AGENDA

NEC Code-Making Panel  1

Report on Comment Meeting

November 28-December 1, 2012

Redondo Beach, CA

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-11-1</td>
<td>Call to Order</td>
</tr>
<tr>
<td>12-11-2</td>
<td>Introduction of Members and Guests</td>
</tr>
<tr>
<td>12-11-3</td>
<td>Review of Meeting Procedures and Revision Schedule</td>
</tr>
<tr>
<td>12-11-4</td>
<td>Approval of ROP Meeting Minutes</td>
</tr>
<tr>
<td>12-11-5</td>
<td>Task Group Reports (if any)</td>
</tr>
<tr>
<td>12-11-6</td>
<td>Processing of Comments</td>
</tr>
<tr>
<td>12-11-7</td>
<td>Fire Protection Research Foundation Requests</td>
</tr>
<tr>
<td>12-11-8</td>
<td>Old Business</td>
</tr>
<tr>
<td>12-11-9</td>
<td>New Business</td>
</tr>
<tr>
<td>12-11-10</td>
<td>Adjournment</td>
</tr>
</tbody>
</table>
NATIONAL ELECTRICAL CODE
CODE-MAKING PANEL 1

Report on Proposals Meeting

Minutes

1. List date(s) and location of meeting:
   1/12 - 14, 2012, Crowne Plaza Resort, Hilton Head, SC

2. List names of TC members and guests in attendance (or attach sign-in sheets):
   See Attached

3. List names of guests addressing the Panel (if any), the subject of their address, and the length of time they spoke:
   James T. Dollard, Jr., Proposal 1-70, 2 Minutes
   Vincent J. Saporita, Proposal 1-88, 2 Minutes
   Ed Larsen, Proposal 1-88, 3 Minutes
   James T. Dollard, Jr., Proposal 1-109, 4 Minutes
   L. Keith Lofland, Proposal 1-109, 2 Minutes
   Michael J. Johnston Proposal 1-114, 2 Minutes
   L. Keith Lofland, Proposal 1-114, 1 Minute
   Vincent J. Saporita, Proposal 1-131, 2 Minutes
   Ed Larsen, Proposal 1-131, 2 Minutes
   James T. Dollard, Jr., Proposal 1-143, 1 Minute
   Vincent J. Saporita, Proposal CP101, 2 Minutes
   Ed Larsen, Proposal CP101, 2 Minutes
   Mark R. Hilbert, Proposal CP102, 2 Minutes

4. Number of public proposals acted upon: 198

5. Number of Panel generated proposals: 3

6. If applicable, list the appointment of any Task Groups that will be working on any Panel subject subsequent to the Panel Meeting, along with the names of the members of the Task Group(s).
   NA

7. If applicable, list any request(s) contained in a Panel Statement that requires Technical Correlating Committee attention:
   Proposal 1-191a Panel 1 requests that the Technical Correlating Committee appoint a task group to include this Informational Note in the appropriate sections of the NEC, where equipment is installed subject to ADA Standards for Accessible Design.
8. If applicable, list any Panel Actions that, in your opinion, should to be referred to another Panel(s) for correlation:

The panel requests the TCC refer the following proposals to other Panels for comment or information:

<table>
<thead>
<tr>
<th>Proposal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-85</td>
<td>The panel requests the TCC refer this proposal to CMP 8 for information</td>
</tr>
<tr>
<td>1-131</td>
<td>The panel requests the TCC refer this proposal to CMP 2 and CMP 18 for information</td>
</tr>
<tr>
<td>1-150</td>
<td>The panel requests the TCC refer this proposal to CMP 13 for information</td>
</tr>
<tr>
<td>1-167</td>
<td>The panel requests the TCC refer this proposal to CMP 19 for information</td>
</tr>
<tr>
<td>1-28</td>
<td>The panel requests the TCC refer this proposal to CMP’s-9, 8, 18, 11, 14, 3, and 16 for information</td>
</tr>
<tr>
<td>1-53</td>
<td>The panel requests the TCC refer this proposal to CMP 3 for information</td>
</tr>
<tr>
<td>1-62</td>
<td>The panel requests the TCC refer this proposal to CMP 9 for information</td>
</tr>
<tr>
<td>1-69</td>
<td>The panel requests the TCC review this proposal relative to its use throughout the code.</td>
</tr>
<tr>
<td>1-72</td>
<td>The panel recognizes that &quot;scope&quot; is the responsibility of the TCC and requests approval of these changes.</td>
</tr>
<tr>
<td>1-73</td>
<td>The panel requests the TCC refer this proposal to CMP-5 for information</td>
</tr>
<tr>
<td>1-85</td>
<td>The panel requests the TCC refer this proposal to CMP-8 for information</td>
</tr>
<tr>
<td>1-131</td>
<td>The panel requests that the TCC refer this proposal to CMP-2, CMP-3, CMP-19 and CMP-18 for comment.</td>
</tr>
<tr>
<td>1-149</td>
<td>The Panel requests the Technical Correlating Committee forward this proposal to Panel 13 for information.</td>
</tr>
<tr>
<td>1-156</td>
<td>The Panel requests the Technical Correlating Committee forward this proposal to Panel 13 for information.</td>
</tr>
<tr>
<td>1-167</td>
<td>The panel requests that the TCC refer this proposal to CMP-9 for information</td>
</tr>
<tr>
<td>1-178</td>
<td>The Panel requests the Technical Correlating Committee refer this proposal to the Usability Task Group for information.</td>
</tr>
<tr>
<td>1-179</td>
<td>The panel requests that the TCC refer this proposal to CMP-4 for information.</td>
</tr>
<tr>
<td>1-184</td>
<td>The panel requests that the TCC refer this proposal to CMP-6 for information relative to bending space in 314.28.</td>
</tr>
</tbody>
</table>

9. List any Proposals that should be referred to the Toxicity Advisory Committee:

NA
10. Identify any issues that should be brought to the attention of the NFPA Research Foundation for their input and assistance:

   NA

11. List all Proposals related to combustibles in plenums or other air handling spaces:

   NA

12. List any general Panel requests for information or assistance from the Technical Correlating Committee:

   NA

13. List any additional information that you feel would be helpful to the Technical Correlating Committee, Staff, or to the process in general:

   NA

14. Were any units of measure "Accepted" by the panel that are not listed in Annex C of the NEC Style Manual? If so, please list the section number(s) and proposal number(s) below:

   NA

   Gil Moniz
   Name (Please Print)

   January 28, 2012
   Date
# NEC ROP Meeting
**Hilton Head, SC\** 
**January 12-14, 2012**

**Sign-In Sheet**
**Code-Making Panel 1**

<table>
<thead>
<tr>
<th>Name</th>
<th>Office</th>
<th>Organization</th>
<th>Signature</th>
<th>Staying at hotel</th>
<th>Days</th>
</tr>
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<tbody>
<tr>
<td>Moniz, Gil</td>
<td>Chair</td>
<td>National Electrical Manufacturers</td>
<td></td>
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<tr>
<td>Anthony, Michael</td>
<td>Principal</td>
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<tr>
<td>Barrios, Louis</td>
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<td>American Chemistry Council</td>
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<tr>
<td>Boyce, Kenneth</td>
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<tr>
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<tr>
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<td>McCarver, Randall</td>
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<tr>
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</table>

Date: December 29, 2011
## Sign-In Sheet

**Code-Making Panel 1**

**NEC ROP Meeting**  
Hilton Head, SC  
January 12-14, 2012

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<th>Days</th>
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<tr>
<td>Sood, Mohinder</td>
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<td>International Association of Electrical</td>
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<td>✓ ✓ ✓ ✓</td>
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<tr>
<td>Tsisserev, Ark</td>
<td>Nonvoting Member</td>
<td>CSA/Canadian Electrical Code Committee</td>
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<td>✓ ✓</td>
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<tr>
<td>Earley, Mark</td>
<td>Staff Liaison</td>
<td>National Fire Protection Association</td>
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### Guests:

<table>
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<tr>
<th>Name</th>
<th>Office</th>
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<tr>
<td>David Clements</td>
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<tr>
<td>Bill Burke</td>
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<tr>
<td>Steve Fez</td>
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<td>Rob Fowter</td>
<td></td>
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<tr>
<td>Todd West</td>
<td></td>
<td>NEMA/Schneider Electric</td>
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<td>Mike Johnston</td>
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<td>NECA</td>
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<td>Keith Lopand</td>
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<td>Matt Connoly</td>
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<td>EP Larsen</td>
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<td>James Oakland</td>
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<tr>
<td>T. David Mills</td>
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<tr>
<td>Vince Saporita</td>
<td></td>
<td>Cooper Bosswaiss</td>
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<tr>
<td>Paul Dabrowski</td>
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<td>Innovative Technology Society</td>
<td>[Signature]</td>
<td>yes</td>
<td>x</td>
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**December 29, 2011**

