panel action text as indicated.
Substantiation: The panel action was to reject the part of the proposal requiring a primary protector. The added text was intended to indicate the location where the protector was to be installed, when optionally used. Therefore, the word "required" is incorrect and should be replaced with the word "installed".
Panel Meeting Action: Accept in Principle
Revise 820.93(C) as follows:

(C) Location. Where a listed primary protector shall be applied on each community antenna and radio distribution the CATV cable external to the premises. The listed primary protector should be located as close as practicable to the entrance point of the cable on either side or integral to the ground block.
Panel Statement: The panel agrees with the submitter's comment but revised the text as shown in the panel action to correlate with similar text in 820.93(D) (of the draft).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:

BRUNSSEN, J.: The underlined and strikeout text (legislative format) as developed by Panel 16 does not appear in the panel meeting action text. Revise the text to read as follows:

"(C) Location. Where a listed primary protector is used it shall be applied on the CATV cable as close as practicable or integral to the ground block."

16-228 Log #1133 NEC-P16 **Final Action: Reject**
(820.100(8) (New))

Submitter: George Bish, Mastec
Comment on Proposal No: 16-302
Recommendation: Insert: (8) the noncurrent carrying metal parts of cord and plug connected equipment, if grounded per 250.138(A) or (B).
Substantiation: This would allow for a coaxial cable to use the receiver as a ground point.
Panel Meeting Action: Reject
Panel Statement: Grounding protects insulation in the equipment and reduces electric shock hazards.

These comments should be rejected even if limited only to satellite dish installations on the basis that where grounding is required a cord connected product ground is a poor substitute for a more permanent grounding method.

• The receptacle itself may not be grounded properly (Many older buildings, especially those built before the 1960's, were not even required to have branch circuit equipment grounding provisions.)

• If a grounded receptacle is not be available a "cheater" plug may be used with no ground connection

• If the equipment is unplugged you lose the ground

• The equipment may be replaced by a non-grounded piece of equipment

• The grounding methods described in Sec 810.21 (and 820.100) are considerably more robust than the typical branch circuit equipment grounding conductor as described in Parts VI and VII of Art. 250. The Art. 810 grounding conductor is larger in size, mechanically protected, and run in a straight line as opposed to an equipment grounding conductor in a typical 15- or 20-ampere residential branch circuit. In Art. 810, the grounding conductor(s) is connected to (or very closely to) the building's grounding electrode system. This system is typically very robust, reliable, free from splices, and of low impedance. The branch circuit equipment grounding conductor can travel long distances and in various directions, oftentimes spliced or connected several times.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-229 Log #1392 NEC-P16 **Final Action: Reject**
(820.100(8) (New))

Submitter: Raymond D. Edwards, DIRECTV, Inc.
Comment on Proposal No: 16-302
Recommendation: Revise text to read as follows:

820.100 Cable Grounding.

(B) Electrode. The grounding conductor shall be connected in accordance with 820.100(B)(1) and (B)(2).

(1) In Buildings or Structures with Grounding Means. To the nearest accessible location on the following:

(1) The building or structure grounding electrode system as covered in 250.50

(2) The grounded interior metal water piping system, within 1.52 m (5 ft) from its point of entrance to the building, as covered in 250.52

(3) The power service accessible means external to enclosures as covered in 250.94

(4) The metallic power service raceway

(5) The service equipment enclosure

(6) The grounding electrode conductor or the grounding electrode conductor metal enclosure, or

(7) The grounding conductor or the grounding electrode of a building or structure disconnecting means that is grounded to an electrode as covered in 250.32

(8) The non-current-carrying metal parts of cord- and-plug-connected equipment, if grounded as covered in 250.138(A) or (B).

250.138 reads as follows:

"250.138 Cord-and-Plug-Connected Equipment. Non-current-carrying metal parts of cord-and-plug-connected equipment, if grounded, shall be grounded by one of the methods in 250.138(A) or (B).

(A) By Means of an Equipment Grounding Conductor. By means of an equipment grounding conductor run with the power supply conductors in a cable assembly or flexible cord properly terminated in a grounding-type attachment plug with one fixed grounding contact.

Exception: The grounding contacting pole of ground-type plug-in ground-fault circuit interrupters shall be permitted to be of the movable, self-restoring type on circuits operating at not over 150 volts between any two conductors or over 150 volts between any conductor and ground.'
Substantiation: Problem: In some circumstances grounding as listed in 820.100(B)(1) 1-7 cannot be done in accordance with that section. Therefore we are proposing another alternative the meets NEC requirements and is contained within another section of the National Electrical Code.

Substantiation: Since the ground connection listed in 250.138 sufficiently protects the occupants and equipment within the building, it should be accepted when used in the manner proposed within that section.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 16-228.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-230 Log #461 NEC-P16 **Final Action: Reject**
(820.100(A)(3))

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 16-296
Recommendation: Accept in Part the proposed revision to (A)(3), second sentence.
Substantiation: Present wording is vague and subjective; proposed wording is specific.
Panel Meeting Action: Reject
Panel Statement: The panel has reviewed and affirms their panel action on Proposal 16-296. The present wording ensures that the grounding conductor will be no smaller than AWG # 14 and is consistent with similar requirements in 800.100(A)(3) and 830.100(A)(3).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-231 Log #193 NEC-P16 **Final Action: Accept**
(820.100(B))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-299
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal with respect to the use of the word "and" in the sentence "The grounding conductor shall be connected in accordance with 820.100(B)(1), (B)(2), and (B)(3)." This action will be considered by the Panel as a Public Comment.

It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 5-20.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise 820.100(B) as follows:

"(B) Electrode. The grounding conductor shall be connected in accordance with 820.100(B)(1), (B)(2), ~~and~~ or (B)(3)."

Revise 820.100(B)(1) as follows:

"(1) In Buildings or Structures with an Intersystem ~~Grounding~~ Bonding Termination. If the building or structure served has an intersystem ~~grounding~~ bonding termination, the grounding conductor shall be connected to the intersystem ~~grounding~~ bonding termination."

Revise 820.100(B)(2) as follows:

"(2) In Buildings or Structures with Grounding Means. If the building or structure served has no intersystem ~~grounding~~ bonding termination, the grounding conductor shall be connected to the nearest accessible location on the following:"

Retain existing list and text

Revise 820.100(B)(3) as follows: "(3) In Buildings or Structures Without Intersystem ~~Grounding~~ Bonding Termination or Grounding Means. If the building or structure served has no intersystem ~~grounding~~ bonding termination or grounding means, as described ….".

Revise 820.100(B)(3)(2) as follows:

"(2) If the building or structure served has no intersystem ~~grounding~~ bonding termination or has no grounding means, as described in 800.100(B)(2) or …"
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action.

The panel has clarified the panel action on Proposal 16-299 with respect to the word "and" as indicated in the panel action on this comment. It is not the intent to accomplish the grounding connections of 820.100 (B)(1), (B)(2), and (B)(3) simultaneously.

The panel has reconsidered Proposal 16-299 in light of the panel action on Proposal 5-20 as directed by the TCC and has revised "intersystem grounding termination" to "intersystem bonding termination" as indicated in the panel action on this comment.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-232 Log #194 NEC-P16 **Final Action: Accept**
(820.100(B))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-300
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal based on the placement of the recommended text as indicated in the affirmative comment. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Relocate the text to follow 820.100(B)(2)(7) and revise as follows:

"A bonding device intended to provide a termination point for the grounding conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is non-removable."
Panel Statement: The panel accepts the direction of the TCC to review clarification of the panel action.

The panel action on Proposal 16-300 to accept in principle is correct. The panel has reviewed the comment expressed in the voting and determined that the proper location of the text is 820.100(B)(2)(7), not 820.100(B)(5), as indicated in the comment. That is where equipment (service) enclosures are discussed. The panel has also added editorial clarification as indicated in the panel action on this comment. The panel notes that the text is presently located incorrectly in the preprint.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-233 Log #685 NEC-P16 **Final Action: Accept in Part**
(820.100(B))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-299
Recommendation: The Proposal should be Accepted in Principle by incorporating the following changes:

In 820.100(B), change "and" to "or" so it reads:

"...with 820.100(B)(1), (B)(2), or (B)(3)."

Change "has no" to "does not have an" in 820.100(B)(2), (B)(3), and (B)(3)(2).

Revise 820.100(B)(3)(2) as follows:

"~~If the building or structure served has no intersystem grounding termination of grounding means, as described in 820.100(B)(2) or~~ If none of the individual electrodes listed in (B)(3)(1) exist, to any one of the individual electrodes described in 250.52(A)(5), (A)(6), ~~and~~ or (A)(7)."
Substantiation: While the 2005 Code erroneously contains the word "and" in reference to two conditions, the installation can only comply with one of the three conditions so "or" is appropriate. This change will also address the first part of the TCC Action.

The text revision is editorial.

The deleted phrase in 820.100(B)(3)(2) is identical to the first phrase in 820.100(B)(3) so it has already been determined that the condition exists. The revised text now states that if the individual electrodes in (B)(3)(1) exist, one of them must be used. If none of those electrodes exist, then the individual electrodes in (B)(3)(2) must be used. The change from "and" to "or" is appropriate since there is a choice between the three electrodes. This change is for editorial clarity and was not intended to change any of the requirements.

If the revision to 820.100(B)(3)(2) is accepted, then the editorial text revision to that section is no longer necessary.
Panel Meeting Action: Accept in Part

Revise "and" to "or" in 820.100(B).
Panel Statement: The panel has accepted the part to revise "and" to "or" in 820.100(B). See panel action and statement on Comment 16-231. The panel accepts the editorial revisions to 820.100(B)(3)(2).

The panel rejects the portion of the comment to revise "has no" to "does not have an" in 820.100(B)(2), (B)(3), and (B)(3)(2). The text is clear as written. See panel action and statement on Comments 16-17 and 16-189.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-234 Log #1526 NEC-P16 **Final Action: Accept**
(820.100(B))

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-299
Recommendation: Continue to accept the proposal, but change the term "Intersystem Grounding Termination" to "Intersystem Bonding Termination."
Substantiation: This is a correlating comment to correlating with the actions of CMP-5 taken on proposal 5-20 as directed by the TCC. CMP-5 changed the term "Intersystem Grounding Termination" to "Intersystem Bonding Termination."
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 16-231.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-235 Log #1547 NEC-P16 **Final Action: Accept**
(820.100(B))

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-299
Recommendation: Revise the text of 820.100(B) as follows:
"**(B) Electrode.** The grounding conductor shall be connected in accordance with 820.100 (B) (1), (B) (2) ~~and~~ or (B) (3)."
Substantiation: The present text is incorrect as 820.100 (B) refers to three individual requirements that are appropriate under three separate circumstances. They are not to be done simultaneously. Hence, "and" should be replaced by "or".
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 16-231.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-236 Log #1546 NEC-P16 **Final Action: Accept**
(820.100(B)(2)7.)

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-4
Recommendation: Revise the text of 820.100(B)(2)(7) as follows:
"…disconnecting means that is ~~grounded~~ connected to an electrode as covered in 250.32."
Substantiation: The original text included both words "grounded" and "connected". The correct word in keeping with the direction of the TCC Task Group on Grounding is "connected".
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 16-3.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-237 Log #775 NEC-P16 **Final Action: Reject**
(820.100(B)(8) (New))

Submitter: David Lettkeman, Dish Network Service, LLC
Comment on Proposal No: 16-302
Recommendation: Add new text to read as follows:
820.100 Cable Grounding.
(B) Electrode. The grounding conductor shall be connected in accordance with 820.100(B)(1) and (B)(2).
(1) In Buildings or Structures with Grounding Means. To the nearest accessible location on the following:
(1) The building or structure grounding electrode system as covered in 250.50
(2) The grounded interior metal water piping system, within 1.52 m (5 ft) from its point of entrance to the building, as covered in 250.52
(3) The power service accessible means external to enclosures as covered in 250.94
(4) The metallic power service raceway
(5) The service equipment enclosure
(6) The grounding electrode conductor or the grounding electrode conductor metal enclosure, or
(7) The grounding conductor or the grounding electrode of a building or structure disconnecting means that is grounded to an electrode as covered in 250.32
(8) The non-current-carrying metal parts of cord-and-plug-connected equipment, if grounded as covered in 250.138(A) or (B)
Substantiation: Problem: Some locations do not allow for one of the grounding connections listed in 820.100(B)(1) 1-7, therefore, we are proposing the addition of another alternative.
Substantiation: The ground connection listed in 250.138 is substantial enough to protect the equipment and the occupants of the building, therefore, it should be adequate to be used as a connection point for the coaxial cable.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 16-228.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-238 Log #779 NEC-P16 **Final Action: Reject**
(820.100(B)(8))

Submitter: Steve C. Hill, Satellite Broadcast and Communications Association
Comment on Proposal No: 16-302
Recommendation: Add new text to read as follows:
820.100 Cable Grounding.
(B) Electrode. The grounding conductor shall be connected in accordance with 820.100(B)(1) and (B)(2).
(1) In Buildings or Structures with Grounding Means. To the nearest accessible location on the following:
(1) The building or structure grounding electrode system as covered in 250.50
(2) The grounded interior metal water piping system, within 1.52 m (5 ft) from its point of entrance to the building, as covered in 250.52
(3) The power service accessible means external to enclosures as covered in 250.94
(4) The metallic power service raceway
(5) The service equipment enclosure
(6) The grounding electrode conductor or the grounding electrode conductor metal enclosure, or
(7) The grounding conductor or the grounding electrode of a building or structure disconnecting means that is grounded to an electrode as covered in 250.32
(8) The non-current-carrying metal parts of cord-and-plug-connected equipment, if grounded as covered in 250.138(A) or (B)
250.138 Cord-and-Plug-Connected Equipment. Non-current-carrying metal parts of cord-and-plug-connected equipment, if grounded, shall be grounded by one of the methods in 250.138(A) or (B).
(A) By Means of an Equipment Grounding Conductor. By means of an equipment grounding conductor run with the power supply conductors in a cable assembly or flexible cord properly terminated in a grounding-type attachment plug with one fixed grounding contact.
Exception: The grounding contacting pole of grounding-type plug-in ground-fault circuit interrupters shall be permitted to be of the movable, self-restoring type on circuits operating at not over 150 volts between any two conductors or over 150 volts between any conductor and ground.
Substantiation: Problem: Some locations do not allow for one of the grounding connections listed in 820.100(B)(1) 1-7, therefore, we are proposing the following alternative.
Substantiation: Since the ground connection listed in 250.138 is substantial enough to protect the equipment and the occupants of the building, the manner of grounding proposed above should also be considered an acceptable ground.
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 16-228.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-239 Log #195 NEC-P16 **Final Action: Accept**
(820.106(A))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-305
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 16-4 based on text in the affirmative comments. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider and correlate with the action on Proposal 16-4.
Proposal 16-305 was accepted in principle, as the appropriate revisions were to have been made in Proposal 16-4. They were not. The text of 820.106(A)(1) and (2) in the preprint is incorrect with respect to Proposals 16-4 and 16-305. See the panel action on Comment 16-3.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-240 Log #1549 NEC-P16 **Final Action: Accept**
(820.106(A))

TCC Action: The Technical Correlating Committee understands that the panel action on Comment 16-240 provides the final text of 820.106(A).
Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-4
Recommendation: Under "Revise 820.106(A) as follows:", revise the text as follows:
"(1) Where there is no mobile home service equipment located ~~in sight from, and not more than~~ within 9.0 m (30 ft) ~~from,~~ of the exterior wall of the mobile home it serves, the coaxial cable shield ground, or surge arrester ground, shall be connected to a grounding conductor in accordance with 820.100(B)(2).
(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within ~~sight from, and not more than~~ 9.0 m (30 ft) ~~from,~~ of the exterior wall of the mobile home it serves, the coaxial cable shield ground, or surge arrester ground, shall be connected to a grounding conductor in accordance with 820.100(B)(2)."
Substantiation: The text as shown in the Panel Statement and the text of 820.106(A) in the ROP draft of the 2008 NEC is incorrect per Proposal 16-305. The text as revised by this comment satisfies the submitter's intent and is consistent with the Panel action on Proposal 16-170 (800.106(A)).
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 16-3.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-241 Log #1550 NEC-P16 **Final Action: Accept In Principle**
(820.106(A))

TCC Action: The Technical Correlating Committee directs that the action on this comment be reported as "Accept In Principle". See the Technical Correlating Committee action on Comment 16-240.
Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-305
Recommendation: The Panel Action is "Accept in Principle" and the reader is referred to the Panel Action on Proposal 16-4. However, the Panel Meeting Action on Proposal 16-4 with regard to 820.106(A) is incorrect. See my Comment on Affirmative on Proposal 16-4, 820.106(A).
Substantiation: The text as shown in the Panel Statement and the text of 820.106(A) in the ROP draft of the 2008 NEC is incorrect. The text as revised by my comment on Proposal 16-4 satisfies the submitter's intent and is consistent with the Panel action on Proposal 16-170 (800.106(A)).
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 16-3.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-242 Log #1290 NEC-P16 **Final Action: Hold**
(820.110)

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-306
Recommendation: The panel action on the Proposal should have been Accept in Principle with the following changes:

820.110 Raceways for Coaxial Cables. Where coaxial cables are installed in a raceway, the raceway shall be either of a type permitted in Chapter 3 and installed in accordance with Chapter 3 or a ~~listed plenum~~ CATV raceway~~, listed riser CATV raceway, or listed general purpose CATV raceway~~ listed in accordance with 820.182 and installed in accordance with 820.154~~, and with 362.24~~ and 362.22 through 362.56, where the requirements applicable to electrical nonmetallic tubing apply.