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<table>
<thead>
<tr>
<th>Name</th>
<th>Guests: Name</th>
<th>Organization</th>
<th>Days Staying at Hotel</th>
<th>Signature</th>
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<tbody>
<tr>
<td>Mark Early</td>
<td>Christel Hunter</td>
<td>National Fire Protection Association</td>
<td>1 2 3 4 5</td>
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<tr>
<td>BRIAN F. ROY</td>
<td></td>
<td>HUBBELL INCORPORATED</td>
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<td>MORT TURTLE</td>
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<td>National Fire Protection Association</td>
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<tr>
<td>Matt Cannavale</td>
<td></td>
<td>NFPA</td>
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- Staying at hotel: 1 (X), 2 (X)

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December 29, 2011
<table>
<thead>
<tr>
<th>Log #</th>
<th>NEC-P01</th>
<th>Final Action:</th>
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<tbody>
<tr>
<td>1-1</td>
<td>Log #1239</td>
<td>Final Action:</td>
</tr>
<tr>
<td></td>
<td>(90.1(C))</td>
<td></td>
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<tr>
<td>Submitter: John Masarick, Independent Electrical Contractors, Inc.</td>
<td></td>
<td></td>
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<tr>
<td>Comment on Proposal No: 1-3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommendation: I support the panel action and request the panel maintain their position.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Panels Action: Delete 90.1(C) in its entirety and revise 90.1(A) as follows: (A) Practical Safeguarding Purpose. The purpose of this Code is the practical safeguarding of persons and property from hazards arising from the use of electricity. This Code is not intended as a design specification or an instruction manual for untrained persons.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substantiation: The introduction of the code should be positive yet not contain regulations.</td>
<td></td>
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<tr>
<td>1-2</td>
<td>Log #1335</td>
<td>Final Action:</td>
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<tr>
<td></td>
<td>(90.2(A)(5))</td>
<td></td>
</tr>
<tr>
<td>Submitter: Paul Dobrowsky, Holley, NY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comment on Proposal No: 1-5</td>
<td></td>
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</tr>
<tr>
<td>Recommendation: Accept the proposal in principle and add a definition of Premises as follows:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premises. Property consisting of land, with or without buildings or structures.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substantiation: During discussions it appeared that different opinions exist regarding whether land without a building or structure would be considered a premises. Section 90.2(A)(1) uses the word &quot;premises&quot; including &quot;buildings, structures, etc. If the term conductor is removed from the definition of &quot;device&quot; and a change for the 2011 NEC removed the word &quot;material&quot; from the definition of &quot;equipment&quot; it is now unclear if conductors are considered equipment. If a property does not have buildings or structures, but does have wiring and &quot;equipment&quot; does the NEC apply? Adding this definition will provide clarity that the NEC applies to property as stated in 90.1(A) that has no buildings or structures but has &quot;wiring&quot;. A panel statement indicating if this position it true would be helpful.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3</td>
<td>Log #289</td>
<td>Final Action:</td>
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<tr>
<td></td>
<td>(90.2(B)(1), Informational Note 2 (New) )</td>
<td></td>
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<tr>
<td>Submitter: Robert C. DeLucia, Electrical Inspector</td>
<td></td>
<td></td>
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<tr>
<td>Comment on Proposal No: 1-8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Recommendation: Add an Informational Note as follows:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Informational Note No. 2: See Article 625 for the installation of equipment and devices related to electric vehicle charging.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substantiation: This Public Comment alerts the user as to the requirements necessary for the electric (automotive) vehicle and brings correlation between 90.2(B)(1) and Article 625.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-4</td>
<td>Log #1240</td>
<td>Final Action:</td>
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<tr>
<td></td>
<td>(90.2(B)(5))</td>
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<tr>
<td>Comment on Proposal No: 1-11</td>
<td></td>
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<tr>
<td>Recommendation: I support the action taken by the panel and wish the panel to maintain their position.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substantiation: Utilization equipment and premises wiring comes under the control of the NEC. The utility distribution system is covered by the NESC, Article 90.2(B)(5)(c) of the NEC should reiterate that the NEC does not cover supply wiring by other written agreements under the conditions of this article.</td>
<td></td>
<td></td>
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</table>
Submittor: Louis Barrios, Shell Global Solutions

Comment on Proposal No: 1-9

Recommendation: The committee action should have been Accept in Principle and modify the text so that it is identical to NFPA 70E-2012.

Substantiation: During the 2012 revision cycle of NFPA 70E, the committee changed the order of 90.2(B)(5) and modified the language in 90.2(B)(5)(b). The content of 90.2(B)(5) in NFPA 70E and the NEC should match.
Original proposal

(6) Installations of utility scale PV systems under the exclusive control of an electric public or private utility or independent power producer, located outdoors or in a building space used exclusively for such installations. Installations must be on property owned or leased by the electric public or private utility or independent power producer, for the purpose of communications, metering, generation, control, transformation, transmission or distribution of electric energy.

Add informational note describing utility scale PV installations as:

– Are of the “free field” or “ground mounted” variety. The PV modules are installed in large open spaces and not on roofs of residential, commercial or industrial structures whose primary purpose are for activities other than strictly supporting the PV modules.
– The Point of Interconnection or Point of Common Coupling between the PV system and the Utility is at voltage level at or greater than 12 kV.
– The Point of Interconnection or Point of Common Coupling between the PV system and the Utility is through dedicated electrical switchgear, substation, switchyard or similar methods whose sole purpose is to safely and effectively interconnect the two systems. Any electrical loads connected to said electrical equipment are only used for power of auxiliary equipment vital to the generation of the PV power.
– The access to the power plants is only by Qualified Personnel.
– The access to the power plants by the general public is restricted by a continuous locked fencing system consisting of a minimum height of six feet above ground.

Substantiation: Additional Clarification of Proposal 2933 NEC-P01

We are requesting the clear exclusion of utility scale PV (defined below) from the NEC in order to prevent the erroneous interpretation, on the part of AHJs to apply NEC requirements to utility scale PV installations rather than the appropriate NESC code requirements. Inclusion of section 690 (PV Systems) in the NEC could lead an AHJ to the conclusion that all PV systems are within the scope of the NEC when in fact only PV systems that fall under the scope defined in 90.2 are within the jurisdiction of the NEC.

The only other renewable energy source covered by NEC is “Small Wind Power” which is defined as “Wind (turbine) electric systems that consist of one or more wind electric generators with individual generators having up to and including 100 kW”. Therefore, precedence has been set to define a size limitation after-which the NEC does not have jurisdiction over power generation systems.

Specific Response to NEC CMB Statements:

• Regardless of technology, equipment under the exclusive control of an electric utility that is presently addressed by 90.2(B)(5) is already excluded from the scope of the NEC.
  — First Solar Response – Agree

• Independent Power Producer (IPP) systems are utility interactive systems not under the exclusive control of a utility.
  — First Solar Response – Rather than “IPP” the term “Private Utility” should have been used in the proposal. Wording has been revised in the suggested new wording above.
  — Section 2 of the 2012 NESC defines utilities as “An organization responsible for the engineering and supervision (design, construction, operation, and maintenance) of a public or private supply, communicating, area lighting, street lighting, signal or railroad utility system.” And defines a private utility as “an entity that performs or provides one or more utility services to its own facilities…and/or (b) generates or transmits power that is delivered to another utility.”
  — NESC also defines a Generating Station as – “A plant wherein electrical energy is produced by conversion from
some other form of energy, (e.g., chemical, nuclear, solar, mechanical, or hydraulic) by means of suitable apparatus. This includes all generating station auxiliaries and other associated equipment required for the operation of the plant. Not included are stations producing power exclusively for use with communications systems.

- The submitter’s contention that “there are no differences in the design, construction or operation of utility and nonutility systems” has not been substantiated.
  — First Solar Response – A clear definition of “Utility Scale PV Power Plant” has been provided
  – Are of the “free field” or “ground mounted” variety. The PV modules are installed in large open spaces and not on roofs of residential, commercial or industrial structures whose primary purpose are for activities other than strictly supporting the PV modules.
  – The Point of Interconnection or Point of Common Coupling between the PV system and the Utility is at voltage level at or greater than 12 kV.
  – The Point of Interconnection or Point of Common Coupling between the PV system and the Utility is through dedicated electrical switchgear, substation, switchyard or similar methods whose sole purpose is to safely and effectively interconnect the two systems. Any electrical loads connected to said electrical equipment are only used for power of auxiliary equipment vital to the generation of the PV power.
  – The access to the power plants is only by Qualified Personnel.
  – The access to the power plants by the general public is restricted by a continuous locked fencing system consisting of a minimum height of six feet above ground.

- Electric utilities are subjected to specific regulations and utilize other specific installation code requirements that have not been addressed by the proposal, and systems owned and operated by a utility are serviced and maintained by qualified personnel
  — First Solar Response - Agreed, utilities are subject to NESC which is the appropriate Code for electricity generation.
  – Section 011(8). (Scope) of the 2012 NESC states that the code covers “similar systems to those listed above that are under the exclusive control of qualified persons, and authorized by a regulating or controlling body, including those associated with an industrial complex or utility interactive system.”
  – Section 2 of the 2012 NESC defines utilities as “An organization responsible for the engineering and supervision (design, construction, operation, and maintenance) of a public or private supply, communicating, area lighting, street lighting, signal or railroad utility system.” And defines a private utility as “an entity that performs or provides one or more utility services to its own facilities… and/or (b) generates or transmits power that is delivered to another utility.”