Delete the Exception.

Substantiation: The revisions in the first sentence clarify that the listing requirements are specified in 820.182 and the installation requirements in 820.154. These revisions will also provide consistency with 770.110 and 800.110.

362.22 should also apply if the requirements for ENT are to be utilized.

Using the term "listed CATV raceways" will still permit the installation of CATV coaxial cables in CATV raceways (plenum, riser, or general-purpose) or in any type of listed raceway permitted in Chapter 3 without adding additional text to the Code. This revision will also permit the installation of other types of listed CATV coaxial cables and CATV raceways that may be included in future Codes without having to revise 820.110.

The Exception should have been deleted rather than including it as positive text in the last sentence. The first sentence in 820.110 already states "installed in accordance with Chapter 3" which would include all of Chapter 3 requirements pertaining to raceways including the maximum percentage fill limitations in Chapter 9. The Proposal and the panel action perpetuates conflicting requirements between that sentence and the Exception.

No substantiation was submitted to support the deletion of the conduit fill restrictions of Chapters 3 and 9. The fill restrictions are based on the physical limitations of being able to pull conductors or cables into raceways without damaging the conductors or cables, particularly when there are bends in the run, and to avoid conductor/cable jamming. The maximum percentage fill requirements are independent of whether they are electrical conductors or not; they could be empty tubes.

The maximum percentage fill requirements in Chapters 3 and 9 are an integral part of the permitted uses of the raceways contained in Chapter 3 and if CATV cables are to be installed in a Chapter 3 raceway, then the maximum percentage fill requirements must also apply.

Chapter 9, Table 1 permits 53 percent fill when one conductor or cable is installed in a raceway; 31 percent for two; and 40 percent for three or more.
Panel Meeting Action: Hold
Panel Statement: Changing the installation requirements for raceways is new material.

The proposed revision(s) constitutes new material that has not had the benefit of public review and cannot be considered at this stage of the code-making cycle. Refer to 4.4.6.2.2 of the Regulations Governing Committee Projects.

See panel action and statement on Comment 16-26.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-243 Log #196 NEC-P16 **Final Action: Accept**
(820.113 and 820.179)

TCC Action: The Technical Correlating Committee directs that the new Exception to 820.113 be written as a complete sentence in accordance with the Section 3.1.4.1 of the NEC Style Manual as follows:
"Exception: Coaxial cables that comply with 800.48 shall not be required to be listed."
The Technical Correlating Committee directs that Fine Print Note No.1 be deleted since it is more than explanatory, and that Fine Print Note No. 2 also be deleted to be consistent with the Technical Correlating Committee action on Comment 16-41.
Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-309
Recommendation: It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 16-284. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

The panel clarifies that the text of 820.48 and 820.113, and the first paragra ph of 820.179 should be as follows:

"820.48. Unlisted Cables Entering Buildings. Unlisted outside plant coaxial cables shall be permitted to be installed in locations as described in 820.154(C) where the length of the cable within the building, measured from its point of entrance, does not exceed 15 m (50 ft) and the cable enters the building from the outside and is terminated at a grounding block.

FPN No. 1: This section limits the length of unlisted outside plant cable to 15 m (50 ft), while 820.93 requires that the outer conductive shield of the coaxial cable be grounded at the building premises as close to the point of cable entrance or attachment as practicable. Therefore the outside plant coaxial cable may not be permitted to extend 15 m (50 ft) into the building if it is practicable to ground the outer conductive shield closer than 15 m (50 ft) to the entrance point.

FPN No. 2: See 820.2 for the definition of Point of Entrance.

820.113 Installation of Coaxial Cables. Coaxial cables installed in buildings shall be listed.

Exception: As permitted in 820.48.

820.179 Coaxial Cables. Coaxial cables shall be listed in accordance with 820.179(A) through 820.179(D) and marked in accordance with Table 820.179. The cable voltage rating shall not be marked on the cable.

FPN: Voltage markings on cables could be misinterpreted to suggest that the cables may be suitable for Class 1, electric light, and power applications.

Exception: Voltage markings shall be permitted where the cable has multiple listings and voltage marking is required for one or more of the listings."
Panel Statement: The panel accepts the direction of the TCC to reconsider and correlate with the action on Proposal 16-284.

The panel also correlated the text with Proposal 16-319 renumbering.

Section 820.113 has been revised to establish parallelism with 770.113.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-244 Log #2286 NEC-P16 **Final Action: Hold**
(820.113 and 820.179)

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-309
Recommendation: The Panel action should have been to Accept in Part by not accepting the FPN to 820.179.
Substantiation: The FPN is not necessary since the reason for not marking the voltage rating on the cable is obvious. There are numerous other instances in the Code where similar requirements to the last sentence in 820.179 are included and there are no explanatory FPNs included with them.
Panel Meeting Action: Hold
Panel Statement: Proposal 16-309 is an editorial proposal that relocated the cable marking requirements from 820.113 to 820.179. The FPN is not new text; it is relocated text. Deleting it would be a concept that has not had public review.

The proposed revision(s) constitutes new material that had not had the benefit of public review and cannot be considered at this stage of the code-making cycle. Refer to 4.4.6.2.2 of the Regulations Governing Committee Projects.

See panel action and statement on Comment 16-26.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-245 Log #1958 NEC-P16 **Final Action: Reject**
(820.133(A)(1)(2) Exception No.1)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 16-315
Recommendation: Accept the proposal as submitted.
Substantiation: The submitter is well aware of the differences between circuit separation as covered in this location and as covered for adjacent snap switches. However, the CMP 9 approach will accommodate CMP 16's requirements without disadvantaging one segment of the market. By using the term "identified" as the standard of product acceptance (See Article 100), you can have a plastic divider in a plastic box (both will be listed because nonmetallic boxes must be listed); or you have a steel divider in a steel box (the box will likely be listed but doesn't have to be and the divider probably

won't be listed.) The CMP 16 conclusion that this wording would allow a barrier to be installed such that it would void a box listing is untrue. The identification requirement means that the partitions will be covered on factory cut sheets, etc. describing the boxes for which they were designed. You will not find a divider that will meet this standard and be unsuitable for this application. And, in the case of nonmetallic boxes, all identified products will also be listed, so any improper barrier would provoke a citation under 110.3(B). In the case of steel boxes, the barriers will probably not be listed, but the anchoring methods are obvious to any installer and inspector, and they can easily be made secure for obvious reasons. The submitter has been an electrician for a long time, and has never encountered any problems securely installing steel dividers into the boxes for which they are identified.

Panel Meeting Action: Reject

Panel Statement: The listing of dividers is important given current trends and wiring methods.

"Identified" is not the same as "listed" which means that some sort of evaluation for suitability of the divider and its installation has been performed. Mounting, compatibility, material type and thickness, maintenance of spacings, etc. are all items of concern that a listing would address.

In recent years there has been a flood of devices and configurations utilizing standard outlet box dimensions and configurations for mix and matching of ac outlets, Ethernet, CATV and telecom connectors and receptacles. There is great concern regarding the separation of circuits, "storage" of excess cabling, routing of cables through or within the box, lack of expertise related to the installation of non-power cabling, and the like.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-246 Log #197 NEC-P16 **Final Action: Accept (820.154)**

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 16-322

Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

The panel action on Proposal 16-322 should have read, "The panel accepts the submitter's deletion in subsection (B) and (D)."

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-247 Log #242 NEC-P16 **Final Action: Accept in Principle (820.154)**

Submitter: Stanley Kaufman, CableSafe Inc.

Comment on Proposal No: 16-319

Recommendation: Accept this proposal in principle.

(E) Cable Substitutions. The uses and permitted substitutions for CATV coaxial cables listed in Table 820.154 and illustrated in Figure 800.154 shall be considered suitable for the purpose and shall be permitted.

~~FPN No. 1: See Figure 820.154, Cable Substitution Hierarchy.~~

FPN ~~No. 2~~: The substitute cables in Table 820.154 are only coaxial-type cables.

Substantiation: Section 2.3 of the NEC Style Manual provides for two options for figures, either they are mandatory and can have mandatory language (shall) or they are nonmandatory and are in a fine print note and do not contain mandatory language. This comment will bring the cable substitution figures into compliance with the style manual by making the cable substitution figures part of the mandatory text.

Similar corrections for Articles 770 and 800 are in another comment.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 16-248.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-248 Log #376 NEC-P16 **Final Action: Accept (820.154)**

Submitter: S. D. Kahn, Tri-City Electric Company, Inc. / Rep. NECA

Comment on Proposal No: 16-319

Recommendation: Accept this proposal in principle making the following changes and renumbering the titles of the Tables and Figures as shown:

(E) Cable Substitutions. The uses and substitutions for CATV coaxial cables listed in Table 820.154(E) and illustrated in Figure 820.154(E) shall be permitted.

~~FPN No. 1: See Figure 820.154, Cable Substitution Hierarchy.~~

FPN ~~No. 2~~: The substitute cables in Table 820.154(E) and Figure 820.154(E) are only coaxial-type cables.

Renumber Table 820.154 to be Table 820.154(E) and Figure 820.154 to be Figure 820.154(E).

Substantiation: Section 2.3 of the NEC Style Manual provides for two options for figures, either they are mandatory and can have mandatory language (shall) or they are non-mandatory and are in a fine print note and do not contain mandatory language. This comment will bring the cable substitution figures into compliance with the style manual by making the cable substitution figures part of the mandatory text.

Similar corrections for Articles 725, 760, 770 and 800 are contained in other Comments.

This Comment has been prepared by a Task Group established by the Technical Correlating Committee. The Task Group includes R. Owen, M. Ode, S. Owen, J. Brunssen, S. Kaufman, S. Johnson, S. L. Stene and S. D. Kahn.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-249 Log #1291 NEC-P16 **Final Action: Accept (820.154)**

Submitter: James M. Daly, Upper Saddle River, NJ

Comment on Proposal No: 16-322

Recommendation: The panel action should continue to be Accept in Part in accordance with the panel action and adding the words "in accordance" between "shall be" and "with" in the first sentence of 820.154(D).

Substantiation: The current text is incomplete. Addition of the two words does not change any of the requirements.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-250 Log #1792 NEC-P16 **Final Action: Reject (820.154)**

Submitter: Robert W. Jensen, dbi

Comment on Proposal No: 16-321

Recommendation: Accept proposal to delete Fine Print Note

~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~

Substantiation: The Standards Council issued two decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address Code Making Panel (CMP) decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. Proposals to the fine print notes were filed and rejected by the responsible CMP based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is clearly open for further consideration and action during the Comment phase."

This FPN is being misinterpret and used in aggressive marketing attempts to require the installation of "limited combustible cable" (one such example is found at http://www.dupont.com/cablingsolutions/products/codes.html). The FPN has had a profound effect in which it is used in misleading the AHJ to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

As an example, an AHJ Massachusetts would not provide a certificate of occupancy until the communications cabling was either replaced with limited combustible cable, the CMP cable was placed in conduit, or a sprinkler system installed above the suspended ceiling.. Although the installer had met the requirements of the NEC, the FPN misled the AHJ causing project delays and the potential of inordinate cost to the project. A plea to the NFPA aided the communications installer in which clarification was given that the CMP cabling was indeed sufficient to meet code and that NFPA 13 allowed some quantities (which is not defined) of communications cabling within concealed spaces. The installation of the CMP cable was allowed.

To further the removal of this FPN, the Report on Proposals A2006 from NFPA 13 (copy provided), the NFPA committee specifically added an annex

A.8.14.1.2.1 in 13-284 log #551 stating that, "Some minor quantities of combustible materials, such as communication wiring, can be present in some concealed spaces but should not typically be viewed as requiring sprinklers (see 8.14.1.1). The threshold value at which sprinklers become necessary in the concealed space is not defined. For example, the usual amounts of data or telephone wiring found above a ceiling would not typically constitute a threat. If bundles of unsheathed computer wiring are installed above the ceiling or beneath the floor in a manner where fire propagation in all directions is likely, then the concealed space should be treated the same as a combustible space, thereby requiring appropriate sprinkler protection."

In addition to the above, Panel 3 rejected the last minute introduction of this proposal that was made in the ROC stage. BICSI, which represents 24,000 installers, designers and manufacturers, feels that this last minute interjection of a FPN was not sufficiently vetted to industry and that the TCC should review this matter.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 820 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: This comment should have been accepted as this FPN does not provide useful guidance as indicated in the Panel Statement. This FPN which references 8.14.1 of NFPA 13 (2002) Installation of Sprinkler Systems has shown to be problematic and therefore should be deleted as allowed per Standards Council Decision D#06-03. If the FPN were to be deleted this would in effect restore the NEC to the 2002 edition.

The panel statement also included that the 2007 Edition of NFPA 13 would automatically eliminate the possibilities of misinterpretation. There was no opportunity for CMP 16 or the public to review the new proposed edition to see if this would eliminate the possibilities of misinterpretation. The 2007 edition of NFPA 13 also could be in violation of Standards Council Decision D#05-24 to remain status quo on these issues.

16-251 Log #2057 NEC-P16 **Final Action: Accept**
(820.154)

Submitter: Harold C. Ohde, IBEW #134

Comment on Proposal No: 16-320

Recommendation: Continue to Reject.

Substantiation: The submitter's recommendation to create a new cable designation (CATV50) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's substantiation would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. The submitter's substantiation references 2002 NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc...can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-252 Log #2287 NEC-P16 **Final Action: Accept**
(820.154, 820.179)

Submitter: James Daly, Upper Saddle River, NJ

Comment on Proposal No: 16-324

Recommendation: The Panel action should continue to be Reject.

Substantiation: The proposed FPNs to 820.179(A) and (B) do not comply with the NEC Style Manual.

3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The Proposal as submitted defines the damage and specifies performance requirements in the FPNs.

Panel Meeting Action: Accept

Panel Statement: The panel is acting on this and other proposals related to wire and cable in plenum and other air-handling spaces based on NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005 that states, in pertinent part, as follows:

"So as not to inject the problems identified in the 2002 edition of NFPA 90A into the NEC®, and in order to give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues related to plenum cables by processing the issues through the entire upcoming NFPA 90A revision cycle, the Council directs the NEC Project to maintain the status quo in the NEC until the Technical Committee on Air Conditioning has, through the processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A."

This action does not constitute agreement or disagreement with any of the substantiations submitted for the affected proposal.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-253 Log #749 NEC-P16 **Final Action: Reject**
(820.154, FPN)

Submitter: James T. Dollard, Jr., IBEW Local 98

Comment on Proposal No: 16-321

Recommendation: This proposal should be Accepted.

Substantiation: The submitter of this proposal to delete the Fine Print Note referencing NFPA 13 is correct in his substantiation. However, CMP-16 rejected this proposal on the basis of the directive from Standards Council D#05-24, to remain "status quo" on issues with respect to NFPA 90A. The Standards Council has recently decided that the Fine Print Notes under the purview of CMP-16 which reference NFPA 13 may be deleted, and such deletion is not in conflict with the Standards Council directive. This final Standards Council decision is titled D#06-03 and is included for your review. It is important to note that, **Standards Council clearly recognizes the 2002 edition of the NEC, in which these Fine Print Notes were not included, as the status quo.**

An appeal was made by Mr. A. Weidman in an attempt to overturn the previous decision by Standards Council to allow CMP-16 to delete the Fine Print Notes referencing NFPA 13. The appeal was soundly denied by Standards Council. The final decision, D#06-19 is also included for your review. It is extremely interesting to note that the last sentence of the decision by Standards Council provides directions for CMP-16 as follows:

"<u>If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC.</u>"

These Fine Print Notes are problematic. Following the advice of Standards Council, they should be deleted. These Fine Print Notes exist solely to manipulate, misinform and threaten end users of the NEC. The proponents of flouropolymer products have developed an elaborate, financially driven scheme outlined as follows:

(1) Develop an Association (CFRA), funded by manufacturers, to coordinate and orchestrate unethical marketing plans by manipulation NFPA codes and standards

(2) Place consultants, hired to push flouropolymer interests, on CMP-3 and CMP-16 under the cloak of other organizations

(3) Promote Fine Print Notes referencing NFPA 13 in the NEC

(4) Use the Fine Print Notes to develop deceiving literature and presentations to manipulate the NFPA family of codes and standards to promote products which are not required

(5) Misinform and manipulate building code officials with a propaganda campaign based on Fine Print Notes in the NEC which reference NFPA 13

(6) Label this deceptive literature, designed for building officials, as "Field Guides" and " Inspection Checklists" (See an example field guide that I have submitted)

(7) Provide instructions for building officials to threaten and harass building owners to use the proponents products

In summary, the proponents of retaining these Fine Print Notes are engaged in an effort to misrepresent and manipulate the NFPA Family of Codes and Standards for their own financial gain. Provided for your review is just one many "Field Guides" supplied by the Cable Fire Research Association to Building Officials across the United States. As you read this "field guide" take note of the serious manipulation and misrepresentation of the NEC and NFPA 13, designed specifically to sell products in which the proponents have financial interests.

The efforts of this same group to manipulate the NFPA family of codes and standards in NFPA 90A led to the "return to committee" of the entire document. The NFPA 13 committee has taken serious steps to stop this runaway propaganda campaign by adding informational text explaining ***that usual amounts of cabling do not represent a problem***. This is referenced in the original proposal to delete the Fine Print Note.

CMP-16 has been lied to by the proponents of these Fine Print Notes referencing NFPA 13. The only reason they exist is to fuel a financially driven propaganda campaign. Retaining these Fine Print Note will lead to continued deception, misrepresentation and manipulation which will lead to the lack of adoption of the NEC.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 820 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-250.

16-254 Log #750 NEC-P16 **Final Action: Reject**
(820.154, FPN)

Submitter: James T. Dollard, Jr., IBEW Local Union 98
Comment on Proposal No: 16-329
Recommendation: This proposal should be Accepted.
Substantiation: The submitter of this proposal to delete the Fine Print Note referencing NFPA 13 is correct in his substantiation. However, CMP-16 rejected this proposal on the basis of the directive from Standards Council D#05-24, to remain "status quo" on issues with respect to NFPA 90A. The Standards Council has recently decided that the Fine Print Notes under the purview of CMP-16 which reference NFPA 13 may be deleted, and such deletion is not in conflict with the Standards Council directive. This final Standards Council decision is titled D#06-03 and is included for your review. It is important to note that, **Standards Council clearly recognizes the 2002 edition of the NEC, in which these Fine Print Notes were not included, as the status quo.**
An appeal was made by Mr. A. Weidman in an attempt to overturn the previous decision by Standards Council to allow CMP-16 to delete the Fine Print Notes referencing NFPA 13. The appeal was soundly denied by Standards Council. The final decision, D#06-19 is also included for your review. It is extremely interesting to note that the last sentence of the decision by Standards Council provides directions for CMP-16 as follows:
"If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC."
These Fine Print Notes are problematic. Following the advice of Standards Council, they should be deleted. These Fine Print Notes exist solely to manipulate, misinform and threaten end users of the NEC. The proponents of flouropolymer products have developed an elaborate, financially driven scheme outlined as follows:

(1) Develop an Association (CFRA), funded by manufacturers, to coordinate and orchestrate unethical marketing plans by manipulation NFPA codes and standards

(2) Place consultants, hired to push flouropolymer interests, on CMP-3 and CMP-16 under the cloak of other organizations

(3) Promote Fine Print Notes referencing NFPA 13 in the NEC

(4) Use the Fine Print Notes to develop deceiving literature and presentations to manipulate the NFPA family of codes and standards to promote products which are not required

(5) Misinform and manipulate building code officials with a propaganda campaign based on Fine Print Notes in the NEC which reference NFPA 13

(6) Label this deceptive literature, designed for building officials, as "Field Guides" and " Inspection Checklists" (See an example field guide that I have submitted)

(7) Provide instructions for building officials to threaten and harass building owners to use the proponents products

In summary, the proponents of retaining these Fine Print Notes are engaged in an effort to misrepresent and manipulate the NFPA Family of Codes and Standards for their own financial gain. Provided for your review is just one many "Field Guides" supplied by the Cable Fire Research Association to Building Officials across the United States. As you read this "field guide" take note of the serious manipulation and misrepresentation of the NEC and NFPA 13, designed specifically to sell products in which the proponents have financial interests.

The efforts of this same group to manipulate the NFPA family of codes and standards in NFPA 90A led to the "return to committee" of the entire document. The NFPA 13 committee has taken serious steps to stop this runaway propaganda campaign by adding informational text explaining ***that usual amounts of cabling do not represent a problem***. This is referenced in the original proposal to delete the Fine Print Note.

CMP-16 has been lied to by the proponents of these Fine Print Notes referencing NFPA 13. The only reason they exist is to fuel a financially driven propaganda campaign. Retaining these Fine Print Note will lead to continued deception, misrepresentation and manipulation which will lead to the lack of adoption of the NEC.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 820 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-250.

16-255 Log #751 NEC-P16 **Final Action: Reject**
(820.154, FPN)

Submitter: James T. Dollard, Jr., IBEW Local Union 98
Comment on Proposal No: 16-331
Recommendation: This proposal should be Accepted.
Substantiation: The submitter of this proposal to delete the Fine Print Note referencing NFPA 13 is correct in his substantiation. However, CMP-16 rejected this proposal on the basis of the directive from Standards Council D#05-24, to remain "status quo" on issues with respect to NFPA 90A. The Standards Council has recently decided that the Fine Print Notes under the purview of CMP-16 which reference NFPA 13 may be deleted, and such deletion is not in conflict with the Standards Council directive. This final Standards Council decision is titled D#06-03 and is included for your review. It is important to note that, **Standards Council clearly recognizes the 2002 edition of the NEC, in which these Fine Print Notes were not included, as the status quo.**
An appeal was made by Mr. A. Weidman in an attempt to overturn the previous decision by Standards Council to allow CMP-16 to delete the Fine Print Notes referencing NFPA 13. The appeal was soundly denied by Standards Council. The final decision, D#06-19 is also included for your review. It is extremely interesting to note that the last sentence of the decision by Standards Council provides directions for CMP-16 as follows:
"If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC."

These Fine Print Notes are problematic. Following the advice of Standards Council, they should be deleted. These Fine Print Notes exist solely to manipulate, misinform and threaten end users of the NEC. The proponents of flouropolymer products have developed an elaborate, financially driven scheme outlined as follows:

(1) Develop an Association (CFRA), funded by manufacturers, to coordinate and orchestrate unethical marketing plans by manipulation NFPA codes and standards

(2) Place consultants, hired to push flouropolymer interests, on CMP-3 and CMP-16 under the cloak of other organizations

(3) Promote Fine Print Notes referencing NFPA 13 in the NEC

(4) Use the Fine Print Notes to develop deceiving literature and presentations to manipulate the NFPA family of codes and standards to promote products which are not required

(5) Misinform and manipulate building code officials with a propaganda campaign based on Fine Print Notes in the NEC which reference NFPA 13

(6) Label this deceptive literature, designed for building officials, as "Field Guides" and " Inspection Checklists" (See an example field guide that I have submitted)

(7) Provide instructions for building officials to threaten and harass building owners to use the proponents products

In summary, the proponents of retaining these Fine Print Notes are engaged in an effort to misrepresent and manipulate the NFPA Family of Codes and Standards for their own financial gain. Provided for your review is just one many "Field Guides" supplied by the Cable Fire Research Association to Building Officials across the United States. As you read this "field guide" take note of the serious manipulation and misrepresentation of the NEC and NFPA 13, designed specifically to sell products in which the proponents have financial interests.

The efforts of this same group to manipulate the NFPA family of codes and standards in NFPA 90A led to the "return to committee" of the entire document. The NFPA 13 committee has taken serious steps to stop this runaway propaganda campaign by adding informational text explaining ***that usual amounts of cabling do not represent a problem***. This is referenced in the original proposal to delete the Fine Print Note.

CMP-16 has been lied to by the proponents of these Fine Print Notes referencing NFPA 13. The only reason they exist is to fuel a financially driven propaganda campaign. Retaining these Fine Print Note will lead to continued deception, misrepresentation and manipulation which will lead to the lack of adoption of the NEC.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 820 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-250.

16-256 Log #752 NEC-P16 **Final Action: Reject**
(820.154, FPN)

Submitter: James T. Dollard, Jr., IBEW Local Union 98
Comment on Proposal No: 16-332
Recommendation: This proposal should be Accepted.
Substantiation: The submitter of this proposal to delete the Fine Print Note referencing NFPA 13 is correct in his substantiation. However, CMP-16 rejected this proposal on the basis of the directive from Standards Council D#05-24, to remain "status quo" on issues with respect to NFPA 90A. The Standards Council has recently decided that the Fine Print Notes under the purview of CMP-16 which reference NFPA 13 may be deleted, and such deletion is not in conflict with the Standards Council directive. This final Standards Council decision is titled D#06-03 and is included for your review. It is important to note that, **Standards Council clearly recognizes the 2002 edition of the NEC, in which these Fine Print Notes were not included, as the status quo.**

An appeal was made by Mr. A. Weidman in an attempt to overturn the previous decision by Standards Council to allow CMP-16 to delete the Fine Print Notes referencing NFPA 13. The appeal was soundly denied by Standards Council. The final decision, D#06-19 is also included for your review. It is extremely interesting to note that the last sentence of the decision by Standards Council provides directions for CMP-16 as follows:

"If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC."

These Fine Print Notes are problematic. Following the advice of Standards Council, they should be deleted. These Fine Print Notes exist solely to manipulate, misinform and threaten end users of the NEC. The proponents of flouropolymer products have developed an elaborate, financially driven scheme outlined as follows:

(1) Develop an Association (CFRA), funded by manufacturers, to coordinate and orchestrate unethical marketing plans by manipulation NFPA codes and standards

(2) Place consultants, hired to push flouropolymer interests, on CMP-3 and CMP-16 under the cloak of other organizations

(3) Promote Fine Print Notes referencing NFPA 13 in the NEC

(4) Use the Fine Print Notes to develop deceiving literature and presentations to manipulate the NFPA family of codes and standards to promote products which are not required

(5) Misinform and manipulate building code officials with a propaganda campaign based on Fine Print Notes in the NEC which reference NFPA 13

(6) Label this deceptive literature, designed for building officials, as "Field Guides" and " Inspection Checklists" (See an example field guide that I have submitted)

(7) Provide instructions for building officials to threaten and harass building owners to use the proponents products

In summary, the proponents of retaining these Fine Print Notes are engaged in an effort to misrepresent and manipulate the NFPA Family of Codes and Standards for their own financial gain. Provided for your review is just one many "Field Guides" supplied by the Cable Fire Research Association to Building Officials across the United States. As you read this "field guide" take note of the serious manipulation and misrepresentation of the NEC and NFPA 13, designed specifically to sell products in which the proponents have financial interests.

The efforts of this same group to manipulate the NFPA family of codes and standards in NFPA 90A led to the "return to committee" of the entire document. The NFPA 13 committee has taken serious steps to stop this runaway propaganda campaign by adding informational text explaining ***that usual amounts of cabling do not represent a problem***. This is referenced in the original proposal to delete the Fine Print Note.

CMP-16 has been lied to by the proponents of these Fine Print Notes referencing NFPA 13. The only reason they exist is to fuel a financially driven propaganda campaign. Retaining these Fine Print Note will lead to continued deception, misrepresentation and manipulation which will lead to the lack of adoption of the NEC.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 820 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-250.

16-257 Log #1593 NEC-P16 **Final Action: Reject**
(820.154, FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-321
Recommendation: This proposal should be accepted.
Substantiation: This FPN should be deleted as the submitter proposed. In the submitter's substantiation he states that this FPN has misled the AHJ to believe and enforce limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible

construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc...can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC, therefore, it can and should be deleted.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 820 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-250.

16-258 Log #1594 NEC-P16 **Final Action: Reject**
(820.154, FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-329
Recommendation: This proposal should be accepted.
Substantiation: This FPN should be deleted as the submitter proposed. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, the confusion. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc...can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC, therefore, it can and should be deleted.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 820 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-250.

16-259 Log #1596 NEC-P16 **Final Action: Reject**
(820.154, FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-332
Recommendation: This proposal should be accepted.
Substantiation: This FPN should be deleted as the submitter proposed. In the submitter's substantiation he states that this FPN has misled the AHJ to believe and enforce limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc...can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC, therefore, it can and should be deleted.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit,

or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 820 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-250.

16-260 Log #198 NEC-P16 **Final Action: Accept**
(Figure 820.154)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-325
Recommendation: The Technical Correlating Committee directs that the Panel clarify the placement of the additional text added by the proposal as follows: "Type BM-Network-Powered Broadband Communications Medium Power cable" should be placed in the figure directly below the similar text for CATV and CM. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept

Add the following legend beneath "Type CATV…" and "Type CM…" beneath the figure to read as follows: "Type BL network-powered broadband communications low power cable" and "Type BM network-powered broadband communications medium power cable".

Panel Statement: The panel accepts the direction of the TCC to clarify the panel action.

The panel also added reference to Type BL cable, as it was also missing.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-261 Log #1769 NEC-P16 **Final Action: Reject**
(820.154(A))

Submitter: Robert W. Jensen, dbi
Comment on Proposal No: 16-332
Recommendation: Accept proposal to delete Fine Print Note

~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~

Substantiation: The Standards Council issued two decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address Code Making Panel (CMP) decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. Proposals to the fine print notes were filed and rejected by the responsible CMP based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is clearly open for further consideration and action during the Comment phase."

This FPN is being misinterpret and used in aggressive marketing attempts to require the installation of "limited combustible cable" (one such example is found at http://www.dupont.com/cablingsolutions/products/codes.html). The FPN has had a profound effect in which it is used in misleading the AHJ to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

As an example, an AHJ Massachusetts would not provide a certificate of occupancy until the communications cabling was either replaced with limited combustible cable, the CMP cable was placed in conduit, or a sprinkler system installed above the suspended ceiling.. Although the installer had met the requirements of the NEC, the FPN misled the AHJ causing project delays and the potential of inordinate cost to the project. A plea to the NFPA aided the communications installer in which clarification was given that the CMP cabling was indeed sufficient to meet code and that NFPA 13 allowed some quantities (which is not defined) of communications cabling within concealed spaces. The installation of the CMP cable was allowed.

To further the removal of this FPN, the Report on Proposals A2006 from NFPA 13 (copy provided), the NFPA committee specifically added an annex A.8.14.1.2.1 in 13-284 log #551 stating that, "Some minor quantities of combustible materials, such as communication wiring, can be present in some concealed spaces but should not typically be viewed as requiring sprinklers (see 8.14.1.1). The threshold value at which sprinklers become necessary in the concealed space is not defined. For example, the usual amounts of data or telephone wiring found above a ceiling would not typically constitute a threat. If bundles of unsheathed computer wiring are installed above the ceiling or beneath the floor in a manner where fire propagation in all directions is likely, then the concealed space should be treated the same as a combustible space, thereby requiring appropriate sprinkler protection."

In addition to the above, Panel 3 rejected the last minute introduction of this proposal that was made in the ROC stage. BICSI, which represents 24,000 installers, designers and manufacturers, feels that this last minute interjection of a FPN was not sufficiently vetted to industry and that the TCC should review this matter.

Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-250.

16-262 Log #1793 NEC-P16 **Final Action: Reject**
(820.154(A))

Submitter: Robert W. Jensen, dbi
Comment on Proposal No: 16-329
Recommendation: Accept proposal to delete Fine Print Note__

~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~

Substantiation: The Standards Council issued two decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address Code Making Panel (CMP) decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. Proposals to the fine print notes were filed and rejected by the responsible CMP based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is clearly open for further consideration and action during the Comment phase."