- While the substantiation states that all utility grade sites limit access, there is nothing in this proposal to say that these are limited to “utility grade sites”, what such a site is, or that access is limited.
  — First Solar Response – A clear definition of “Utility Scale PV Power Plant” has been provided above.
1-7 Log #5 NEC-P01
(90.2(C))

Final Action:

Submitter: David L. Hittinger, Independent Electrical Contractors of Greater Cincinnati
Comment on Proposal No: 1-15
Recommendation: Revise text to read as follows:

(C) Special Permission. The authority having jurisdiction for enforcing this Code may grant exception for the installation of conductors and equipment that are not under the exclusive control of the electric utilities and are used to connect the electric utility supply system to the service conductors of the premises served; provided such installations are outside a building or structure, or terminate inside nearest the point of entrance of the service conductors:

By special permission, the authority having jurisdiction may waive specific requirements in this Code or permit alternative methods where it is assured that equivalent objectives can be achieved by establishing and maintaining effective safety.

Substantiation: See Proposal 1-15 in the submitter's substantiation that refers to applying 90.4. Revising 90.2(C) to mirror the second paragraph of 90.4 clarifies the intent of what “special permission” is in the Scope of the NEC. The current text is confusing as it reiterates what is not covered in 90.2(B). Revising the Scope to the exact wording found in 90.4 simplifies the Scope and the intent.

1-8 Log #994 NEC-P01
(90.8(B))

Final Action:

Submitter: James F. Williams, Fairmont, WV
Comment on Proposal No:
Recommendation: Revise text to read as follows:

90.8 Wiring Planning.

(B) Number of Circuits in Enclosures. It is elsewhere provided in this Code that the number of wires and circuits confined in a single enclosure be varying restricted. The number of wires and circuits in a single enclosure is restricted in various ways in other Articles of this Code. Limiting the number of circuits in a single enclosure minimizes the effects from a short circuit or ground fault.

Substantiation: 90.8(B) revise first sentence for lucidity:
Revise the existing text of the 2011 NEC as follows:

90.9 Units of Measurement.

(A) Measurement System of Preference. Except as provided in (E), (F) and (G), for the purpose of this Code, metric units of measurement shall be in accordance with the modernized metric system known as the International System of Units (SI).

(B) Preference Dual System of Units. SI units shall appear first, and inch-pound units shall immediately follow in parentheses. Conversion from inch-pound units to SI units shall be based on hard conversion except as provided in 90.9(C).

(C) Hard Conversion. Conversion from inch-pound units to SI units shall be based on hard conversion except as provided in (D), (E), (F), and (G).

(D) Permitted Uses of Soft Conversion. Where a negative impact on safety would result, soft conversion shall be used.

The cases given in 90.9(G)(1) through (G)(4) shall not be required to use hard conversion and shall be permitted to use soft conversion.

(E)(1) Trade Sizes. Where the actual measured size of a product is not the same as the nominal size, trade size designators shall be used rather than dimensions. Trade practices shall be followed in all cases.

(E)(2) Extracted Material. Where material is extracted from another standard, the context of the original material shall not be compromised or violated. Any editing of the extracted text shall be confined to making the style consistent with that of the NEC.

(G) Industry Practice. Where industry practice is to express units in inch-pound units, the inclusion of SI units shall not be required.

(F) Safety. Where a negative impact on safety would result, soft conversion shall be used.

The section will then read as follows:

90.9 Units of Measurement.

(A) Measurement System of Preference. Except as provided in (E), (F) and (G), metric units of measurement shall be in accordance with the modernized metric system known as the International System of Units (SI).

(B) Preference. SI units shall appear first, and inch-pound units shall immediately follow in parentheses.

(C) Hard Conversion. Conversion from inch-pound units to SI units shall be based on hard conversion except as provided in (D), (E), (F), and (G).

(D) Soft Conversion. If a negative impact on safety would result, soft conversion shall be used.

(E) Trade Sizes. Where the actual measured size of a product is not the same as the nominal size, trade size designators shall be used rather than dimensions. Trade practices shall be followed in all cases.

(F) Extracted Material. Where material is extracted from another standard, the context of the original material shall not be compromised or violated. Any editing of the extracted text shall be confined to making the style consistent with that of the NEC.

(G) Industry Practice. Where industry practice is to express units in inch-pound units, the inclusion of SI units shall not be required.

Substantiation: This proposal and comment do not introduce any new material but make improvement in the format and arrangement of the requirements or provisions. Problems with the existing arrangements that are corrected in this proposed re-write include:

1. The requirement that conversion from inch-pound units to SI units shall be based on hard conversion except as provided in 90.9(C) is presently misplaced as a second sentence in (B). This is a major requirement that deserves to be in its own sub-section.

2. The existing subsection (C) is a permissive section stating that the examples shown in (C)(1) through (C)(4) are permitted use of soft conversion which is a more precise conversion than hard conversion. Problems that appear with this concept are as follows:

(a) (C)(1) refers to Trade Sizes and the rule allows Trade Sizes to be used without complying with either the Hard or Soft conversion. These common trade sizes including corresponding Metric Designators are shown in Table 300.1(C). The Informational Note states “Note: The metric designators and trade sizes are for identification purposes only and are not actual dimensions.” So, it is inappropriate for the dialog about Trade Sizes to be under the First Division label...
“Permitted Uses of Soft Conversion.” The proposal and Comment correct this mis-location.
(b) (C)(2) refers to Extracted Material or material that is extracted from usually another NFPA standard. The rule in (C)(2) requires “the context of the original material shall not be compromised or violated.” The rule does not indicate whether hard or soft conversion is to be used. The rule is presently mis-placed. This is corrected in the Proposal and Comment.
(c) The present (C)(3) refers to Industry Practice. It provides that if “industry practice is to express units in inch-pound units, the inclusion of SI units shall not be required.” This statement has nothing to do with Permitted Use of Soft Conversion and is presently misplaced. This is corrected in the Proposal and Comment.
(d) The present (C)(4) refers to “Safety.” Note that the title of (C) states (C)(1) through (C)(4) are permitted use of soft conversion. However, (C)(4) is a mandatory requirement to use Soft Conversion to avoid a negative impact on safety. This is corrected in the Proposal and Comment.

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1-10 Log #18 NEC-P01
(100 Scope and Part II)

Final Action:

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 1-72
Recommendation: The Correlating Committee advises that Article Scope statements are the responsibility of the Correlating Committee and the Correlating Committee Rejects the panel action.
   The Correlating Committee directs that the panel clarify the panel action on this proposal since the recommended text in this proposal, in the first paragraph of the proposed text, does not have a proposed destination and the second paragraph appears to be inserted into Part II of Article 100. However, it deals with under 600 volts as well as over 600 volts.
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.

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1-11 Log #393 NEC-P01
(100, Part I Scope)

Final Action:

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 1-70
Recommendation: Continue to reject the Proposal.
Substantiation: A review and comparison of the present text of Part I of Article 100 with OSHA 1926 shows the OSHA document breaks at 600 Volts. Changing the Scope of Article 100, Part I will create a conflict between the two documents causing voltages from 600 Volts to 1000 Volts to be in violation of OSHA requirements. In addition, a Note within the OSHA document states that “If the electrical installation is made in accordance with the National Electrical Code ANSI/NFPA 70-1984, exclusive of Formal Interpretations and Tentative Interim Amendments, it will be deemed to be in compliance with 1926.403 through 1926.408, except for 1926.404(b)(1) and 1926.405(a)(2)(ii)(E), (F), (G), and (J).” This would further conflict with the proposed text without significant amendment.

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1-12 Log #1241 NEC-P01
(100, Part II)

Final Action:

Submitter: John Masarick, Independent Electrical Contractors, Inc.
Comment on Proposal No: 1-70
Recommendation: Continue to reject this proposal which would change 600 volts to 1000 volts.
Substantiation: Replacing 600 volts with 1000 volts will have a major impact on installers, component manufacturers, and industry standards. Increased spacing must be considered when going from 600 volts to 1000 volts. Personal safety must also be considered.
Because the proposer has not provided enough information to the public to justify and understand all the ramifications of the proposal, the committee should continue to reject the submitter’s proposal.
Revise text to read as follows:

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

Substantiation: This is an editorial revision of Proposal 1-24. The need to use a tool to reach something for operation, renewal, or inspection may make it accessible, but not necessarily readily accessible as substantiated in Proposal 1-24. The need to use a tool, even one as simple as a screwdriver, would add another level of action that would impede or delay access.
Conductors, raceways, etc. installed under Chapter 3 methods.  

1) When a UPS supplies fixed wiring, each place the UPS supplied circuit(s) is accessible shall have a clearly legible marking in letters not less than 6 mm (¼ in.) high reading "UPS Supplied". The label shall comply with 110.21(B). 

2) When a control panel contains a UPS which supplies current to fixed wiring external to the control panel, the control panel shall have a clearly legible sign in letters not less than 6 mm (¼ in.) high reading "Caution this panel contains a UPS". The sign shall comply with 110.21(B). 

B Disconnecting Means. A disconnect meeting the requirements of 110.25 shall be installed for all output circuits from the UPS. Exception: The requirements 110.27 do not apply to areas meeting all the requirements of 645 Information Technology Equipment or 646 Modular Data Centers.