This FPN is being misinterpret and used in aggressive marketing attempts to require the installation of "limited combustible cable" (one such example is found at http://www.dupont.com/cablingsolutions/products/codes.html). The FPN has had a profound effect in which it is used in misleading the AHJ to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

As an example, an AHJ Massachusetts would not provide a certificate of occupancy until the communications cabling was either replaced with limited combustible cable, the CMP cable was placed in conduit, or a sprinkler system installed above the suspended ceiling.. Although the installer had met the requirements of the NEC, the FPN misled the AHJ causing project delays and the potential of inordinate cost to the project. A plea to the NFPA

aided the communications installer in which clarification was given that the CMP cabling was indeed sufficient to meet code and that NFPA 13 allowed some quantities (which is not defined) of communications cabling within concealed spaces. The installation of the CMP cable was allowed.
To further the removal of this FPN, the Report on Proposals A2006 from NFPA 13 (copy provided), the NFPA committee specifically added an annex A.8.14.1.2.1 in 13-284 log #551 stating that, "Some minor quantities of combustible materials, such as communication wiring, can be present in some concealed spaces but should not typically be viewed as requiring sprinklers (see 8.14.1.1). The threshold value at which sprinklers become necessary in the concealed space is not defined. For example, the usual amounts of data or telephone wiring found above a ceiling would not typically constitute a threat. If bundles of unsheathed computer wiring are installed above the ceiling or beneath the floor in a manner where fire propagation in all directions is likely, then the concealed space should be treated the same as a combustible space, thereby requiring appropriate sprinkler protection."
In addition to the above, Panel 3 rejected the last minute introduction of this proposal that was made in the ROC stage. BICSI, which represents 24,000 installers, designers and manufacturers, feels that this last minute interjection of a FPN was not sufficiently vetted to industry and that the TCC should review this matter.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 800 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-250.

16-263 Log #1794 NEC-P16 **Final Action: Reject**
(820.154(A))

Submitter: Robert W. Jensen, dbi
Comment on Proposal No: 16-331
Recommendation: Accept proposal to delete Fine Print Note__
~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~
Substantiation: The Standards Council issued two decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address Code Making Panel (CMP) decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. Proposals to the fine print notes were filed and rejected by the responsible CMP based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is clearly open for further consideration and action during the Comment phase."

This FPN is being misinterpret and used in aggressive marketing attempts to require the installation of "limited combustible cable" (one such example is found at http://www.dupont.com/cablingsolutions/products/codes.html). The FPN has had a profound effect in which it is used in misleading the AHJ to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.
As an example, an AHJ Massachusetts would not provide a certificate of occupancy until the communications cabling was either replaced with limited combustible cable, the CMP cable was placed in conduit, or a sprinkler system installed above the suspended ceiling.. Although the installer had met the requirements of the NEC, the FPN misled the AHJ causing project delays and the potential of inordinate cost to the project. A plea to the NFPA aided the communications installer in which clarification was given that the CMP cabling was indeed sufficient to meet code and that NFPA 13 allowed some quantities (which is not defined) of communications cabling within concealed spaces. The installation of the CMP cable was allowed.
To further the removal of this FPN, the Report on Proposals A2006 from NFPA 13 (copy provided), the NFPA committee specifically added an annex A.8.14.1.2.1 in 13-284 log #551 stating that, "Some minor quantities of combustible materials, such as communication wiring, can be present in some concealed spaces but should not typically be viewed as requiring sprinklers (see 8.14.1.1). The threshold value at which sprinklers become necessary in the concealed space is not defined. For example, the usual amounts of data or telephone wiring found above a ceiling would not typically constitute a threat. If bundles of unsheathed computer wiring are installed above the ceiling or beneath the floor in a manner where fire propagation in all directions is likely, then the concealed space should be treated the same as a combustible space, thereby requiring appropriate sprinkler protection."
In addition to the above, Panel 3 rejected the last minute introduction of this proposal that was made in the ROC stage. BICSI, which represents 24,000 installers, designers and manufacturers, feels that this last minute interjection of a FPN was not sufficiently vetted to industry and that the TCC should review this matter.

Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 820 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-250.

16-264 Log #662 NEC-P16 **Final Action: Reject**
(820.154(A), FPN)

Submitter: Marcelo M. Hirschler, GBH International / Rep. American Fire Safety Council
Comment on Proposal No: 16-332
Recommendation: Revise text to read as follows:

820.154 Applications of Listed CATV Cables and CATV Raceways. CATV cables shall comply with the requirements of 820.154(A) through 820.154(D) or where cable substitutions are made as shown in Table 820.154.

(A) Plenums. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type CATVP. Abandoned cables shall not be permitted to remain. Types CATVP, CATVR, CATV, and CATVX cables installed in compliance with 300.22 shall be permitted. Listed plenum CATV raceways shall be permitted to be installed in ducts and plenums as described in 300.22(B) and in other spaces used for environmental air as described in 300.22(C). Only Type CATVP cable shall be permitted to be installed in these raceways.
~~FPN: See 8.14.1 of NFPA 13 (2002), Installation of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~
Substantiation: This is one of three references to NFPA 13 (it is repeated identically in articles 770, 800 and 820) included in the code that is a meaningless reference. Other references to NFPA 13, in Article 362, are properly included in mandatory sections of the code (section 362.10). Whenever a jurisdiction adopts NFPA 13 they need to adopt it for mandatory sections and not for an unenforceable FPN in one section, which is intended to mislead the user. In fact, NFPA 13 does not require that sprinklers be installed in plenums of "noncombustible or limited combustible construction", even if "the usual amount of cabling" is present. In fact, there have been several documented examples already of misrepresentation in that authorities having jurisdiction have been told that this means that sprinklers are required in plenum areas unless "limited combustible cable" is installed. I have been personally involved in several cases, and have heard of many more cases where this is being stated.

Section 8.14.1 of NFPA 13 (2006) reads as follows:

8.14.1.2 Concealed Spaces Not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum. (For

additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustibles shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc. can be present in concealed spaces constructed of limited or noncombustible materials but should not typically be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

The same change is being proposed to the corresponding Fine Print Notes in articles 770 and 800, all of which deal with the same type of cables.

The committee rejected the proposal based on, and I quote: "NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005 that states, in pertinent part, as follows:

"[S]o as not to inject the problems identified in the 2002 edition of NFPA 90A into the NEC®, and in order to give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues related to plenum cables by processing the issues through the entire upcoming NFPA 90A revision cycle, the Council directs the NEC Project to maintain the status quo in the NEC until the Technical Committee on Air Conditioning has, through the processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A."

However, Standards Council has since issued two new decisions, NFPA Standards Council Decision 06-03 (SC #06-3-18) dated 22 March 2006 and NFPA Standards Council Decision 06-19 (SC #06-7-33) dated 28 July 2006. These decisions address CMP decisions on Fine Print Notes referencing NFPA 13. The former (earlier) decision states, in pertinent part: "Mr. Dollard asks for clarification whether the Standards Council directive prohibits the NEC project from deleting the Fine Print Notes to sections 770.154, 800.154 & 820.154. The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC project would not violate the directive by deleting the fine print notes at issue." The later decision states, in pertinent part, as follows: "if the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this." The decision also states: "It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800, and 820), but not in others (Articles 725 and 760)." The decision also states: "nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the Comment phase of the code development process. The question whether the fine print notes should be in the NEC is hardly new. Aside from the fact that their presence was debated in the previous edition cycle, Proposals to remove them were duly filed and rejected by the responsible Code-Making Panel based on its then understanding of the Council's directive. The subject was explicitly raised during the Report on Proposals phase of the process and is, therefore, clearly open for further consideration and action during the Comment phase."

Thus, clearly these Standards Council decisions directly permit the deletion of the Fine Print Note addressed by this comment.

Technically this Fine Print Note needs to be deleted for two reasons:

1. This Fine Print Note is misleading by pointing the reader to NFPA 13 which does not require the use of sprinklers, as both Bob Jensen and Harry Ohde point out in their negative votes and as is shown by the sections of NFPA 13 reproduced above.

2.This Fine Print Note is identical to the ones in 770.154 (A) and in 800.154 (A), both of which are equally misleading. On the other hand there are no Fine Print Notes in articles 725 and 760. Thus, deleting this Fine Print Note will provide further consistency within the NEC.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 820 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-250.

16-265 Log #955 NEC-P16 **Final Action: Reject**
(820.154(A), FPN)

Submitter: Donald Hall, Corning Cable Systems

Comment on Proposal No: 16-329

Recommendation: Note: The commenter is also submitting analogous comments to Proposal 16-197 (ROP Log #3097) and Proposal 16-78 (ROP Log #3098) pertaining to FPNs referencing NFPA 13 section 8.14.1. Accept the proposal to delete the FPN, leading to the following:

820.154 Applications of Listed CATV Cables and CATV Raceways.

CATV cables shall comply with the requirements of 820.154(A) through 820.154(D) or where cable substitutions are made as shown in 820.154(F).

(A) Plenums. Cables installed in ducts, plenums, and other spaces used for environmental air shall be Type CATVP. Abandoned cables shall not be permitted to remain. Types CATVP, CATVR, CATV, and CATVX cables installed in compliance with 300.22 shall be permitted. Listed plenum CATV raceways shall be permitted to be installed in ducts and plenums as described in 300.22(B) and in other spaces used for environmental air as described in 300.22(C). Only Type CATVP cables shall be permitted to be installed in these raceways.

~~FPN: See 8.14.1 of NFPA 13 (2002), Installations of Sprinkler Systems, for requirements for sprinklers in concealed spaces containing exposed combustibles.~~

Substantiation: The committee rejected this proposal without any consideration of its merits, based on its belief at the time that it fell within the scope of Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005. since that time, however, the Standards Council has issued two new decisions as follows: Decison 06-06 (SC #6-3-18) dated 22 March 2006 states: in petinent part; "The Council, after due consideration, believes that clarification is appropriate in this instance and responds that the NEC Project would not violate the directive by deleting the Fine Print Notes as issue."

Decision 06-19 (SC #06-7-33) dated 28 July 2006 states, in pertinent part:

"If the fine print notes are not a helpful reference to NFPA 13 or engender confusion, the NEC Project should have the ability to delete them and nothing in the Council's status quo directive prohibits this."

And

"It has also been pointed out that deletion of the fine print notes would provide further consistency within the NEC itself since, currently, the fine print notes at issue only appear in some relevant NEC Articles (Articles 770, 800 and 820), but not in others (Articles 725 and 760)."

And

"Nothing in NFPA procedures prevents the NEC Project from considering and acting on deletion of the fine print notes during the comment phase of the code development process."

And

"If the fine print notes are in any way problematic, they should now be deleted, restoring the NEC in this regard to the status quo on plenum cable issues represented by the 2002 edition of the NEC".

In view of the above decisions, the commenter requests that the proposal be considered on its merits as stated in the original proposal substantiation and as further substantiated below.

Since the original proposal was submitted, the following Annex Note was added to the 2007 Edition of NFPA 13:

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic pluming piping, nonstructural wood, etc. can be present in concealed spaces constructed of limited or noncombustible materials but should not typically be viewed as requiring sprinklers (see 8.14.1.1. for example, it is not the intent of this section to require sprinklers which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

Additionally, the standard approach of the NEC is to require the use of listed products which are tested and approved by a Nationally Recognized Test Laboratory (NRTL) as being suitable for use in a particular application. Normal fire hazards associated with an application space and the application of wiring products installed within them are duly anticipated during the establishment of listing criteria for these products. Air handling spaces are no different from any other space in this regard. The inclusion and particular placement of this FPN is suggestive of the idea that the NEC or the NRTLs has failed to adequately recognize the hazards associated with these spaces. The safety record of plenum cables within air handling spaces has been debated extensively and is open to continued debate within the NFPA Code making process, but the FPN in question should not be used as a maens to short circuit this process and lead users around the code. When properly understood, the FPNs of 770.154(A), 800.154(A), and 820.154(A) lead to a dead end. When not properly understood, they lead to an unnecessary encumbrance upon the use of listed products installed in accordance with approved NEC wiring methods.

Panel Meeting Action: Reject

Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:
JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 820 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-250.

16-266 Log #1595 NEC-P16 **Final Action: Reject**
(820.154(A), FPN)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-331
Recommendation: This proposal should be accepted.
Substantiation: This FPN should be deleted as the submitter proposed. In the submitter's substantiation he states that this FPN has misled the AHJ to believe and enforce limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, the confusion. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc...can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo. This FPN referencing NFPA 13 was added to the 2005 NEC, therefore, it can and should be deleted.
Panel Meeting Action: Reject
Panel Statement: The FPN continues to provide useful guidance. Possibilities of misinterpretation are minimized in the 2007 Edition of NFPA 13.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
JENSEN, R.: This FPN, as informative text to the NEC, is being used to market limited combustible cable. The NEC should not be used for this purpose. The FPN has had a profound effect in which it is used in misleading the AHJ, designers and installers to require limited combustible cable, conduit, or a sprinkler system to be installed within the concealed space.

In addition to the above, Panel 3 where there is not a marketing influence, rejected the inclusion of this FPN in Article 725. Cables used in 725 and 820 are interchangeable in many applications, yet there is no correlation of such a FPN.

JOHNSON, S.: See my explanation of negative vote on Comment 16-50.

OHDE, H.: See my Explanation of Negative for Comment 16-250.

16-267 Log #1293 NEC-P16 **Final Action: Accept**
(820.154(D))

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-334
Recommendation: The panel action should be Accept in Part by continuing to accept the deletion of the last sentence and adding the words "in accordance" between "shall be" and "with" in the first sentence.
Substantiation: The current text is incomplete. Addition of the two words does not change any of the requirements.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-268 Log #1464 NEC-P16 **Final Action: Reject**
(820.154(E) (New))

Submitter: Sanford Egesdal, Egesdal Associates PLC
Comment on Proposal No: 16-320
Recommendation: Reconsider proposal 16-320 and revise 820.154 as shown below.
(E) CATV Fire Hazard (FHC) Cable. CATV Fire hazard (FHC) cable shall be permitted for use in communications systems as other wiring within buildings in accordance with 820.154(D) to provide reduced potential heat release.
Substantiation: The application of the Standards Council's decision on NPFA 90A was an error. The proposed marking on the cable did not include a "P" added to CATV. Type CATVP cable is permitted to be installed in plenums.

This comment creates a new section for the fire hazard cable. The new section provides a requirement that clearly identifies that the fire hazard cable is permitted to be installed as "Other Wiring Within Buildings."

To better clarify that the Standards Council's decision on NFPA does not apply and to better clarify where the cable is permitted to be installed, the marking on the cable is changed to Type CATV-FHC. The "FHC" suffix stands for fire hazard cable. There is a companion comment to revise the marking found in my comment to Proposal 16-344.

Some installations require large amounts of cable. A typical application of a fire hazard cable would be above a suspended ceiling or under a raised floor, neither of which is a plenum. The proposed cable has a very low fuel load, as compared to other types of cable insulation. Some cable constructions use one type of insulation on the conductor and another type for the jacket.

The Type CATV-FHC cable suggested for listing and marking in 820.179(E) (comment to proposal 16-244) has parameters (e.g. 3500 BTU/lb) that are standard in the building industry, and useful to system designers and fire protection engineers.

To put cable insulation heat release in perspective, here are relative values:
Fire Hazard Cable insulation: less than 8 MJ/kg (3,500 BTU/lb)
PVC insulation: As high as 25 MJ/kg (11,000 BTU/lb)
Polyolefin insulation: As high as 46 MJ/kg (20,000 BTU/lb)
Panel Meeting Action: Reject
Panel Statement: Cable meeting specifications as described in this comment is not prohibited by the Code, and the panel sees no need for an additional marking.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-269 Log #2060 NEC-P16 **Final Action: Accept**
(820.154(E))

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-337
Recommendation: Continue to Reject.
Substantiation: The submitter's recommendation to create a new cable designation (CATV50) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's recommendation to add this FPN to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. The submitter's substantiation references 2002 NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-270 Log #2288 NEC-P16 **Final Action: Reject**
(820.179(A))

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-339
Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN to read:

FPN: One method of determining that the cable has fire-resistant and low-smoke-producing characteristics is NFPA 262-2002, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.*

Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The FPN defines the damage and specifies performance requirements.

Panel Meeting Action: Reject
Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-271 Log #2289 NEC-P16 **Final Action: Hold**
(820.179(B))

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-340
Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN as shown:

FPN: One method of determining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is ~~that the raceways pass the requirements of the test for Flame Propagation (riser) in~~ ANSI/UL 1666-2002, *Standard Test for Flame Propagation Height of Electrical and Optical-Fiber Cable Installed Vertically in Shafts.*

Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The FPN defines the damage and specifies performance requirements.

Panel Meeting Action: Hold
Panel Statement: The proposal was editorial, seeking no changes to the fine print note. A technical change in the fine print note would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-272 Log #2290 NEC-P16 **Final Action: Hold**
(820.179(C))

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-341
Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN to read:

FPN: One method of determining that the cable is resistant to the spread of fire is the UL Flame Exposure, Vertical Tray Flame Test in UL1685-2000 *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables.*

Another method of determining that the cable is resistant to the spread of fire is the "Vertical Flame Test - Cables in Cable Trays," in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables.*

Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The Proposal as submitted defines the damage and specifies performance requirements.

The number, title, and the date of the latest edition of the UL standard were corrected to reflect the current applicable standard. The reference in the CSA standard and the date of the CSA standard were also corrected.

Panel Meeting Action: Hold
Panel Statement: The proposal was editorial, seeking no changes to the fine print note. A technical change in the fine print note would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-273 Log #2292 NEC-P16 **Final Action: Hold**
(820.179(C), FPN)

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-342
Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN to read:

FPN: One method of determining that the cable is resistant to the spread of fire is the UL Flame Exposure, Vertical Tray Flame Test in UL1685-2000 *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables.*

Another method of determining that the cable is resistant to the spread of fire is the "Vertical Flame Test - Cables in Cable Trays", in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*.

Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The Proposal as submitted defines the damage and specifies performance requirements.

The sentence "The smoke measurements in the test method are not applicable." is mandatory language.

Panel Meeting Action: Hold
Panel Statement: A technical change in the fine print note as proposed in this comment would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-274 Log #2294 NEC-P16 **Final Action: Hold**
(820.179(D))

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-343
Recommendation: The Panel Action should have been to Accept in Principle and reword the FPN to read:

FPN: One method of determining that the cable is resistant to flame spread is the VW-1 (vertical-wire) flame test in ANSI/UL 1581-2001, *Reference Standard for Electrical Wires, Cables and Flexible Cords.*

Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The FPN as submitted in the Proposal includes mandatory language by requiring that the cable be tested to UL 1581. The revised wording provides explanatory information without any requirements.

The date of the latest edition of the UL standard was updated from 1991 to 2001.

Panel Meeting Action: Hold

Panel Statement: The proposal was editorial, seeking no changes to the fine print note. A technical change in the fine print note would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-275 Log #1465 NEC-P16 **Final Action: Reject**
(820.179(E) (New))

Submitter: Sanford Egesdal, Egesdal Associates PLC
Comment on Proposal No: 16-344
Recommendation: Reconsider proposal 16-344 and revise 820.179 as shown below.
(E) CATV Limited Fire Hazard (-FHC) Cable. Cables used to reduce potential heat release shall be listed as fire hazard (-FHC) cable and shall have a low potential heat release. Fire hazard cables specified in 820.154(E), and used to reduce potential heat release shall have an additional classification using the suffix "-FHC".

FPN No. 1: One method of defining a low potential heat release cable is that the cable exhibits a maximum potential heat value of exceeding 8141 kJ/kg (3500 BTU/lb) when tested in accordance with NFPA 259, *Standard Test Method for Potential Heat of Building Materials*, as well as a maximum flame spread index of 25 and a maximum smoke developed index of 50 when tested in accordance with NFPA 255, *Standard Method of Test of Surface Burning Characteristics of Building Materials*.
Substantiation: The application of the Standards Council's decision on NPFA 90A was an error. The proposed marking on the cable did not include a "P" added to CATV. Type CATVP cable is permitted to be installed in plenums.

To better clarify that the Standards Council's decision on NFPA does not apply and to better clarify where the cable is permitted to be installed, the marking on the cable is changed to Type CATV-FHC. The "FHC" suffix stands for fire hazard cable. There is a companion comment to revise the application of fire hazard cable in my comment to Proposal 16-329.

The proposed cable provides listing parameters useful to system designers and fire protection engineers.

The key parameter in the listing requirements is potential heat release.

To put cable heat release in perspective, here are relative values:

Fire Hazard Cable insulation: less than 8 MJ/kg (3,500 BTU/lb

PVC insulation: As high as 25 MJ/kg (11,000 BTU/lb)

Polyolefin insulation: As high as 46 MJ/kg (20,000 BTU/lb)

Polyolefin insulation is sometimes used as insulation on conductors, and is covered by a PVC jacket. Polyolefin insulation provides better electrical properties (dielectric constant) than PVC insulation.

Additionally, flame spread and smoke developed parameters identify the robustness of the cable.

A flame spread index of 25 is found in a number of NFPA publications, for example:

NFPA 13-2007

8.15.1 Concealed Spaces.

8.15.1.2.10 Concealed spaces where rigid materials are used and the exposed surfaces have a flame spread index of 25 or less, and the materials have been demonstrated not to propagate fire when tested in accordance with NFPA 255, Standard Method of Test of Surface Burning Characteristics of Building Materials, extended for an additional 20 minutes in the form in which they are installed, shall not require sprinkler protection.

NFPA 13 use of "concealed spaces" corresponds to a typical dictionary definition: out of sight, hidden. This definition add "spaces" to "concealed" and represents a different meaning from how the NEC defines "concealed." Where both the NEC and NFPA 13 apply, "concealed" cable can be removed from a "concealed space." After removal of the cable, the "concealed space" would remain.

A smoke developed index of 50 is more rigorous than the typical smoke developed index of 450 for interior finishes. Interior finishes can be considered a "fixed" application: one sheet or one coat. Cable installations are a "variable" application: one cable or hundreds of cables. It seems reasonable to establish a robust requirement, due to the variable application. Electronic equipment is susceptible to damage from smoke and heat, both components of a fire.
Panel Meeting Action: Reject
Panel Statement: Cable meeting specifications as described in this comment is not prohibited by the Code, and the panel sees no need for an additional marking.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-276 Log #1575 NEC-P16 **Final Action: Accept**
(820.179(E))

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-346
Recommendation: Continue to reject.
Substantiation: The submitter's recommendation to create a new cable designation (concealed space cable) is nothing more than a marketing ploy. A backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The submitter's substantiation would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore, the confusion and making it impossible to enforce. What does constitute a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1)

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1) For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-277 Log #2061 NEC-P16 **Final Action: Accept**
(820.179(E))

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-344
Recommendation: Continue to Reject.
Substantiation: The submitter's recommendation to create a new cable designation (CATV 50) is nothing more than a marketing ploy. The submitter's recommendation to add these three FPN's to this section is in grave error. FPN No. 1 is a backdoor approach you might say to get NFPA 255 and NFPA 259 cables in the cable hierarchy. The FPN No. 2 would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. The submitter's substantiation references 2002 NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?

NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:

8.14.1.2 Concealed Spaces not Requiring Sprinkler Protection.

8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).

8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.

A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.

In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the

construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-278 Log #2296 NEC-P16 **Final Action: Accept**
(820.179(E))

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-344
Recommendation: The Panel action should continue to be Reject.
Substantiation: The proposed FPN No. 1 does not comply with the NEC Style Manual.

3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The Proposal as submitted defines the damage and specifies performance requirements in the FPNs.

Panel Meeting Action: Accept
Panel Statement: The panel rejected Proposal 16-344 and reaffirms its rejection by accepting Comment 16-277. The panel action does not indicate agreement or disagreement with the substantiation for the comment.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-279 Log #2297 NEC-P16 **Final Action: Accept**
(820.179(E))

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-345
Recommendation: The Panel action should continue to be Reject.
Substantiation: The proposed FPN does not comply with the NEC Style Manual.

3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The FPN proposed defines the damage and specifies the performance requirements.

Panel Meeting Action: Accept
Panel Statement: The panel is acting on this and other proposals related to wire and cable in plenum and other air handling spaces based on NFPA Standards Council Decision 05-24 (SC #05-7-4) dated 29 July 2005 that states, in pertinent part, as follows:

"So as not to inject the problems identified in the 2002 edition of NFPA 90A into the NEC®, and in order to give the Technical Committee on Air Conditioning the opportunity to fully address all technical issues related to plenum cables by processing the issues through the entire upcoming NFPA 90A revision cycle, the Council directs the NEC Project to maintain the status quo in the NEC until the Technical Committee on Air Conditioning has, through the processing of NFPA 90A, addressed the issues and released the next edition of NFPA 90A."

This action does not constitute agreement or disagreement with any of the substantiations submitted for the affected proposal.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-280 Log #2304 NEC-P16 **Final Action: Accept**
(820.179(E) (New))

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-346
Recommendation: The Panel action should continue to be Reject.
Substantiation: The proposed FPN does not comply with the NEC Style Manual.

3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The FPN proposed defines the damage and specifies the performance requirements.

Panel Meeting Action: Accept
Panel Statement: The panel rejected Proposal 16-346 and reaffirms its rejection by accepting Comment 16-276. The panel action does not indicate agreement or disagreement with the substantiation for the comment.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 830 — NETWORK-POWERED BROADBAND COMMUNICATIONS SYSTEMS

16-280a Log #CC1603 NEC-P16 **Final Action: Accept**
(820.2)

Submitter: Code-Making Panel 16,
Comment on Proposal No: 16-245
Recommendation: Delete the definition of CATV Raceway including the FPN in 820.2.
Substantiation: The panel intends to delete the definition. The listing requirements in 820.182 adequately describe a CATV raceway.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-281 Log #251 NEC-P16 **Final Action: Accept in Part**
(830.2)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-357
Recommendation: Accept this proposal in principle in part by continuing to accept the modification to the definition of the point of entrance and rejection the addition of the fine print notes. Add the following additional definitions:

Intermediate Metal Conduit (Type IMC). The definition in 342.2 shall apply.

Rigid Metal Conduit (Type RMC). The definition in 344.2 shall apply.

Substantiation: Article 830 uses the terms Intermediate Metal Conduit and Rigid Metal Conduit. These terms are defined in Articles 342 and 344 respectively. Because of 90.3 (excerpted below), these definitions do not apply to Chapter 8. They will apply if this comment is accepted.

"Chapter 8 covers communications systems and is not subject to the requirements of Chapters 1 through 7 except where the requirements are specifically referenced in Chapter 8."

Panel Meeting Action: Accept in Part
Panel Statement: The panel accepts the deletion of the FPNs and rejects the addition of the new definitions. See panel action and statement on Comment 16-100.

The panel continues to accept the modification to the definition of the Point of Entrance.

The panel rejects the addition of the definitions of IMC and RMC.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-282 Log #1551 NEC-P16 **Final Action: Accept**
(830.2)

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-352
Recommendation: Continue to reject this proposal.
Substantiation: This proposal should continue to be rejected as the application of the "block" concept by the telecommunications utilities has resulted in an exemplary safety record. The many reasons for rejecting the proposal as iterated in the Panel Statement accompanying Proposal 16-383 are appropriate and support continued rejection.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-283 Log #1584 NEC-P16 **Final Action: Accept**
(830.2)

Submitter: Harold C. Ohde, IBEW-NECA Technical Institute
Comment on Proposal No: 16-350
Recommendation: Continue to reject.
Substantiation: The term "air duct" is not used in Article 830 and, therefore, it does not need to defined in 830.2. Defining a term that is not being used (such as air duct) in that Article is in direct violation with the National Electrical Code Style Manual. CMP 16 rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A.

I do believe that expansion of or a new definition of air duct in another Article would be a violation Standards Council Decision D#05-24. Standards Council recognizes the 2002 edition of the NEC as being status quo.

Panel Meeting Action: Accept
Panel Statement: As there was no opportunity for public review and comment, the panel continues to affirm its original action on the referenced proposal in accordance with the action taken to comply with the Standards Council relative to the 90A Decision.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-284 Log #2305 NEC-P16 **Final Action: Accept in Part**
(830.2)

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-357
Recommendation: The Panel Action should continue to be Accept in Principle with the following additional revisions to the Panel Action.
In the definition for Point of Entrance, delete the last phrase in the Proposal "grounded to an electrode in accordance with 830.100(B)"
Delete the two FPNs.
Substantiation: The deletion of the phrase is required to comply with 2.2.2 of the NEC Style Manual which states "Definitions shall not contain requirements or recommendations." and 2.3.2.2 of the Manual of Style for NFPA Technical Committee Documents which states "Definitions shall not contain requirements."
The comments expressed by the Technical Correlating Committee on Proposals 16-116 and 16-117 provide valid reasons for the deletion of the FPNs.
Panel Meeting Action: Accept in Part
Panel Statement: The panel accepts the deletion of the FPNs. See panel action and statement on Comment 16-100.
The panel rejects the deletion of the phrase "connected by a grounding conductor to an electrode in accordance with 830.100(B)" because it is an integral and necessary part of the definition. See panel action and statement on Comment 16-87, which also applies to Article 830.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-285 Log #1118 NEC-P16 **Final Action: Accept in Part**
(830.2.Point of Entrance)

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-357
Recommendation: The Panel Action should continue to be Accept in Principle with the following additional revisions to the Panel Action.
In the definition for Point of Entrance, delete the last phrase in the Proposal "grounded to an electrode in accordance with 830.100(B)"
Delete the two FPNs.
Substantiation: The deletion of the phrase is required to comply with 2.2.2 of the NEC Style Manual which states "Definitions shall not contain requirements or recommendations." and 2.3.2.2 of the Manual of Style for NFPA Technical Committee Documents which states "Definitions shall not contain requirements."
The comments expressed by the Technical Correlating Committee on Proposals 16-116 and 16-117 provide valid reasons for the deletion of the FPNs.
Panel Meeting Action: Accept in Part
Panel Statement: The panel accepts the deletion of the FPNs. See panel action and statement on Comment 16-100.
The panel rejects the deletion of the phrase "connected by a grounding conductor to an electrode in accordance with 830.100(B)" because it is an integral and necessary part of the definition. See panel action and statement on Comment 16-87, which also applies to Article 830.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-286 Log #877 NEC-P16 **Final Action: Accept**
(830.3)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 16-360
Recommendation: The panel is encouraged to continue to Reject Proposal 16-360.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-287 Log #1215 NEC-P16 **Final Action: Accept**
(830.3(A))

Submitter: John Burke, Fusion Cable Systems
Comment on Proposal No: 16-362
Recommendation: Continue to Reject this Proposal.
Substantiation: We remove old and unused cable as part of our standard business practice especially in retrofit jobs. The amount of old cable on some jobs has caused damage to the building and created unsafe working conditions for our techs. We support continuing the abandoned cable removal requirement in the Code.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-288 Log #199 NEC-P16 **Final Action: Accept**
(830.3(A), 830.25 (new) & 830.26 (new))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-365
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal relative to the panel action text to accept the deletion of 830.3(A), not 830.3(C). This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Delete 830.3(A). Reorder remaining subsections.
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-289 Log #2062 NEC-P16 **Final Action: Reject**
(830.3(A), 830.25, and 830.26)

Submitter: Harold C. Ohde, IBEW #134
Comment on Proposal No: 16-365
Recommendation: This Proposal should have been Rejected.
Substantiation: The submitter's recommendation to add a new 830.26 with this FPN No. 2 to this section is in grave error. This FPN would not provide guidance to designers, installers or code officials. This FPN would have misled the designer, installer and code officials to believe, install and enforce that limited combustible cable, conduit or a sprinkler system to be installed in the concealed space or plenums would be a requirement because of NFPA 13, Section 8.14.1. The submitter's substantiation references 2002 NFPA 13 Section 8.14.1. It is important to note that the NEC does not have a definition of "concealed spaces", therefore making it impossible to enforce. What constitutes a concealed space? Is it the space above a dropped ceiling; or is it a space above plastered or drywall ceiling? Is it the wall cavity of typical wall construction?
NFPA 13 just completed their revision process for the 2006 NFPA 13 Standard. 8.14.1 of NFPA 13 has been revised to read as follows:
8.14.1.2 Concealed Spaces
not Requiring Sprinkler Protection.
8.14.1.2.1* Concealed spaces of noncombustible and limited combustible construction with minimal combustible loading having no access shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those as a return air for a plenum. (For additional information on combustible loading see A.8.14.1.2.1).
8.14.1.2.2 Concealed spaces of noncombustible and limited combustible construction with limited access and not permitting occupancy or storage of combustible shall not require sprinkler protection. The space shall be considered a concealed space even with small openings such as those used as return air for a plenum.
A.8.14.1.2.1 Minor quantities of combustible materials such as but not limited to: cabling, nonmetallic plumbing piping, non-structural wood, etc... can be present in concealed spaces constructed of limited or noncombustible materials but should not be viewed as requiring sprinklers (see 8.14.1.1). For example, it is not the intent of this section to require sprinklers, which would not otherwise be required, in the interstitial space of a typical office building solely due to the presence of the usual amount of cabling within the space. The threshold value at which sprinklers become necessary in the concealed space is not defined.
In the 2006 NFPA 13 committee's substantiation, they wanted to clarify that the normal amount of cabling would not require sprinklers due to the construction of the space. They also expanded the list of combustibles to provide examples of potential combustible loading.