Substantiation: 90.1(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 recent introduction of fixed wiring in buildings fed from UPSs in other than Information Technology Equipment areas has introduced a new hazard. Until recently when you opened the main service disconnect for a building you would be able to assume that fixed wiring was no longer energized. APC and other manufacturers are selling UPS accessories for their products to facilitate connection to fixed wiring. (For example see http://www.apcmedia.com/salestools/A...8L95_R0_EN.pdf). This installation guide does not require an output disconnect.

The recent introduction of UPSs embedded in control panels which feed external fixed wiring presents a similar hazard. I have directly experienced a case of this sort. I was tasked to replace a shunt-trip 3-pole circuit breaker with trip alarm contacts. I opened all the circuits serving the control cabinet. I measured the voltages on the circuit breaker power connections, the shunt-trip, and the trip alarm contacts. I found that the shunt-trip circuit was de-energized, but that the trip alarm contact was still energized. I opened the control cabinet (not something I normally would do, because the cabinet and associated equipment were maintained under contract by a third-party). I found that a standalone style UPS like one might buy in a big box store was inside and its output was energizing the trip alarm contacts. I also confirmed that all external power to the control panel was indeed turned off.

I am proposing the addition of 110.27 and the associated 100 I Fixed Wiring additions to the NEC to warn electricians of these new hazards. I am suggesting the use of "UPS supplied" as labeling for receptacle outlet covers (and other covers) because it also serves as useful label for non-electrician users. The exception is proposed because those qualified personnel working in 645/646 areas are already expecting UPS supplied receptacles.

Basis for 100 Fixed Wiring Terms

akin to Fixed Wiring are used in:
220.14(H) Fixed Multioutlet Assemblies.
250.34(C)(3)<info note> Fixed wiring systems
393.6(B)(4) fixed wiring methods
400.8(1) fixed wiring method
411.3(B)(5) fixed wiring method
500.8(B)<info note> fixed wiring
501.140(A)(2) fixed wiring methods
505.17(A) fixed wiring methods
511.7(A)(1) fixed wiring
511.16(B)(2) fixed wiring system
513.7(A) fixed wiring
513.10(C)(1) fixed wiring
513.10(D)(1) fixed wiring
513.16(B)(2) fixed wiring system
515.7(A) fixed wiring
516.7(A) fixed wiring
517.61(A)(3) fixed wiring
518.4(A) fixed wiring methods
518.4(A)<except> fixed wiring methods
520.5(A) fixed wiring method
520.5(A)<except> fixed wiring methods
530.31 fixed wiring
550.19(A) fixed-type wiring methods
550.32(D) fixed wiring method
620.21(A)(2)(b) fixed wiring

Basis for UPS labeling
I posted a poll on forums.mikeholt.com/showthread.php?t=148012 which asked in essence “would you check for voltage at receptacles and switches after turning off and locking the service main?”. There were 26 responses to the poll, 5 said they would NOT check, basically 24%. Three who chose a testing method said they would not turn off main for various reasons. The poll was posted in the Safety forum to bias the answers towards testing.

Changing switches and receptacles
Let’s assume you’ve got a job that consists of changing the receptacles, switches, and cover plates throughout a house from ivory to almond. You ask why and the guy who hired you said it is a directive from "She Who Must Be Obeyed". They are going away for the week. So you show up and decide the simplest way to do this is to put on a head lamp and turn off the main breaker. You turn it off and padlock it.

View Poll Results: Now when you go to each box, what do you do?
Voters 21. This poll is closed
· test for voltage with a non-contact voltage stick 6 28.57%
· test using a wiggly 5 23.81%
· test using a Digital Volt Meter 5 23.81%
· test using a shorting plug (for receptacles) 0 0%
· test? are you crazy, the power is off! 5 23.81%

The response from CMP-1 limited itself to the original example (an elevator control panel, and not to the general cases supplied above). Panel Statement: The problem identified by the submitter relates to product design and marking rather than installation. In addition, the submitter is proposing specific requirements in the general section of the code which maybe more appropriate in other sections of the code. In sections such as 620.52(B), the submitter’s concerns are addressed.
Submitter: Marcelo M. Hirschler, GBH International
Comment on Proposal No: 1-52
Recommendation: Revise text to read as follows:

Location, Damp. Locations protected from weather and not subject to saturation with water or other liquids but subject to moderate degrees of moisture. Examples of such locations include partially protected locations under canopies, marquees, roofed open porches, and like locations, and interior locations subject to moderate degrees of moisture, such as some basements, some barns, and some cold-storage warehouses.

Informational Note: Examples of such locations include partially protected locations under canopies, marquees, roofed open porches, and like locations, and interior locations subject to moderate degrees of moisture, such as some basements, some barns, and some cold-storage warehouses.

Substantiation: I accept the concept that NEC definitions are not required to be in single sentences. However this definition contains a list of examples that is simply informational. The proposed changes eliminate the list and place it as information. If the CMP believes that this information is a requirement it should place it somewhere else, perhaps within an article addressing damp locations.

The NEC Manual of Style states as follows:

2.2.2 Definitions. Definitions shall be in alphabetical order and shall not contain the term that is being defined. Definitions shall not contain requirements or recommendations.

Submitter: David L. Hittinger, Independent Electrical Contractors of Greater Cincinnati
Comment on Proposal No: 1-66
Recommendation: Add text to read as follows:

Location, Wet. Installations underground or in concrete slabs or masonry in direct contact with the earth; in locations subject to saturation with water or other liquids, such as vehicle washing areas; and in unprotected locations exposed to weather.

Informational Note: See 314-15 which addresses boxes, conduit bodies and fittings installed in wet locations.

Substantiation: See Proposals 1-66 and 1-67 where the submitter has identified a situation where the informational note would increase awareness and usability in the Code. At the 2014 ROP Panel 1 discussed this issue and there appears to be a lack of understanding in the industry that fittings installed in a wet location are required to be raintight.
1-17  Log #1336  NEC-P01
(100.Premises (New) )

Submitter: Paul Dobrowsky, Holley, NY
Comment on Proposal No:  1-58
Recommendation: Accept the proposal in principle and add a definition of Premises as follows:
Premises. Property consisting of land, with or without buildings or structures
Substantiation: During discussions it appeared that different opinions exist regarding whether land without a building or structure would be considered a premises. Section 90.2(A)(1) uses the word "premises" including "buildings, structures, etc. If the term conductor is removed from the definition of "device" and a change for the 2011 NEC removed the word "material" from the definition of "equipment" it is now unclear if conductors are considered equipment. If a property does not have buildings or structures, but does have wiring and "equipment" does the NEC apply? Adding this definition will provide clarity that the NEC applies to property as stated in 90.1(A) that has no buildings or structures but has "wiring". A panel statement indicating if this position it true would be helpful.

1-18  Log #1345  NEC-P01
(100.Premises)

Submitter: Louis Barrios, American Chemistry Council
Comment on Proposal No:  1-58
Recommendation: The committee action should have been Accept In Principle and change the definition to the one provided in NFPA Glossary of Terms and NEC 800.2, which states: "The land and buildings of a user located on the user side of the utility-user network point of demarcation."
Substantiation: The need for a definition of "premises" became apparent during panel deliberations when it was not clear following the panel action whether or not premises are required to have structures on them to be considered "premises". The proposed definition is extracted from the NFPA Glossary of Terms and NEC 800.2, "The land and buildings of a user located on the user side of the utility-user network point of demarcation."

1-19  Log #1387  NEC-P01
(100.Premises)

Submitter: Greg Marchand, Briggs & Stratton
Comment on Proposal No:  1-61
Recommendation: Add new text to read as follows:
A stand-alone generator that is supplying only cord connected equipment is not considered to be premises wiring. Generators, including integral outlets are considered to belong to the power source and are not considered to be premises wiring.
Substantiation: We are in full support of the more complete substantiation presented by the Portable Generator Manufacturers Association authored by Joseph Harding and John Loud of Exponent, Inc.
James T. Dollard, Jr., IBEW Local 98

Comment on Proposal No: 1-58
Recommendation: Continue to Reject.

Substantiation: The proposed definition would literally remove many outdoor electrical installations from the scope of the NEC. It is not possible to occupy a disconnect mounted on a structure to supply HVAC equipment. It is not possible to occupy an outdoor luminaire. There are countless other examples. Read the proposed definition as written, it recognizes a built structure or structures and “the land on which the structures are situated.” That means only the land on which the structure sits, it recognizes only the footprint of a structure.

The definition of “Premises Wiring” has served the industry well for decades. Users of the NEC have no problem reading, understanding and applying the defined term “Premises Wiring.” While CMP-1 apparently had an interesting discussion on this proposal, we need to focus on the intent of the proposal. A review of proposals and comments in the last NEC cycle and this NEC cycle from this submitter as well as the submitter of proposal 1-60, clearly reveals their intent. The intent is to exclude portable generators supplying power to a structure during a loss of power or any other reason from the scope of the NEC. There is no other reason for this proposal. There is not a problem with this definition. It is crystal clear. Everything on the load side of the service point is included in the scope of the NEC and where there is no service, (power outages or temporary) the power source is also included. If the application of this definition was creating an enforcement issue, CMP-1 would be flooded with proposals. Acceptance of this proposal gives them what they want because the portable generator will occupy land that is not within the footprint of the structure.

If this proposed definition is accepted, there are dozens of NEC rules that must be deleted and the purview of the NEC would be limited only to structures that can be occupied. The NESC will gladly step in and take purview over all electrical installations that can not be occupied.

Marcelo M. Hirschler, GBH International

Comment on Proposal No: 1-59
Recommendation: Revise text to read as follows:

Substantiation: I accept the point that NEC definitions need not be in single sentences. However, the last sentence of the existing definition simply gives examples and is definitely not part of the definition. This is consistent with the comments by Mr. Anthony and Mr. Barrios and with action by CMP 1 on some other proposals.
The use of an extra pole in the transfer switch in order to switch the neutral conductor. According to industry sources, the scope of the NEC (90.2(A)) and therefore cannot be considered as premises wiring. If it were, then once again the stand-alone generator that operates in the middle of a field supplying only cord-connected equipment is not covered by the Code currently has a provision for connecting generators as non-separately derived systems (250.30 system will not be in compliance with the NEC. Considering the significant expense of replacing a transfer switch, it is important to note that the Code currently has a provision for connecting generators as non-separately derived systems (250.30 Informational Note No. 1: Generators, including integral outlets are considered to belong to the power source and are not considered to be premises wiring. Informational Note No. 2: Generators, including integral outlets are considered to belong to the power source and are not considered to be premises wiring. Informational Note No. 3: A stand-alone generator that is supplying only cord-connected equipment is not considered to be premises wiring. Substantiation: The added Informational Note in Proposal 1-61 will lead to unintended consequences, as detailed below:

1. If the outlets on generators are considered as premises wiring, then this will indirectly mean that isolated output (also known as “floating neutral”) generators will no longer be allowed, since 250.26 specifies the conductor to be grounded in AC premises wiring systems. According to a recent PGMA survey, approximately 50% of all portable generators sold in the U.S. are the isolated output type. Portable generators that are used in “stand alone” mode are not normally connected to a grounding electrode (as allowed in 250.34(A)). In this configuration, isolated output generators pose no risk of a shock hazard (please refer to the presentation and videos associated with this comment). It is also the experience of the portable generator industry that there have been no reported incidents of electrical shock associated with these generators over at least the last five years for which data is readily available. Requiring the neutral conductor to be connected to the grounding conductor in a portable generator outlet only serves to increase the risk of electrical shock (again please refer to the presentation and video associated with this comment).

2. If isolated output generators are no longer allowed, then all generators used for backup power during power outages would need to be connected as separately derived systems. This is required because not doing so would result in the system having two points where the neutral is bonded to the grounding electrode (the main bonding jumper and the generator). The dual bonding points allow neutral current to flow on equipment bonding conductors under normal conditions, resulting in nuisance tripping of GFCIs. etc. Connecting a generator as a separately derived system requires the use of an extra pole in the transfer switch in order to switch the neutral conductor. According to industry sources, 99% or more of portable generators used for backup power are connected as non-separately derived systems by using single or dual pole transfer switches. If this proposal is accepted, it will then force those owners who subsequently replace their portable generator to also replace their current transfer switch at considerable expense and without any real-world safety benefit. If the owner chooses to operate a new portable generator with the existing transfer switch, the system will not be in compliance with the NEC. Considering the significant expense of replacing a transfer switch, it is the belief of PGMA members that some owners would then attempt to modify their new generator or their existing transfer switch and this would then pose significant safety risks where one would not otherwise exist. It is finally noted that the Code currently has a provision for connecting generators as non-separately derived systems (250.30 Informational Note No. 1).

3. There will continue to be considerable uncertainty in the Code regarding what part of a generator, if any, would be considered as premises wiring. In the case of a standby generator, where a service point exists, the question remains regarding where does the “power source” end and the “premises wiring” begin? Also, the current definition states that premises wiring “includes (a) wiring from the service point or power source to the outlets”. Are the “outlets” to be considered outlets that may be present on the generator itself or the “normal” outlets in the home, building, etc.? There will also continue to be considerable uncertainty in the Code in the case of “stand-alone” generators. A stand-alone generator that operates in the middle of a field supplying only cord-connected equipment is not covered by the scope of the NEC (90.2(A)) and therefore cannot be considered as premises wiring. If it were, then once again the question remains about what part of that system would be considered as premises wiring and what part would not. This similarly draws into question what other devices with internal power sources (e.g. shavers or cell phones) may also be misinterpreted to be a premises wiring system. According to the proposal, since no service point exists, the entire generator is premises wiring. This would include not only the generator outlets but also the alternator windings, spark plug wire etc. Acceptance of this proposal would be in direct conflict of 90.1(C), as it would prescribe very specific design requirements for the internal wiring on generators.

For this reason, as well as the reasons given in unintended consequences 1. and 2. above, it is proposed that no part of
the generator should be considered as premises wiring for clarity.

The proposed addition of Informational Notes 2 and 3 attempts to address all of the unintended consequences outlined above. Please refer to the supporting documentation on this comment (presentation and videos) for further information. PUMA members represent a significant majority of the portable generator industry. Our member companies include:

• American Honda Motor Co.
• Briggs & Stratton Home Power Products
• Champion Power Equipment
• Generac Power Systems
• Pramac America
• Subaru Industrial Power
• Techtronic Industries North America
• Wacker Neuson Production Americas LLC
• Yamaha Motor Corp USA

Note: Supporting material is available for review at NFPA Headquarters.

This comment was prepared by the PGMA Technical Committee. The supporting documentation was prepared by Mr. John Loud of Exponent, Inc.

1-23   Log #1299  NEC-P01
(100.Premises Wiring (System))

Final Action:

Submitter: James Jongkind, American Honda Motor Co., Inc.
Comment on Proposal No: 1-61
Recommendation: Please reject the proposal.

Substantiation: This proposal seeks to require that all portable generators have their neutral conductors connected to the generator frame by classifying the internal wiring as a “premises wiring system.” Most of the portable generators that Honda has sold for the past 40 years are of the floating neutral design and are used safely everyday by millions of consumers. To require that all newly produced portable generators be bonded is not only unjustified by the lack of incident data, but it would also introduce a safety risk where one did not previously exist. The output on these floating neutral generators is isolated, so there is no path back to the source through which users can be shocked. This is a well established and proven safety strategy for this type of product and should not be arbitrarily eliminated.
Reject the proposal.

OSHA requires bonded neutral generators in their regulations for construction sites. In reading these regulations, they appear to be identical to the NEC requirements except for this bonding requirement. The interpretation in Appendix A explains their position. To completely understand OSHA’s response, please read the request letter by Mr. Iwasa (provided). It appears OSHA incorrectly interprets the NEC. OSHA says a generator in stand-alone use is a separately derived system (see Article 100) and as such needs to be bonded. However, the NEC definition of a separately derived system says it is a premises wiring system. A generator in stand-alone use is not a premises wiring system so it is not separately derived. Please note the OSHA interpretation does not have any safety arguments other than misinterpreting the NEC which leaves it with no technical merit. As such it has no relevance in this discussion because it is circular logic.

What is relevant is the definition of a premises wiring system. Separately derived systems are limited to premises wiring systems by definition and separately derived systems must be bonded. This change now means all portable generators used in stand-alone use must be bonded. A portable generator in stand-alone use (which I define as powering only cord connected equipment) in the middle of a field is not a premises wiring system. It is not a premises wiring system until it is connected to my house as either a separately derived system or a non-separately designed system.

I believe this change in the definition meets a UL objective because they believe all generators should be bonded when, in fact and in theory, using a floating-neutral generator in stand-alone use is safer than a bonded-neutral generator. Using a bonded-neutral generator allows the neutral of the generator to come into contact to the ground more easily since the neutral is connected to the frame. As soon as the frame is grounded, you have the possibility of ground faults, a condition that does not exist for floating-neutral generators. Add to that the numbers of floating neutral generators in use today with no safety problems, and one can see UL is being a bit stubborn in their objective. In addition, many floating-neutral generators are being installed in non-separately derived systems and now the homeowner would be violating the NEC if he used the generator to power only cord connected equipment in his back yard.

If the definition stands and the panel’s intent is not to bar floating-neutral generator use in stand-alone applications, then maybe it needs to be taken up by other panels before the change takes place so other sections of the code can be changed as to not affect portable generator use.

Note: Supporting material is available for review at NFPA Headquarters.

Delete text to read as follows:

Informational Note: Power sources include, but are not limited to, interconnected or stand-alone batteries, solar voltaic systems, other distributed systems, or generators.

The substantiation for this proposal admits that U.L. is trying to use the NEG to force its own Standards Technical Panel to do something that the panel does not agree with. Defining a stand-alone generator as a premises has many far-reaching implications. A portable generator would then be subject to bonding and grounding standards that are completely unnecessary for a portable generator and that may actually compromise safety. The 2201 STP is fully aware of this and must take this into account when developing the standard. They are a panel of experts that is uniquely qualified to make decisions about the safe use of portable generators.