CMP 16 should have rejected this proposal based on the Standards Council decision D#05-24 to remain "status quo" on issues that pertain to NFPA 90A. Standards Council recently issued another decision (D#06-03) which decided that this FPN may be deleted from Sections 770.154, 800.154, and 820.154 (all under CMP 16 purview) and this deletion will not be in conflict with the Standards Council decision (D#05-24). Standards Council recognizes the 2002 edition of the NEC as being status quo.

Panel Meeting Action: Reject

Panel Statement: The panel rejected the text that the submitter of the comment objected to.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-290 Log #200 NEC-P16 **Final Action: Accept (830.3(E))**

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 16-367

Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal and give further consideration to the comments expressed in the voting. This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

The panel accepts the direction of the TCC to clarify the panel action.

The panel accepts the part of the proposal to delete existing subsection (A) from 830.3, as it has been moved to 830.26. This was accomplished by panel action on Proposal 16-361.

It was not clearly stated in the panel action that the text was relocated in Proposal 16-367.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

16-291 Log #201 NEC-P16 **Final Action: Accept (830.24)**

Submitter: Technical Correlating Committee on National Electrical Code

Comment on Proposal No: 16-373

Recommendation: The Technical Correlating Committee notes that neither the panel statement nor the revised statement shown in the affirmative vote are responsive to the submitter's substantiation for the recommendation. The Technical Correlating Committee directs the panel to act on the merits of the recommendation. This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the TCC to reconsider the comments expressed in the voting and continues to reject the proposal.

The requirements of 300.11 are applicable to network-powered broadband cables, are not overly restrictive, and are appropriate.

Requiring any and all cables to be properly supported is not overly restrictive and is appropriate. Securing an additional cable to an existing properly supported cable does not constitute support. Additional cables must be directly supported by the same structural member that supports the first cable. In such installations, the additional cable is being supported by the same structural member.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

BRUNSSEN, J.: Proposal 16-373 should have been accepted. See my explanation of negative on Comment 16-297.

16-292 Log #377 NEC-P16 **Final Action: Reject (830.24)**

Submitter: S. D. Kahn, Tri-City Electric Company, Inc. / Rep. NECA

Comment on Proposal No: 16-372

Recommendation: Reject the Proposal.

Substantiation: Although I agree with the proposal and the submitter's intent to introduce consistency, the material is used in plenums and other air handling spaces. Consequently, the proposal should have been subjected to the direction given by the Standards Council, as were many other proposals which were rejected.

As Mr. Dorna noted in his "Explanation of Negative Vote", "The UL Directory (2005), shows that category ZODZ covers "cable ties, cable tie mounts and similar types of related hardware". Likewise, Conduit and Fittings, category DWFV covers "cable ties, conduit straps, staples and similar hardware..." Both categories list as "Suitable for use in air handling spaces in accordance with Sec 300.22(C) and (D) of the National Electrical Code."

This proposal should have been rejected because of the Standards Council decision concerning NFPA 90A. Code Making Panels must be consistent in their handling of all submitted proposals.

Panel Meeting Action: Reject

Panel Statement: This is not a 90A issue.

The guide information for ZODZ, Wire Positioning Devices states that:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

The reference to air handling spaces is only a reference and is stated as:

"…for those devices which have been investigated to determine their suitability for use in air handling areas…"

This is a standard statement that is found in a wide variety of listing categories including the category for IT and Telecom equipment to cover situations where a special investigation is done to evaluate a device for air handling spaces. It no way implies that devices in the category are automatically intended for air handling spaces.

Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

Devices are evaluated for properties that we are concerned about. It is NOT a requirement for a listed device to be evaluated for use in air handling spaces.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

JOHNSON, S.: See my explanation of negative vote on Comment 16-27.

16-293 Log #378 NEC-P16 **Final Action: Reject (830.24)**

Submitter: S. D. Kahn, Tri-City Electric Company, Inc. / Rep. NECA

Comment on Proposal No: 16-374

Recommendation: Reject the Proposal.

Substantiation: This proposal should be rejected as the term "listed" should not be introduced at this time. The panel accepted moving the abandoned cable requirement but did not accept deleting "The accessible portion of". The panel rejected the remainder of the proposal except for adding the word "listed". Other proposals move the abandoned cable requirement.

I agree with the submitter's intent with reference to "listed" in order to introduce consistency, however the material is used in plenums and other air handling spaces. Consequently, the proposal should have been subjected to the direction given by the Standards Council, as were many other proposals which were rejected because of that direction.

As Mr. Dorna noted in his "Explanation of Negative Vote", "The UL Directory (2005), shows that category ZODZ covers "cable ties, cable tie mounts and similar types of related hardware". Likewise, Conduit and Fittings, category DWFV covers "cable ties, conduit straps, staples and similar hardware..." Both categories list as "Suitable for use in air handling spaces in accordance with Sec 300.22(C) and (D) of the National Electrical Code."

The proposal portion that introduces "listed" should have been rejected because of the Standards Council decision concerning NFPA 90A. Code Making Panels must be consistent in their handling of all submitted proposals.

Panel Meeting Action: Reject

Panel Statement: This is not a 90A issue.

The guide information for ZODZ, Wire Positioning Devices states that:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

The reference to air handling spaces is only a reference and is stated as:

"…for those devices which have been investigated to determine their suitability for use in air handling areas…"

This is a standard statement that is found in a wide variety of listing categories including the category for IT and Telecom equipment to cover situations where a special investigation is done to evaluate a device for air handling spaces. It no way implies that devices in the category are automatically intended for air handling spaces.

Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

Devices are evaluated for properties that we are concerned about. It is NOT a requirement for a listed device to be evaluated for use in air handling spaces.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 14 Negative: 1
Explanation of Negative:
JOHNSON, S.: See my explanation of negative vote on Comment 16-27.

16-294 Log #480 NEC-P16 **Final Action: Reject**
(830.24)

Submitter: Timothy P. McNeive, Thomas & Betts Corporation
Comment on Proposal No: 16-372
Recommendation: Delete the word "listed".
Substantiation: Refer to my comment in ROP 16-374. The use of the word "listed" is redundant whether or not my comment in 16-275 is accepted. I agree with Mr. Boyer's comment accompanying his negative vote. His suggested additional text is not needed, however, in this section, if adopted in 830.24 according to my comment in ROP 16-374.
Panel Meeting Action: Reject
Panel Statement: The guide information for ZODZ, Wire Positioning Devices states that:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

The evaluation of positioning devices includes:

• Classification by mechanical strength, material, maximum temperature, and environmental conditions
• Required Markings giving critical information to the installer / inspector
• Mechanical strength tests
•Flammability classification of polymeric materials and coatings (NOT air-handling space requirements)
• Relative thermal index
• Material requirements (Including blending and substitution)
• Corrosion resistance
• Sharp edges
• Installation
• Mechanical strength
• Vibration
•Tests for mounting blocks and other mounting hardware and devices
• Environmental conditioning.....

Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
BOYER, J.: See my explanation of vote on Comment 16-29.
JOHNSON, S.: See my explanation of negative vote on Comment 16-29.

16-295 Log #483 NEC-P16 **Final Action: Reject**
(830.24)

Submitter: Timothy P. McNeive, Thomas & Betts Corporation
Comment on Proposal No: 16-374
Recommendation: Accept the panel action but delete the requirement that hardware be "listed" in 830.24. Add the following sentence before the last sentence in 830.24:

"Cable ties that provide primary support for optical fiber cables and raceways shall have a minimum loop tensile strength of 23 kg (50 lbs)".

Substantiation: Adding a requirement that all hardware be "listed" is far from editorial as asserted in the substantiation accompanying the proposal. The panel is asked to consider the long-standing positions of CMP-7 and CMP-8 that do not require support hardware to be "listed". Above all else, consistency in the NEC seems to be what the original submitter values most. No substantiation has been provided in the proposal that would differentiate treatment of antenna television and radio distribution cables from other wiring systems with respect to support. The wide variety of hardware used for supporting cables and raceways are called upon to provide both primary support required in the NEC and very often secondary support or wire management functions. All hardware need not be held to the highest standard.

The comment provided by Mr. Dorna with his negative vote references two UL categories under which cable ties and other hardware are "listed". The correct UL category for Hardware for Support of Conduit, Tubing and Cable (UL 2239) is DWMU, not DWFV. Nevertheless, this standard and UL 1565, Positioning Devices (ZODZ) establishes a 23 kg test load for all support products for flexible conduits and cables in accordance with the requirements for primary support throughout the NEC. For cable ties, "minimum loop tensile strength" is commonly marked on packages. The 23 kg minimum for cable support is well representative of typical straps, hangers and staples listed for flexible conduit and cable support in accordance with UL 2239. Hardware for Support of Conduit, Tubing and Cable. The proposed new text will add value to inspectors in acceptance of appropriate cable ties without requiring lists.

Companion proposals have been submitted for 640.6, 725.8, 770.24, 800.24 and 820.24.

Panel Meeting Action: Reject
Panel Statement: There is more to listing than mechanical strength. Also, the mechanical strength should be based on the use and ratings of the device.

Cable ties can be used for securing and supporting cables in a number of Chapter 3 wiring methods without any requirements for a minimum loop tensile strength of 23 kg (50 Ibs) or any particular strength. For example, Section 334.30 covering securing and supporting of "nonmetallic-sheathed cable requires supporting and securing by staples, cable ties, straps, hangers, or similar fittings designed and installed so as not to damage the cable, at intervals not exceeding 1.4 m (4 1/ 2 ft) and within 300 mm (12 in.) of every outlet box, junction box, cabinet, or fitting." Notice it does not have any recommendation for the support strength, nor does it need this additional marking or special consideration. The cables may not be providing any support at all where the tie wrap is simply anchoring it to a beam or joist. Types AC and MC cable also give permission to use cable ties for securing and supporting these cables in 320.30 and 330.30, respectively. In addition, this added text could be considered to be new information that has not been reviewed as part of the process.

Listing includes an evaluation of the particular device that goes beyond the ability to support cable. The guide information for ZODZ, Wire Positioning Devices states that:

"The investigation of these products includes consideration of the rated mechanical strength, maximum operating temperature, smoke and heat generation, corrosion resistance and weatherability characteristics as appropriate for the product."

These are all characteristics that we should be concerned about for electrical installations.

Listed devices are evaluated using UL1565 – Standard for Positioning Devices. The scope of this standard states:

"1.1 This standard applies to those metallic and nonmetallic devices used for positioning - which may include bundling and securing - or to a limited extent supporting cable, wire, conduit, or tubing of a wiring system in electrical installations, to reduce the risk of fire, electric shock, or injury to persons."

Number Eligible to Vote: 15
Ballot Results: Affirmative: 13 Negative: 2
Explanation of Negative:
BOYER, J.: See my explanation of vote on Comment 16-29.
JOHNSON, S.: See my explanation of negative vote on Comment 16-29.

16-296 Log #878 NEC-P16 **Final Action: Reject**
(830.24)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 16-374
Recommendation: The panel is encouraged to continue to Reject Proposal 16-374.
Substantiation: The reasons to continue to Reject the Proposal are as follows:

1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Reject
Panel Statement: The action on proposal 16-374 was to accept in principle in part. This is not consistent with the submitter's request.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-297 Log #1552 NEC-P16 **Final Action: Reject**
(830.24)

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-373
Recommendation: Accept this proposal.
Substantiation: This proposal should be accepted. The requirement added by Panel 16 during the 2005 revision cycle is overly restrictive and inappropriate for network-powered broadband communications cables. The Fine Print Note associated with 830.24 directs the reader to the appropriate installation standards. The Panel has enhanced the Fine Print Note during this cycle by the addition of three new references covering the installation of network-powered broadband communications cables (see Proposal 16-376). These references are all that is necessary and sufficient for such cables without imposing the burdensome requirements of 300.11. Section 300.11 is directed toward power cable assemblies that are heavier and larger than network-powered broadband communications cables, operate at much greater power levels and present a greater risk of injury if not properly installed. If the Panel continues to reject Proposal 16-373 then, at the very least, 300.11(C) should be excepted. See my companion comment on Proposal 16-377.
Panel Meeting Action: Reject
Panel Statement: Securing an additional cable to an existing cable does not constitute support. Additional cables must be directly supported by the same structural member that supports the first cable. In such installations, the additional cable is being supported by the same structural member.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
BRUNSSEN, J.: This comment should have been accepted, as should the original Proposal 16-373. Lashing (tie-wrapping) of additional network-powered broadband communications cables to existing network-powered broadband communications cables is accepted industry practice without detriment to safety. The network-powered broadband communications cables in question are of minimal diameter and light in weight. The argument is not one of whether to support the additional network-powered broadband communications cable, but the adequacy of lashing (tie-wrapping) to existing network-powered broadband communications cable(s). For further substantiation, see my explanation of negative on Proposal 16-373 and my substantiation to Comment 16-297. Additionally, the final sentence of the panel statement is unclear.
JOHNSON, S.: See my explanation of negative vote on Comment 16-31.
JONES, R.: The requirement added by Panel 16 during the 2005 revision cycle is overly restrictive and inappropriate for network-powered broadband communications cables. The Panel has enhanced the Fine Print Note during this cycle by the addition of three new references covering the installation of network-powered broadband communications cables. The installation requirements of Article 830 and the references are adequate without the requirements of 300.11.

16-298 Log #1553 NEC-P16 **Final Action: Reject**
(830.24)

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-377
Recommendation: Accept this proposal.
Substantiation: This proposal should be accepted. If the Panel continues to support the addition of the requirements of 300.11 to 830.24, then at the very least, the requirements of 300.11(C) should be waived. Section 300.11(C) is clearly not applicable to network-powered broadband communications cables. Installation practice is to lash network-powered broadband communications cables together to form a "cable assembly". This frequently occurs during modifications or additions to an existing installation. Network-powered broadband communications cables are physically smaller and lighter than power cables and contain limited power. Application of 300.11(C) is overly restrictive and will preclude lashing of network-powered broadband communications cables together to form a cable assembly. Network-powered broadband communications cables secured in this manner have adequate support (see 300.11 (A)), are supported independently of the suspended ceiling grid, and are not likely to collapse in the event the suspended ceiling collapses. Such restriction imposes additional installation costs with no improvement in safety. See my companion comment on Proposal 16-373.
Panel Meeting Action: Reject
Panel Statement: Securing an additional cable to an existing cable does not constitute support. Additional cables must be directly supported by the same structural member that supports the first cable. In such installations, the additional cable is being supported by the same structural member.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 12 Negative: 3
Explanation of Negative:
BRUNSSEN, J.: This comment should have been accepted, as should the original Proposal 16-377. If the panel continues to support the addition of the securing and supporting requirements of 300.11, then at the very least 300.11(C) should be exempted. It is clearly not applicable to network-powered broadband communications cables. For further substantiation, see my explanation of negative on Proposal 16-377 and the substantiation accompanying my Comment 16-298. Additionally, the final sentence of the panel statement is unclear.
JOHNSON, S.: See my explanation of negative vote on Comment 16-31.
JONES, R.: See my Explanation of Negative Vote on Comment 16-297.

16-299 Log #714 NEC-P16 **Final Action: Reject**
(830.24, FPN)

Submitter: Robert Kelleher, Paramount Electrical Services
Comment on Proposal No: 16-375
Recommendation: The action should be to delete this Fine Print Note.
Substantiation: The addition of these NECA Fine Print Notes, serves no benefit to the user of the National Electrical Code. These are not standards, they are a compilation of generic information and do not serve as information to the user. These must be purchased through NECA. This FPN as written is nothing more than free advertisement for generic, readily available information which must be purchased by the code user. Code Making Panel 16 should consider taking an action to delete this FPN to coordinate with the other technical committees in the NEC project. A total of seventeen new Fine Print Notes were proposed to reference NECA standards. Sixteen were unanimously rejected. Inclusion of this Fine Print Note is in direct conflict with 90.1(C). In the action to reject proposal 8-3, one technical committee member promotes NECA standards as "….a tool to assist untrained electricians to make safer and better installations." The TCC should intervene, uphold the provisions of 90.1(C) and prohibit these types of Fine Print Notes. CMP16 should reject this FPN. Failure to do so will mean adding Fine Print Notes for IEC, EEI, IBEW, IAEI, ACC, NETA, NEI, SEIA, AISI, API, ASHE, AHAM, ICEAI, NYBFU and dozens of others when they decide to develop income through generic standards development. If this type of Fine Print Note is placed anywhere in the NEC an Annex should be included with coupons for the code user. If the NEC is to be used for advertisement purposes, coupons should be included.
Panel Meeting Action: Reject
Panel Statement: Proposal 16-375 pertained to updating the FPN, not to delete it.
The comment requests that the FPN be deleted. The FPN provides valuable information, and the panel intends that it be retained but the date updated. The references provided in the FPN provide guidance for installation in a neat and workmanship like manner.
See panel action and statement on Comment 16-107a (Log #CC1602).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:
PREZIOSO, L.: See my explanation of affirmative vote on Comment 16-34.