I support any proper clarification that makes it easier for users of the NEG to do their jobs. However, this Informational Note looks more like a political tool that is being used to force a highly contested issue into the U.L. standard for portable generators.
Please reject this proposal. This proposal seeks to include batteries and generators in the definition of premises. Merriam-Webster clearly defines premises (when used as a noun) as:

a) a tract of land with the buildings thereon
b) a building or a part of a building usually with its appurtenances (as grounds)

Batteries and generators that are not connected to anything don’t come close to the Webster definition of premises, and this is confusing. The NFPA Manual of Style clause 2.3.2 prohibits re-defining common words, and premises is certainly a common word.

The NFPA Glossary of Terms defines the following:

Premises: the land and buildings of a user located on the user’s side of the utility-user network point of demarcation. Responsible document is NFPA 70 (the NEC).

Also from the NFPA Glossary of Terms:

Premises Wiring: the circuits located on the user side of the network interface unit

The network point is the transformer, meter or service entrance on the premises. Nothing can be on the user side of a utility when there is no utility present. Batteries and generators are not utilities and must not be treated as such. They also do not fit the definition of a premises in the NFPA Glossary of Terms.

This informational note will only increase confusion for users of the NEC.
James T. Dollard, Jr., IBEW Local 98

1-60

Continue to Reject.

The proposed revision is an attempt to exclude portable generators used to supply power to a building or structure from the scope of the NEC.

Read the submitters substantiation. The submitter wants to exclude a portable generator used during a power outage or for temporary purposes from all NEC requirements because in his words it is “unrelated to said premises.” If CMP-1 agrees with the submitter, there are serious safety implications created and dozens of other changes that must be made throughout the NEC.

The definition of “Premises Wiring” has served the industry well for decades. Users of the NEC have no problem reading, understanding and applying the defined term “Premises Wiring.” While CMP-1 apparently had an interesting discussion on this proposal, we need to focus on the intent of the proposal. A review of proposals and comments in the last NEC cycle and this NEC cycle from this submitter as well as the submitter of proposal 1-58, clearly reveals their intent. The intent is to exclude portable generators supplying power to a structure during a loss of power or any other reason from the scope of the NEC. There is no other reason for this proposal. There is not a problem with this definition. It is crystal clear. Everything on the load side of the service point is included in the scope of the NEC and where there is no service, (power outages or temporary) the power source is also included. If the application of this definition was creating an enforcement issue, CMP-1 would be flooded with proposals.

If this proposed definition is accepted, there are dozens of NEC rules that must be deleted and the purview of the NEC would be limited only to the interior of structures. The NESC will gladly step in and take purview over all outdoor electrical installations.

Ron B. Chilton, Rep. NC Code Clearing Committee

1-64

The Panel should have "Accepted" this proposal.

Due to no explanation of the term "source" used extensively throughout the Code, engineers and electrical contractors attempt to make up a definition based on the manner of installation they desire to use for their particular site. The Code Panel statement in itself is substantiation to indicate the need to address this term used in various Sections of the Code. Webster may include several variations of this word based on intentions of use but in the National Electrical Code, the source is the origin of the energy for the system regardless of what that may be as noted, "source of power". In the Panel's response, no conflict in this term was noted as pertaining to how the Code uses the word, and it does meet the Style Manual's criteria for a definition as noted also in the Panel Statement, that being its use to multiple Code Sections.

This is not original material; its reference/source is as follows:
NC Code Clearing Committee.
1-29   Log #509 NEC-P01
(100. Suitable for Wet Locations)

Submitter: Robert A. Jones, IEC Texas Gulf Coast
Comment on Proposal No:  1-66
Recommendation:  Accept proposal 1-66.
Substantiation:  I appreciate the “comment on affirmative” by Mr. Hickman; however the reference to 314.15 will not clarify the requirement “suitable for wet locations”. The following is the panel statement from Panel 4 to my proposal 4-36 - “Regardless of how well an exterior electrical system is designed and installed there is always a possibility that moisture can collect inside of a raceway, this could be from something as simple as condensation, if moisture does collect inside of a raceway it should be arranged so that the moisture will be able to drain from the raceway. Suitable for wet locations does not mean the raceway is raintight.” There is a need for a definition of “suitable for wet locations” since a technical committee has determined the phrase does not mean raintight. What is the criterion that has to be met in order for an exterior raceway system to be judged “suitable for wet locations”? I do not know of any listing as “suitable for wet locations”.

1-30   Log #1242 NEC-P01
(100. Suitable for Wet Locations)

Submitter: John Masarick, Independent Electrical Contractors, Inc.
Comment on Proposal No:  1-66
Recommendation:  I recommend the panel accept proposal 1-66 and add the following definition.
Suitable for Wet Locations. Constructed so that water or other liquids will not enter or accumulate within a raceway, enclosure, outlet box, junction box or fitting.
Substantiation:  There should be a definition in Article 100 for “Suitable for Wet Location”. When a product is tested by a testing laboratory there is a very different interpretation for “Suitable for Damp Locations” and Suitable for “Wet Locations” Article 314.15 appears to treat both damp and wet the same.

1-31   Log #394 NEC-P01
(100, Part II Scope)

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No:  1-71
Recommendation:  Continue to reject the Proposal.
Substantiation:  A review and comparison of the present text of Part II of Article 100 with OSHA 1926 shows the OSHA document breaks at 600 Volts. Changing the Scope of Article 100, Part II will create a conflict between the two documents causing voltages from 600 Volts to 1000 Volts to be in violation of OSHA requirements. In addition, a Note within the OSHA document states that “If the electrical installation is made in accordance with the National Electrical Code ANSI/NFPA 70-1984, exclusive of Formal Interpretations and Tentative Interim Amendments, it will be deemed to be in compliance with 1926.403 through 1926.408, except for 1926.404(b)(1) and 1926.405(a)(2)(ii)(E), (F), (G), and (J).” This would further conflict with the proposed text without significant amendment.
Part II contains definitions applicable only to the articles and parts of articles specifically covering installations and equipment operating at over 600 volts, nominal.
The definitions in Part I are intended to apply wherever the terms are used throughout this Code. The definitions in Part II are applicable only to articles and parts of the articles specifically covering installations and equipment operating at over 600 volts, nominal.

Substantiation: There is no point in duplicating the same phrase in the adjacent paragraph.

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The term "equipment grounding conductor" has a definite purpose that is not uniquely expressed in the term, i.e. “bond the equipment to a terminal at the source of voltage”. As a result, there is a misconception that “grounding”, without bonding to the source, will make a system safe. On the contrary, connecting equipment to ground without providing the bonding connection back to the source can make equipment less safe by increasing the time to clear the fault.

The Panel statement that the equipment grounding conductor is used to both bond and ground does not place sufficient significance of the importance of bonding over grounding. Bonding provides sufficient ground fault current back to the source of voltage to operate an overcurrent device and clear the fault quickly. Connection to ground limits the voltage to ground on normally non-current-carrying parts during non-fault conditions. During fault conditions, the value of grounding is minimal since the primary safety concern is to remove the fault voltage as quickly as possible. A path to ground for fault current is not necessary since ground fault current must return to the source of voltage, not to ground.

Renaming this conductor as an “Equipment Bonding Conductor (EBC)” will clarify that the primary purpose of this conductor is to bond to the source in order to provide a known path for ground fault current that will facilitate rapid fault clearing.

It is recognized that the term "EGC" has been in use for a long time and that changing it to EBC will cause some concerns including changing written literature that uses the EGC term. After the initial period of understanding, users will correctly understand the purpose of this conductor and this will enhance the safety of personnel.

The fundamental purpose of this and companion proposals is to clearly state that “systems” are “grounded” and “equipment” is “bonded”. The fact that the bonding conductor may be grounded also is secondary to the primary function of bonding.
1-34     Log #1348  NEC-P01  (110)
Final Action:  
Submitter: Louis Barrios, American Chemistry Council
Comment on Proposal No:  1-73
Recommendation: The committee should have accepted this proposal.
Substantiation: The primary function of the conductor presently defined as an "equipment grounding conductor" is actually a bonding function. The grounding electrode conductor grounds systems and equipment. Accepting this change will help increase usability and understanding of the associated requirements.

1-35     Log #900  NEC-P01  (110.9)
Final Action:  
Submitter: Lawrence W. Forshner, Bard, Rao + Athanas Consulting Engineers LLC
Comment on Proposal No:  1-86
Recommendation: This proposal should be accepted, or accepted in principle with an informational note referencing 705.16.
Substantiation: “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.” Code rules from Chapter 7 can modify rules from Chapter 1. However there is still no clear direction for the designer when two sources interconnect for 6 cycles (100 milliseconds). The general consensus of all the equipment manufacturer’s application engineers that I have spoken to, is that the probability of a fault to ground or bolted short circuit during a .1 second closed transition event, is so unlikely that engineering judgment can be used to rule it out. Thus they have given consideration of the fault current contributions from two interactive power sources and have determined that the risk is insufficient to warrant the cost of higher AIC rated equipment, bigger rooms etc.

1-36     Log #1350  NEC-P01  (110.9)
Final Action:  
Submitter: Louis Barrios, Shell Global Solutions
Comment on Proposal No:  1-85a
Recommendation: Change the first sentence in the panel’s proposed text to “Equipment intended to interrupt current at fault levels shall have an interrupting rating at nominal circuit voltage sufficient for the current that is available at the line terminals of the equipment.”
Substantiation: This was an important change made by the panel to revert back to the 2008 Code language to improve the clarity of this section. One more improvement can be made, and that is to make both statements parallel structure. This proposed change relocates "nominal circuit voltage" in the sentence to indicate the "interrupting rating at nominal circuit voltage" and now makes both statements in this section parallel in structure.

1-37     Log #19  NEC-P01  (110.9(A) and (B) (New))
Final Action:  
Submitter: Technical Correlating Committee on National Electrical Code®  
Comment on Proposal No:  1-88
Recommendation: The Correlating Committee directs that the panel clarify the panel action on this proposal as it relates to the action taken on Proposal 1-85a for the accepted text revisions.
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.
Submitter: Lawrence W. Forshner, Bard, Rao + Athanas Consulting Engineers LLC
Comment on Proposal No: 1-89
Recommendation: This proposal should be accepted, or accepted in principle with an informational note referencing 705.16.
Substantiation: “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.” Code rules from Chapter 7 can modify rules from Chapter 1. However there is still no clear direction for the designer when two sources interconnect for 6 cycles (100 milliseconds). The general consensus of all the equipment manufacturer’s application engineers that I have spoken to, is that the probability of a fault to ground or bolted short circuit during a .1 second closed transition event, is so unlikely that engineering judgment can be used to rule it out. Thus they have given consideration of the fault current contributions from two interactive power sources and have determined that the risk is insufficient to warrant the cost of higher AIC rated equipment., bigger rooms etc.

Submitter: T. J. Woods, Wyoming Electrical JATC
Comment on Proposal No: 1-92
Recommendation: Add new text to read as follows:
110.12(C) Installation. All wiring, protection, wiring methods, materials, and equipment in this code shall be installed by qualified persons.
Informational Note: See Article 100 for the definition of qualified person.
Substantiation: Only qualified persons should be installing electrical systems because of its hazardous nature, to protect persons and property. I respectfully disagree with the panel’s decision to reject this proposal. I, in agreement with panel members Palmer Hickman and David Hittinger, cannot think of any situation where it would be practical or legitimate for anyone other than a qualified person to perform electrical installations. Please grant this proposal a reconsideration.

Submitter: Keith Fager, Bayer CropScience
Comment on Proposal No: 1-92
Recommendation: Add text to read as follows:
110.12(C) Installation. All wiring, protection, wiring methods, materials, and equipment in this code shall be installed by qualified persons.
Informational Note: See Article 100 for the definition of qualified person.
Substantiation: The panel action should have been Accept. A qualified person is “one who has the skills and knowledge related to the construction and operation …”. The proposal is consistent with 90.1 (A) and 90.1 (C). Installation of electrical systems by unqualified persons is not likely to safeguard persons and property from electrical hazards. In many cases, the AHJ also licenses electricians to ensure electrical installations within their jurisdictions are installed by qualified persons.
1-41 Log #1317 NEC-P01
(110.14)

Submitter: James F. Williams, Fairmont, WV  
Comment on Proposal No:  1-93  
Recommendation:  Revise text to read as follows:

110.14  Electrical Connections.

Informational Note: Many terminations and equipment are either marked with tightening torque or are identified as to
tightening torque in the installation instructions provided. If this information is unavailable, see Informative Annex.

[ROP 1-93]

Substantiation:  Let's put a little more information in the informational note.

1-42 Log #453 NEC-P01
(110.14(A))

Submitter: Robert G. Fahey, City of Janesville  
Comment on Proposal No:  1-94  
Recommendation:  Revise text to read:

110.14(A) Terminals. Connection of conductors to terminal parts shall ensure a thoroughly good connection without
damaging the conductors and shall be made by means of pressure connectors (including set-screw type), solder lugs, or
splices to flexible leads. Connection by means of wire-binding screws or studs and nuts that have upturned lugs or the
equivalent shall be permitted for 10 AWG or smaller conductors. Device terminals utilized for stranded wire shall be
constructed to encapsulate all strands of the conductors with clamps or similar means. Terminals for more than one
conductor and terminals used to connect aluminum shall be so identified.

Substantiation:  I have provided pictures of recent installations where standard THHN, THWN stranded wires, not fine
stranded wire, are terminated on devices which Underwriters Laboratories (UL) have indicated are listed for stranded
conductors. The pictures illustrate the problems in which I encounter in many installations where the stranded wire,
typically #14 through #10 are terminated on devices such as switches, receptacles and lighting fixtures in which the
device terminal does not capture all of the strands of the conductor which is terminated. The termination's which present
the issues are the lower grade of devices (residential grade devices) in which the terminals do not appear to be
manufactured for stranded conductors, but instead are more compatible for solid conductors. I would encourage the
Code Panel members would reconsider the rejection of the additional language I have proposed, the new text would
provide a much better and safer termination of these conductors.

Note:  Supporting Material is available for review at NFPA headquarters.

1-43 Log #20 NEC-P01
(110.14(C)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,  
Comment on Proposal No:  1-98  
Recommendation:  The Correlating Committee directs that the panel clarify the panel action on this proposal as it
relates to the accepted text by following the same format for the new second sentence. The action should be clarified
as to which table is being referenced.

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.
1-44 Log #1112 NEC-P01
(110.14(C)(1))

Final Action:

Submitter: Phil Simmons, Simmons Electrical Services
Comment on Proposal No: 1-98
Recommendation: Revise the text of the 2014 NEC ROP Draft as follows:

(1) Equipment Provisions. The determination of termination provisions of equipment shall be based on
110.14(C)(1)(a) or (C)(1)(b). Unless the equipment is listed and marked otherwise, conductor ampacities used in
determining equipment termination provisions shall be based on Table 310.15(B)(16) as appropriately modified by
310.15(B)(7). Table 400.5(A)(1) ampacities shall be used for flexible cords and cables.

Substantiation: The new text allowing Table 400.5(A)(1) ampacities to be used for flexible cords should be deleted.
Some of these ampacities are higher than provided for in Table 310.15(B)(16). No documentation was submitted to
show that electrical equipment manufacturers have designed or tested their equipment at these higher ampacities. It
also seems the UL Safety standard would have to be revised to determine that the terminals can function safely at these
elevated ampacities.

1-45 Log #1499 NEC-P01
(110.14(C)(1))

Final Action:

Submitter: Alan Manche, Schneider Electric
Comment on Proposal No: 1-98
Recommendation: The panel should reconsider and reject this proposal 1-98.

Substantiation: A few fundamental issues exist with this proposal. The first concern is that Table 400.5 does not exist,
as there are multiple ampacity tables in NEC 400.5. The more significant concern is the permission to use the
ampacities found in these tables. Thermal testing of equipment is performed in accordance with wire using the
ampacities found in Table 310.15(B)(16). Unless the equipment is specifically Listed for the use of smaller conductors
at the same ampacity such as Table 400.5(A)(2) will permit, the general permission granted by the acceptance of
proposals places thermal performance of equipment at risk and more specifically the terminal integrity itself. The
existing language permits equipment to be Listed for such use. This proposal should be rejected.
Submitter: Code-Making Panel 19,
Comment on Proposal No: 1-131
Substantiation: The consensus of Code Making Panel 19 (CMP-19) Task Force is we do not believe that this Proposal is needed, and in any case, is probably unenforceable, mainly due to inspection before occupancy and before the arrangement of furniture and appliances after occupancy.
CMP-19 is periodically asked to incorporate Article 100 definitions and normally responds that specific requirements should be located in specific sections for clarity of purpose. L. Barrios of Panel 1 had a similar concern stated in his comment on negative balloting on Proposal 1-131.
GFCI receptacles have been around for decades and as a matter of course, GFCI receptacles are not always periodically tested. Making them "readily accessible" will not change this fact. As an example, kitchen counter backsplashes are probably the most readily accessible area in a home but questioning of people over the years leads to the conclusion that they aren’t tested. An example of a readily accessible area that could quickly become inaccessible is a circuit breaker panel on the outside of a home where gardening tools, etc., have been stored against or in front of the panel door.
CMP-19’s response to the submitter of Proposal 1-131’s substantiation is that it is very dated. The field survey mentioned in the substantiation was completed in January of 2001, 11 years ago. The results of this survey caused a revision to UL Standard 943 that by UL’s testing of GFCI’s a year after the change, showed a greatly improved survivability rate.
Some people don’t periodically test their GFCI’s, regardless of the recommendation of the manufacturer, therefore, some manufacturers have produced self-testing devices, which are not presently required by the UL Standard or by the NEC. This has led to proposed revisions in UL Standard 943 to require self-testing and shutoff at end of life in the next edition.
This comment was developed by a CMP-19 Task Group and balloted through the entire panel with the following ballot results:
14 Eligible to vote
10 Affirmative
2 Negative (See voting comments below)
2 Ballots Not Returned (S.R. Goodman and B.A. Hopkins)
NEGATIVE:
W. ELLIOTT: I agree with Mr. P. Hickman: There is inadequate substantiation to include AFCI in this proposal. We should not be in the business of anticipating future commercial products. Furthermore, very little substantiation is provided concerning accessible versus readily accessible.
M.L. ZIEMAN: I concur with Mr. Barrios' negative comment that specific requirements should be placed in the specific sections that apply to these devices and not in Article 110. I concur with Mr. Hickman’s negative comment that “This proposed recommendation is overly broad and restrictive”. Based on the above, I also concur with Mr. Hittinger’s negative comments.
The proposal would make it a code violation to place a chair, waste can or similar piece of common household or office furniture in front of a wall receptacle.
Technical Correlating Committee on National Electrical Code,®

The Correlating Committee understands that the panel action on this proposal incorporates the modified definition of “Metal Enclosed Power Switchgear” to “Switchgear” in Proposal 9-7.