16-300 Log #879 NEC-P16 **Final Action: Reject**
(830.24, FPN)

Submitter: John P. Masarick, Independent Electrical Contractors Inc.
Comment on Proposal No: 16-375
Recommendation: The panel is encouraged to continue to Reject Proposal 16-375.
Substantiation: The reasons to continue to Reject the Proposal are as follows:
1. The trend by the CMPs over the last several code cycles has been to limit the use of FPNs.
2. There is also a correlation issue. There is a conflict between those panels that accepted the proposal and those that rejected the proposal.
3. These standards are also covered by a Fine Print Note in 110.12.
4. The FPN should not be accepted because numerous standards and installation manuals exist and to only mention one does not adequately inform the public about accepted industry practices. The NEC is not intended to be an instruction manual for untrained persons. If the FPNs are allowed to reference these standards, then they should list all applicable standards.
5. Since the referenced installation standards are intentionally general to cover different models of equipment, approval of the FPN may lead many to believe these standards can be used instead of listed or labeled manufacturer's instructions which would be in violation of 110.3(B).
6. If the CMP would like to include the reference, it should be placed in the Annex with the other references.

Panel Meeting Action: Reject
Panel Statement: The comment substantiation is inconsistent with the recommended action. The panel does not agree to delete the FPN. The panel did not delete that FPN, as the original proposal was to update the reference date.

See panel action and statement on Comment 16-107a (Log #CC1602).
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:

PREZIOSO, L.: See my explanation of affirmative vote on Comment 16-34.

16-301 Log #202 NEC-P16 **Final Action: Accept**
(830.24 Exception)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-377
Recommendation: The Technical Correlating Committee notes that neither the panel statement nor the revised statement shown in the affirmative vote are responsive to the submitter's substantiation for the recommendation. The Technical Correlating Committee directs the panel to act on the merits of the recommendation. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to reconsider the comments expressed in the voting and continues to reject the proposal.

The requirements of 300.11(C) are applicable to Network-Powered Broadband cables, are not overly restrictive and are appropriate.

Requiring any and all cables to be properly supported is not overly restrictive and is appropriate. Securing an additional cable to an existing properly supported cable does not constitute support. Additional cables must be directly supported by the same structural member that supports the first cable. In such installations, the additional cable is being supported by the same structural member.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15
Comment on Affirmative:

BRUNSSEN, J.: Proposal 16-377 should have been accepted. See my explanation of negative vote on Comment 16-298.

16-302 Log #203 NEC-P16 **Final Action: Accept**
(830.40)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-380
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 16-303.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-303 Log #204 NEC-P16 **Final Action: Accept**
(830.40(C) (New))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-381
Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.

The panel accepts the comment expressed in the voting and acknowledges that the correct panel action was to reject, since the action on Proposal 16-369 met the submitter's intent in a different manner.

The panel notes that the text of 830.40 is correct in the preprint with respect to Proposal 16-98.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-304 Log #1554 NEC-P16 **Final Action: Accept**
(830.90(A))

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-383
Recommendation: Continue to reject this proposal.
Substantiation: This proposal should continue to be rejected as the existing protection practices employed by the telecommunications utilities have resulted in an exemplary safety record. The many reasons for rejecting the proposal as iterated in the Panel Statement are appropriate and support continued rejection.
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-305 Log #243 NEC-P16 **Final Action: Accept in Principle**
(830.93)

Submitter: Stanley Kaufman, CableSafe Inc.
Comment on Proposal No: 16-386
Recommendation: Accept this proposal in principle by revising 830.93 as shown below:
830.93 Grounding or Interruption of Metallic Members of Network-Powered Broadband Communications Cables.
~~The shields of network-powered broadband communications cables used for communications or powering shall be grounded at the building as close as practicable to the point of entrance or attachment of the NIU. Metallic cable members not used for communications or powering shall be grounded or interrupted by an insulating joint or equivalent device as close as practicable to the point of entrance or attachment of the NIU.~~

Network-powered communications cables entering buildings or attaching to buildings shall comply with (A), (B) or (C).

(A) Entering Buildings. In installations where the network-powered communications cable enters the building, the shield shall be grounded and metallic members of the cable not used for communications or powering shall be grounded or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point of entrance.

(B) Terminating Outside of the Building. In installations where the network-powered communications cable is terminated outside of the building, the shield shall be grounded and metallic members of the cable not used for communications or powering shall be grounded or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point of attachment of the NIU.

(C) Mobile Homes….(The only change this comment suggests for the second paragraph and the FPN is to add this section title. Other proposals change the text.)
Substantiation: The suggested text is an editorial clarification intended to bring this section into compliance with section 3.3.1(2) of the NEC Style Manual which states:

2. Use simple declarative sentence structure, and keep sentences short. Writing rules in long sentences full of commas, dependent clauses, and parenthetical expressions often creates confusion and misunderstanding. The requirement can be written in two or more short sentences, expressed using a list or table, or both.

The existing paragraph deals with three scenarios, 1) installations where the cable enters the building, 2) installations where the cable is terminated outside of the building and 3) cables serving mobile homes. It is clearer to deal with each scenario in a separate subsection. The current text requires grounding of a shield (if the cable has a shield) and allows interruption as an alternate to grounding for other non-current-carrying members. The suggested text retains these options.
Panel Meeting Action: Accept in Principle

Revise 830.93 to read as follows:

830.93 Grounding or Interruption of Metallic Members of Network-Powered Broadband Communications Cables.

Network-powered communications cables entering buildings or attaching to buildings shall comply with (A) or (B).

For purposes of this section, grounding located at mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, or at a mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, shall be considered to meet the requirements of this section.

FPN: Selecting a grounding location to achieve the shortest practicable grounding conductor helps limit potential differences between the network-powered broadband communications circuits and other metallic systems.

(A) Entering Buildings. In installations where the network-powered communications cable enters the building, the shield shall be grounded in accordance with 830.100 and metallic members of the cable not used for communications or powering shall be grounded in accordance with 830.100, or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point of entrance.

(B) Terminating Outside of the Building. In installations where the network-powered communications cable is terminated outside of the building, the shield shall be grounded in accordance with 830.100 and metallic members of the cable not used for communications or powering shall be grounded in accordance with 830.100 or interrupted by an insulating joint or equivalent device. The grounding or interruption shall be as close as practicable to the point of attachment of the NIU.
Panel Statement: This revised text achieves the submitter's purpose with improved clarity and achieves parallelism with the text the panel accepted in Comments 16-40 and 16-126.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-306 Log #1113 NEC-P16 **Final Action: Reject**
(830.93, FPN (New))

Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-388
Recommendation: The Panel Action on the Proposal should be Reject.
Substantiation: I agree with the Explanation of Negative submitted by H. Ohde.
Also, the Technical Correlating Committee action on Proposals 16-116 and 16-117, which states in part "It is the intention of Fine Print Notes to provide explanatory information and they are not intended as a vehicle to provide unnecessary cross-references." provides a valid reason to not include the FPN.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 16-224.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-307 Log #205 NEC-P16 **Final Action: Accept**
(830.100(B))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-394
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal. The Panel Action text addresses the change in 830.110(B), rather than the correct section of 830.100(B). This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action.

The panel action on Proposal 16-394 referenced 830.110(B) in error. The correct reference is 830.100(B). See panel action and statement on Proposal 16-395 and Comment 16-308.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-308 Log #206 NEC-P16 **Final Action: Accept**
(830.100(B))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-395
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal with respect to the use of the word "and" in the sentence "The grounding conductor shall be connected in accordance with 830.100(B)(1), (B)(2), and (B)(3)."

It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 5-20.

This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise 830.100(B) as follows:

"(B) Electrode. The grounding conductor shall be connected in accordance with 830.100(B)(1), (B)(3), or (B)(2)."

Revise 830.100(B)(1) as follows:

"(1) In Buildings or Structures with an Intersystem Bonding Termination. If the building or structure served has an intersystem bonding termination, the grounding conductor shall be connected to the intersystem bonding termination."

Revise 830.100(B)(2) as follows:

"(2) In Buildings or Structures with Grounding Means. If the building or structure served has no intersystem bonding termination, the grounding conductor shall be connected to the nearest accessible location on the following."

Revise 830.100(B)(3) as follows:

"(3) In Buildings or Structures Without Intersystem Bonding Termination or Grounding Means. If the building or structure served has no intersystem bonding termination or grounding means, as described...".

Revise 830.100(B)(3)(2) as follows:

"(2) If the building or structure served has no intersystem bonding termination or has no grounding means, as described in 830.100(B)(2) or...". or …".
Panel Statement: The panel has clarified the panel action on Proposal 16-395 with respect to the word "and" as indicated in the panel action on this comment. It is not the intent to accomplish the grounding connections of 830.100 (B)(1), (B)(2), and (B)(3) simultaneously.

The panel has reconsidered Proposal 16-395 in light of the panel action on Proposal 5-20 as directed by the TCC and has revised "intersystem grounding termination" to "intersystem bonding termination" as indicated in the panel action on this comment.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-309 Log #207 NEC-P16 **Final Action: Accept**
(830.100(B))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-396
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal based on the affirmative comment. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Relocate the text to follow 830.100(B)(2)(7) and revise as follows:

"A bonding device intended to provide a termination point for the grounding conductor (intersystem bonding) shall not interfere with the opening of an equipment enclosure. A bonding device shall be mounted on non-removable parts. A bonding device shall not be mounted on a door or cover even if the door or cover is non-removable."
Panel Statement: The panel action on Proposal 16-396 to accept in principle is correct. The panel has reviewed the comment expressed in the voting and determined that the proper location of the text is 830.100(B)(2)(7), not 830.100(B)(5) as indicated in the proposal. That is where equipment (service) enclosures are discussed. The panel has also added editorial clarification as indicated in the panel action on this comment. The panel notes that the text is presently located incorrectly in the draft.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-310 Log #1525 NEC-P16 **Final Action: Accept**
(830.100(B))

Submitter: Jeffrey Boksiner, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-395
Recommendation: Continue to accept the proposal, but change the term "Intersystem Grounding Termination" to "Intersystem Bonding Termination."
Substantiation: This is a correlating comment to correlating with the actions of CMP-5 taken on proposal 5-20 as directed by the TCC. CMP-5 changed the term "Intersystem Grounding Termination" to "Intersystem Bonding Termination."
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 16-308.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-311 Log #1555 NEC-P16 **Final Action: Accept**
(830.100(B))

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-395
Recommendation: Revise the text of 830.100(B) as follows:
"**(B) Electrode**. The grounding conductor shall be connected in accordance with 830.100 (B) (1), (B) (2) ~~and~~ or (B) (3)."
Substantiation: The present text is incorrect as 830.100 (B) refers to three individual requirements that are appropriate under three separate circumstances. They are not to be done simultaneously. Hence, "and" should be replaced by "or".
Panel Meeting Action: Accept
Panel Statement: See panel action and statement on Comment 16-308.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-312 Log #208 NEC-P16 **Final Action: Accept**
(830.106(A))

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-401
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal by determining whether an "and" should be used or an "or" should be used in the accepted text as follows: "shall comply with 830.106(A)(1) and (A)(2)" or "shall comply with 830.106(A)(1) or (A)(2)". The Technical Correlating Committee also directs that consideration be given to the comments expressed in the voting. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Revise 830.106(A) as follows:
"(A) Grounding. Grounding shall comply with 830.106(A)(1) or (A)(2)."
Revise 830.106(A)(1) as follows:
"(1) Where there is no mobile home service equipment located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the network-powered broadband communications cable, network interface unit, and primary protector ground shall be connected to a grounding conductor in accordance with 830.100(B)(2)."
Revise 830.106(A)(2) as follows:
"(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within 9.0 m (30 ft) of the exterior wall of the mobile home it serves, the network powered broadband communications cable, network interface unit, and primary protector ground shall be connected to a grounding conductor in accordance with 830.100(B)(2)."
Panel Statement: The panel has considered the comments expressed in the voting as directed by the TCC.
The panel has clarified the panel action on Proposal 16-401 with respect to the word "and", revising 830.106(A) as indicated in the panel action on this comment. It is not the intent to accomplish the grounding connections of 830.106(A)(1) and (2) simultaneously.
The panel has considered the comment on affirmative as directed by the TCC and made the indicated revisions to the text of 830.106(A)(1) and (2) as currently contained in the draft. These revisions are consistent with the panel action on proposals affecting similar requirements in Articles 770, 800, and 820.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-313 Log #1556 NEC-P16 **Final Action: Accept in Principle**
(830.106(A))

Submitter: James E. Brunssen, Telcordia Technologies, Inc. / Rep. Alliance for Telecommunications Industry Solutions
Comment on Proposal No: 16-401
Recommendation: There are a number of typographical errors in the revised text as provided by the Panel. Revise the Panel's revised text under "Panel Meeting Action" as follows:
"**(A) Grounding.** Grounding shall comply with 830.106(A)(1) and (A)(2).
(1) Where there is no mobile home service equipment located ~~in sight from, and not more than~~ within 9.0 m (30 ft) from~~,~~ the exterior wall of the mobile home it serves, the network-powered broadband communications cable, network interface unit, and primary protector ground shall be ~~installed~~ connected to a grounding conductor in accordance with 830.100(B)(2).
(2) Where there is no mobile home disconnecting means grounded in accordance with 250.32 and located within ~~sight from, and not more than~~ 9.0 m (30 ft) from~~,~~ the exterior wall of the mobile home it serves, the network-powered broadband communications cable, network interface unit, and primary protector ground shall be ~~installed~~ connected to a grounding conductor in accordance with 830.100(B)(2)."
Substantiation: The text as shown in the Panel Statement and the text of 830.106(A) in the ROP draft of the 2008 NEC is incorrect. The text as revised by this comment satisfies the submitter's intent and is consistent with the Panel action on Proposal 16-170 (800.106(A)).
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 16-312.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-314 Log #1294 NEC-P16 **Final Action: Reject**
(830.110)

Submitter: James M. Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-402
Recommendation: The Proposal should have been Accept in Part.
Accept the addition of 830.110 but do not accept the Exception.
Substantiation: No substantiation was submitted to support the deletion of the conduit fill restrictions that apply to Chapter 3 raceways. While I support the effort to correlate similar text between articles, new material cannot be introduced without providing technical substantiation.
The first sentence in 830.110 states "installed in accordance with Chapter 3" which would include all of Chapter 3 requirements pertaining to raceways including the maximum percentage fill limitations in Chapter 9. Including the Exception introduces a conflict between the 830.110 rule and the Exception.
The fill restrictions are based on the physical limitations of being able to pull conductors or cables into raceways without damaging the conductors or cables, particularly when there are bends in the run, and to avoid conductor/cable jamming. The maximum percentage fill requirements are independent of whether they are electrical conductors or not.
The maximum percentage fill requirements in Chapters 3 and 9 are an integral part of the permitted uses of the raceways contained in Chapter 3 and if broadband communications cables are to be installed in a Chapter 3 raceway, then the maximum percentage fill limitations must also apply.
Chapter 9, Table 1 permits 53 percent fill when one conductor or cable is installed in a raceway; 31 percent for two; and 40 percent for three or more.
Panel Meeting Action: Reject
Panel Statement: Throughout Article 830 low-power network-powered communications cables have the same requirements as communications cables.
The fill requirements are not applicable to communications cables.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-315 Log #1959 NEC-P16 **Final Action: Reject**
(830.133(A)(1)(d) Exception No. 1)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 16-408
Recommendation: Accept the proposal as submitted.
Substantiation: The submitter is well aware of the differences between circuit separation as covered in this location and as covered for adjacent snap switches. However, the CMP 9 approach will accommodate CMP 16's requirements without disadvantaging one segment of the market. By using the term "identified" as the standard of product acceptance (See Article 100), you can have a plastic divider in a plastic box (both will be listed because nonmetallic boxes must be listed); or you have a steel divider in a steel box (the box will likely be listed but doesn't have to be and divider probably won't be listed.) The CMP 16 conclusion that this wording would allow a barrier to be installed such that it would void a box listing is untrue. The identification requirement means that the partitions will be covered on factory cut sheets, etc. describing the boxes for which they were designed. You will not find a divider that will meet this standard and be unsuitable for this application. and, in the case of nonmetallic boxes, all identified products will also be listed, so any improper barrier would provoke a citation under 110.3(B). In the case of steel boxes, the barriers will probably not be listed, but the anchoring methods are obvious to any installer and inspector, and they can easily be made secure for obvious reasons. The submitter has been an electrician for a long time, and has never encountered any problems securely installing steel dividers into the boxes for which they are identified.
Panel Meeting Action: Reject
Panel Statement: The listing of dividers is important given current trends and wiring methods.
"Identified" is not the same as "listed" which means that some sort of evaluation for suitability of the divider and its installation has been performed. Mounting, compatibility, material type and thickness, maintenance of spacings, etc. are all items of concern that a listing would address.

In recent years there has been a flood of devices and configurations utilizing standard outlet box dimensions and configurations for mix and matching of ac outlets, Ethernet, CATV and telecom connectors and receptacles. There is great concern regarding the separation of circuits, "storage" of excess cabling, routing of cables through or within the box, lack of expertise related to the installation of non-power cabling, and the like.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-316 Log #209 NEC-P16 **Final Action: Accept**
(830.154)

Submitter: Technical Correlating Committee on National Electrical Code
Comment on Proposal No: 16-412
Recommendation: The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal. The accepted action changes the title of old "(B) Ducts, Plenums and Other Air Handling Spaces." to "(A) Plenums." However, all three applications are still within the subsection. This action will be considered by the Panel as a Public Comment.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3.4.2 and 3.4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
Panel Statement: The panel accepts the direction of the TCC to clarify the panel action.

The panel has reviewed the panel action on Proposal 16-412 and determined that it is indeed correct. The editorial revision of the title of old "830.154(B)" to new "830.154(A) Plenums", while leaving the text of the subsection unchanged is consistent with similar text in 770, 800, and 820.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-317 Log #2300 NEC-P16 **Final Action: Hold**
(830.179)

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-415
Recommendation: The Panel Action should have been to Accept in Principle and revise the Fine Print Notes to read as follows:

830.179(A)(1)

FPN No. 1: One method of determining that the cable is resistant to the spread of fire is the UL Flame Exposure, Vertical Tray Flame Test in UL1685-2000 *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables.*

Another method of determining that the cable is resistant to the spread of fire is the "Vertical Flame Test - Cables in Cable Trays," in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables*.

FPN No. 2: One method of determining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is ANSI/UL 1666-2002, *Standard Test for Flame Propagation Height of Electrical and Optical-Fiber Cable Installed Vertically in Shafts*.

830.179(A)(2)

FPN No. 1: One method of determining that the cable is resistant to flame spread is the VW-1 (vertical-wire) flame test in ANSI/UL 1581-2001, *Reference Standard for Electrical Wires, Cables and Flexible Cords.*

FPN No. 2: One method of determining that the cable is resistant to the spread of fire is the UL Flame Exposure, Vertical Tray Flame Test in UL1685-2000 *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables.*

FPN No. 3: One method of determining fire-resistant characteristics capable of preventing the carrying of fire from floor to floor is ANSI/UL 1666-2002, *Standard Test for Flame Propagation Height of Electrical and Optical-Fiber Cable Installed Vertically in Shafts.*

FPN No. 4: One method of determining that the cable has fire-resistant and low-smoke-producing characteristics is NFPA 262-2002, *Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces*.
Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The FPNs in the Proposal define the damage, specify performance requirements, and include mandatory language by requiring that the cable be tested to a particular standard or pass the requirements of a particular test. The revised wording provides explanatory information without any requirements.

830.179(A)(1) FPN No. 1 – In accordance with the Panel action to Accept Proposal 16-416, the number, title, and the date of the latest edition of the UL 1685 standard were corrected to reflect the current applicable standard; the title of the reference within the CSA standard was corrected and the date of the CSA standard was updated. This Comment also incorporates my Comments on Proposals 16-416 and 16-417.

In 830.179(A)(2): FPN No. 1 – the date was updated. FPN No. 2 – the UL standard was corrected from UL1584 to UL 1581 and then updated to UL 1685 to incorporate the current effective standard as explained in Accepted Proposal 16-416.
Panel Meeting Action: Hold
Panel Statement: The proposal was editorial, seeking no changes to the fine print note. A technical change in the fine print note would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-318 Log #2301 NEC-P16 **Final Action: Hold**
(830.179(A) FPN No. 1)

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-416
Recommendation: The Panel Action should have been to Accept in Principle and reword FPN No. 1 to read:

FPN: One method of determining that the cable is resistant to the spread of fire is the UL Flame Exposure, Vertical Tray Flame Test in UL1685-2000 *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables.*

Another method of determining that the cable is resistant to the spread of fire is the "Vertical Flame Test - Cables in Cable Trays," in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables.*
Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The Proposal as submitted defines the damage and specifies performance requirements.

The sentence "The smoke measurements in the test method are not applicable." is mandatory language.
Panel Meeting Action: Hold
Panel Statement: A technical change in the fine print note as proposed in this comment would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

16-319 Log #2302 NEC-P16 **Final Action: Hold**
(830.179(A)(2), FPN No. 2)

TCC Action: The Technical Correlating Committee understands that the panel action was to Hold the Comment only.
Submitter: James Daly, Upper Saddle River, NJ
Comment on Proposal No: 16-417
Recommendation: The Panel Action should be to continue to Accept in Principle, however, FPN No. 2 should be reworded to read:

FPN No. 2: One method of determining that the cable is resistant to the spread of fire is the UL Flame Exposure, Vertical Tray Flame Test in UL1685-2000 *Standard for Safety for Vertical-Tray Fire-Propagation and Smoke-Release Test for Electrical and Optical-Fiber Cables*.

Another method of determining that the cable is resistant to the spread of fire is the "Vertical Flame Test - Cables in Cable Trays," in CSA C22.2 No. 0.3-M-2001, *Test Methods for Electrical Wires and Cables.*
Substantiation: 3.1.3 of the NEC Style Manual stipulates that "Fine print notes contain explanatory information. They shall not contain requirements and shall not be written in mandatory language."

The Proposal as submitted defines the damage and specifies performance requirements.

The sentence "The smoke measurements in the test method are not applicable." is mandatory language.
Panel Meeting Action: Hold
Panel Statement: A technical change in the fine print note as proposed in this comment would be new material that has not had public review.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

TABLES

8-87 Log #525 NEC-P08 **Final Action: Accept**
(Chapter 9, Table 1)

Submitter: Dan Leaf, Seneca, SC
Comment on Proposal No: 8-200
Recommendation: Accept as revised:

A multiconductor cable or flexible cord of two or more conductors shall be treated as a single conductor for calculating ~~conduit~~ raceway fill.
Substantiation: Where cords are permitted or not prohibited in raceways other than conduit, this rule should also apply.
Panel Meeting Action: Accept
Number Eligible to Vote: 12
Ballot Results: Affirmative: 9 Negative: 3

Explanation of Negative:

DABE, J.: The panel should have rejected this proposal and comment. The Submitter has not supplied any technical substantiation supporting this change.

DWIGHT, J.: The action taken should have been to reject this comment and the panel should not have changed "conduit fill" to "raceway fill" in Note 9, Chapter 9, Table 1.

Table 1 clearly applies to conduit and tubing and in every place in this section the term "conduit" and not "raceway" is used, with a single exception FPN No. 2 which likely is an error.

Changing Note 9 to "raceway" will mislead users and lead to possible misinterpretation and confusion in the field.

Finally, the original ROP 8-200 was to add flexible cords to Note (9). The ROC substantiation implies that the addition of flexible cords to this note should broaden the applicability to all raceways, a conclusion that is not justified by the substantiation provided.

GRIFFITH, M.: Panel action should have been to "Reject" this comment rather than "Accept". Upon close examination of Table 1 in Chapter 9, it is apparent that the table applies to conduit (only) and not raceways in general. Note 9, therefore, should not be changed from how it now reads.

Comment on Affirmative:

BURNS, J.: I recognize the concerns of Mr. Dabe, Mr. Dwight, and Mr. Griffith for not accepting the panel action on Comment 8-87, however, Article 100 does not define "Conduit", but does define "Raceway."

There are also other areas of the NEC that use the term "raceway" and would imply conduit; such as Table 310.15(B)(2)(a). Therefore, the panel action was correct, and I continue to vote Affirmative on the panel action.

8-88 Log #1383 NEC-P08 **Final Action: Accept**
(Chapter 9, Table 4)

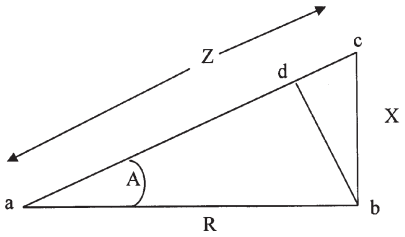
Submitter: William Wagner, Certification Solutions
Comment on Proposal No: 8-204a
Recommendation: This Proposal should continue to be Accepted as proposed.
Substantiation: The panel's statement indicated that it disagreed with the substantiation provided for Proposal 8-204a, which indicated that HDPE is RNC. However, prior to the separation of Article 352 for the 2005 and 2008 editions of the NEC, Type PVC, Type HDPE, and Type RTRC were each included in Article 352 as "Rigid Nonmetallic Conduit: Type RNC." Type HDPE was first covered as a Rigid Nonmetallic Conduit in Article 347 of the 1993 NEC. Therefore, I do not believe that the panel's statement on this issue is correct.
Panel Meeting Action: Accept
Panel Statement: The panel does not necessarily agree with all points of the submitter's substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

6-72 Log #2011 NEC-P06 **Final Action: Reject**
(Chapter 9, Table 9)

Submitter: Noel Williams, Herriman, UT
Comment on Proposal No: 6-102
Recommendation: This Proposal should have been Accepted and the table should be deleted or moved to an annex where material for "informational purposes" should be located.
Substantiation: There is no rule stated in Table 9. Additionally, there is no reference anywhere in the 9 Chapters of the NEC that refers to Table 9. In the absence of any reference in rule, it is difficult to get to Table 9 under any requirement of the Code. Therefore, it appears that this table belongs in an Annex. According to the notes of Table 9, it does provide a way to approximate line-to-neutral voltage drop, but only under the specified conditions, and unlike Table 8, it does not include any method of correcting for other temperatures or other power factors, which limits it only to estimations, not to comply with any required mathematical calculation. Also, there are only two requirements (FPNs are not requirements) in the NEC that relate to voltage drop. This table could, perhaps be useful for such calculations in Article 647, but there is no reference there, and no reason to assume that Table 9 would provide the best or even an appropriate method for calculating voltage drop for Article 647. Line-to-neutral voltage drop is not the issue in Article 695, the only other place where there is an actual voltage drop requirement. The panel statement was not helpful. The panel made the assertion that the table is used for "various mathematical calculations required throughout the code" without providing one piece of evidence to support that assertion.
Panel Meeting Action: Reject
Panel Statement: The panel reaffirms the panel statement in Proposal 6-102. The information contained in Table 9 is used to perform various mathematical calculations required throughout the Code. This table may be used for voltage drop calculations for fire pumps and is more easily found with the other tables.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-73 Log #881 NEC-P06 **Final Action: Reject**
(Chapter 9, Table 9)

Submitter: Arturo Moliha-Cahalet, Sta. Catariha, NL
Comment on Proposal No: 6-101
Recommendation: In formula Z = RCOS0+XSEN0
~~0 is the power factor angle~~
but 0 is Tan-1 (X/R)
OBJECTIVE
To show that in the formula **Z = (RCOSØ+XSENØ)**
Ø is not COS-1(P.F.) but Ø Tan-1 (X\R)
CONSIDERATIONS:
The impedance Z represent the vectorial summ of R and X where R and X are 90' desphased forming a rectangle triangle.



If we draw. A line from point b perpendicular to line ac on point d
Impedance (Z) is equal the summ of line ad and line dc
if ad= RcosØ and dc = XsenØ
Then Z = RcosØ+ xsenØ When **Ø = Tan-1 (X\R)** **Important!**
I think the confusión Ø=Cos PF instead Ø=Tan-1 (X\R
Started by using Ø instead another letter to name the angle, because Ø normally is used to mention the power factor of a Load.
Substantiation: POINTS TO PONDER DURING Z CALCULATIONS
1. Impedance ever should be higher than X or than R
2. Impedance doesnt change with the power factor of load
3. Impedance depends only from resistance and physical disposition of conductors

EXAMPLE OF CALCULATION

Impedance of cables 4\0 Aluminum in PVC ducts
*By revised method
R = 0.203
X = 0.135
X/R=0.665
A = Tan-1(X\R) = 0.586 rad
Cos A =0.832
Sen A = .553
Z = RCosA + X SenA =(,203*.832)+(.135*.553)= 0.168 + 0.074 = 0.242 Ohm/km
By Pithágoras Theorem
Z= raiz (R2 + X2) = raiz (.203*.203) + (.135* .135)= Raiz(0.041+0.018) = 0.242
Ohm/Km
Conclusión: Revised method is correct
Note: Supporting material is available for review at NFPA Headquarters.
Panel Meeting Action: Reject
Panel Statement: The power factor of the load is the proper variable for voltage drop calculations, and theta is the angle of the impedence to the load.
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

ANNEX A

1-115 Log #838 NEC-P01 **Final Action: Accept in Principle (Annex A)**

Submitter: Jim Pauley, Square D Company
Comment on Proposal No: 1-169
Recommendation: Reject the addition of UL 60947-1 to the product standards list. (Item 5 in the proposal recommendation)
Substantiation: This standard is a set of general rules applicable to industrial control equipment only. However, it is a horizontal standard that must be used in conjunction with other standards in the 60947 series (e.g. 60947-5-1). None of these other standards have been added to the list. As such, it is inappropriate to add the horizontal standard because it has no application and is misleading to indicate that a listing can be completed to that standard only.

In addition, although the title proposed for this standard reflects the title used by UL, it is misleading in this context. The title is Low-Voltage Switchgear and Controlgear. However, the UL adoption is for control products only. Since the list in Annex A does not have (and wasn't intended to have) a cross reference to specific NEC sections, the title implies that the standard is used for LV switchgear as well. This, of course, is incorrect.
Panel Meeting Action: Accept in Principle

The panel replaces the reference to "UL 60947-1" with "UL 60947-4-1, Electromechanical Contactors and Motor-Starters".
Panel Statement: The submitter is correct that UL 60947-1 is a horizontal standard, containing requirements that are applicable to a broad range of switchgear and controlgear. UL 60947-1 itself is not used alone to list equipment. As is the case with many standards harmonized with IEC standards, UL 60947-1 is supplemented by many daughter standards that apply to specific product types and include inherent references to the applicable requirements of UL 60947-1. One of these daughter standards, UL 60947-4-1, Electromechanical Contactors and Motor-Starters has a very specific scope that is relevant for users of the Code and is a valid alternative for UL 508, which is referenced in Annex A.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ANNEX G ADMINISTRATION AND ENFORCEMENT

20-17a Log #CC2005 NEC-P20 **Final Action: Accept (Annex G)**

TCC Action: The Technical Correlating Committee directs that the following text be added to Annex G, after the title, to read as follows:

"This annex is not a part of the requirements of this NFPA document, but is included for informational purposes only."

The Technical Correlating Committee directs that a new FPN No. 7 be added to the Scope of the Article that reads:

"FPN No. 7: See Annex G for information on Supervisory Control and Data Acquisition".
Submitter: Code-Making Panel 20,
Comment on Proposal No: 20-1
Recommendation: Place the text on testing and maintenance of SCADA systems shown in 585.6(F) of Proposal 20-1 (page 70-616 in the Report on Proposals) in Annex I as shown in the panel meeting action on Proposal 20-1 (page 70-624 in the Report on Proposals). The text will be identified as 585.60(D) in Annex I. The text is as follows:
(D) Maintenance and Testing. SCADA systems shall be maintained and tested in accordance with 585.60(D)(1) and 585.60(D)(2)
(1) Maintenance. The maintenance program for SCADA systems shall consist of the following components:
(1) Shall have a documented Preventive Maintenance program.
(2) Shall have concurrent maintenance capabilities, so that the testing, troubleshooting, repair, and/or replacement of a component or subsystem while redundant component(s) or subsystem(s) are serving the load.
(3) Operational data shall be retained – the deleted material goes well beyond requirements to ensure proper maintenance and operation.
(2) Testing. SCADA systems shall be tested periodically under actual or simulated contingency conditions.
FPN No. 1: Periodic system testing procedures can duplicate or be derived from the recommended functional performance testing procedures of individual components, as provided by the manufacturers.
FPN No. 2: For more information on Maintenance and Testing of SCADA, see NFPA 70B-2002, Recommended Practice for Electrical Equipment Maintenance.
Substantiation: The text was deleted from 585.6(F) in the panel meeting action and was supposed to be relocated to the informational Annex I covering SCADA systems as shown in the panel meeting action on Proposal 20-1. This comment corrects that inadvertent ommission.
Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16