It was the action of the Correlating Committee that this proposal be referred to Code-Making Panel 1 for action.

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.

Daleep C. Mohla, DCM Electrical Consulting Services, Inc.

The proposal should have been accepted.

Evaluating the potential arc flash hazard during the design stage will provide user/owner of the degree of hazard before equipment installation is done and an opportunity to reduce the hazards by an alternative design. Alternative design could use current limiting devices and/or smaller size transformers to reduce the hazard. These options cannot be easily exercised after equipment is installed. This is the essential principle of safety by design: eliminate or reduce the hazard during design. Providing a label with arc flash hazard warning without quantifying the hazards transfers the problem to operating and maintenance personnel with no possibility of reducing the hazard. Personal Protective Equipment (PPE) does not protect against all arc flash hazards and only reduces the risk if proper PPE is used. Optimum protection is reduction of hazards during the design stage. Calculations have to be done to ensure equipment has proper interrupting rating and short circuit raing. At the same time, arc flash hazard calculation should be done to improve the safety. This will also ensure that AHJ can check and enforce this requirement before equipment is put in service.

Revise text to read as follows:

Electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers, that are in other than dwelling units, and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential electric arc flash hazards. The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

Operation has been replaced by a descriptive term “opening and closing of disconnecting device” which is normally understood to mean operation of the equipment. Opening and closing of the disconnect devices is likely to pose the greatest risk to person performing this work due to possibility of failure of the equipment and resulting arc flash. Risk of arc flash is greatest during change of state of the disconnect device. Personnel opening or closing the disconnect device need to be warned of such risk.
Revise text to read as follows:

110.16 Arc-Flash Hazard Warning.

Electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers, that are in other than dwelling units, and are likely to require operation, examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential electric arc flash hazards. The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

Substantiation: Asking the panel to reconsider their action of "Reject" to "Accept" by the addition of the word "operation" within 110.16 NEC.

Operation as defined in Webster's dictionary is performance of practical work or something involving a practical application. "Operation" is the exertion of power (force) or a method of functioning that can be manual or automatic with the use of preset protection devices. Operation is showing the intent of action or intent of purpose either manual operation or sensing action (device tripping or fuse blowing) as part of the system design. It is when there is an action (intentional) or reaction (unintentional) condition to occur when a higher fault current usually exits.

Why as electricians and inspectors are we taught to not stand in front of electrical equipment of any type when it is being energized, or de-energized, one should always be to the side from the possible direct action of power flow? Why are their arc shields on disconnects, but for arc fault condition upon opening and closing of any electrical devices. It is important to re-affirm that an arc-flash hazard does exist so persons are aware, please remember not all persons are qualified, trained, or understand the affects of arc-flash when and if they perform an action.

Substantiation: THIS IS A SAFETY ISSUE. Arc flash hazard is a function of voltage and available current. The location of the equipment is not a factor in arc flash.

Multi-family building and massive single family dwellings may present arc flash hazards comparable to industrial installations.

The intent of the changes is to apply Sections 110.16 and 110.24 to equipment that presents a hazard in buildings containing dwellings.
Submitter: Keith Fager, Bayer CropScience
Comment on Proposal No:  1-101
Recommendation: Revise proposal text as follows:

**110.16 Arc-Flash Hazard Warning.** Electrical equipment, such as switchboards, switchgear, panelboards, industrial control panels, meter socket enclosures, and motor control centers, that are in other than dwelling units, and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential arc flash hazards. The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment. The marking shall include the necessary information to select the work practices and PPE appropriate for the level of hazard to which the qualified person will be exposed.

**Substantiation:** Panel Action should have been Reject. The durability of the marking is covered by 110.21. The detailed information in the proposal is too restrictive and doesn’t coordinate with the requirements in NFPA 70E. The label information requirements in NFPA 70 should be the minimum information required for a worker to use the proper work practices and PPE to protect himself or herself. If more detailed hazard information is not included there is no reason to require the marking or label at all. By definition a qualified person is already aware of the arc flash hazard. The proposed text is general and will not have to be revised to coordinate with revisions to NFPA 70E. Marking durability is covered by 110.21. Informing the worker of the level of the hazard is related to the equipment installation and enables the worker to select the proper work practices and PPE as outlined in NFPA 70E.

Submitter: Keith Fager, Bayer CropScience
Comment on Proposal No:  1-103
Recommendation: Panel action should have been “Accept in Principle”. Revise proposal text as follows:

**110.16 Arc-Flash Hazard Warning.** Electrical equipment, such as switchboards, switchgear, panelboards, industrial control panels, meter socket enclosures, and motor control centers, that are in other than dwelling units, and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential arc flash hazards. The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment. The marking shall include the necessary information to select the work practices and PPE appropriate for the level of hazard to which the person will be exposed.

**Substantiation:** By definition, a qualified person is aware of the potential arc flash hazard. If the degree of the hazard or the minimum PPE requirements are not included on the label, the label does not contribute to the safety of the electrician in the field. The design and installation of the electrical system determines the incident energy level of the arc flash hazard, so the level of the hazard is related to installation and not work practices. This information would then be used to develop procedures and work practices required for the work on that specific equipment and its associated hazard.
1-105 Log #1415 NEC-P01
(110.16)

Submitter: Keith Fager, Bayer CropScience

Comment on Proposal No:  1-105

Recommendation: Panel action should have been Reject. Paragraph should be revised as follows:

110.16 Arc-Flash Hazard Warning. Electrical equipment, such as switchboards, switchgear, panelboards, industrial control panels, meter socket enclosures, and motor control centers, that are in other than dwelling units, and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential arc flash hazards. The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment. The marking shall include the necessary information to select the work practices and PPE appropriate for the level of hazard to which the qualified person will be exposed.

Substantiation: By definition, a qualified person is already aware of the potential arc flash hazard. A factory applied label can not be anything more than a general warning of the hazard. The current requirements for the label don’t include listing specific incident energy levels or PPE requirements and it’s not clear who is responsible for applying the marking or label (see Proposal 1-105 explanation of negative). The installing contractor may or may not have the resources and information to conduct an arc flash study, and if they do their contract would have to include that in the scope of work. If the degree of the hazard or minimum level of PPE is not going to be identified on the label, the required label does nothing to increase the safety of the qualified person(s) working on the equipment. The proposed text is general and will not have to be revised to coordinate with revisions to NFPA 70E.

1-105 Log #1416 NEC-P01
(110.16)

Submitter: Keith Fager, Bayer CropScience

Comment on Proposal No:  1-105

Recommendation: Panel action should have been Reject. Paragraph should be deleted.

110.16 Arc-Flash Hazard Warning. Electrical equipment, such as switchboards, panelboards, industrial control panels, meter socket enclosures, and motor control centers, that are in other than dwelling units, and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential electric arc flash hazards. The marking shall be located so as to be visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

Substantiation: By definition, a qualified person is already aware of the potential arc flash hazard. A factory applied label can not be anything more than a general warning of the hazard. The current requirements for the label don’t include listing specific incident energy levels or PPE requirements and it’s not clear who is responsible for applying the marking or label (see Proposal 1-105 explanation of negative). The installing contractor may or may not have the resources and information to conduct an arc flash study, and if they do their contract would have to include that in the scope of work. If the degree of the hazard or minimum level of PPE is not going to be identified on the label, the required label does nothing to increase the safety of the qualified person(s) working on the equipment. This paragraph is not coordinated with 70E. If the AHJ has adopted 70E, would the installation have to have the label required by 110.16 and the more detailed label required by 70E?
### 1-56 Log #1417 NEC-P01

**Submitter:** Keith Fager, Bayer CropScience  
**Comment on Proposal No:** 1-107  
**Recommendation:** Panel action should have been Reject. Paragraph should be revised as follows:

#### 110.16 Arc-Flash Hazard Warning

Electrical equipment, such as switchboards, switchgear, panelboards, industrial control panels, meter socket enclosures, and motor control centers, that are in other than dwelling units, and are likely to require examination, adjustment, servicing, or maintenance while energized shall be field marked to warn qualified persons of potential arc flash hazards. The marking shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment. The marking shall include the necessary information to select the work practices and PPE appropriate for the level of hazard to which the qualified person will be exposed.

**Substantiation:** By definition, a qualified person is already aware of the potential arc flash hazard. A factory applied label can not be anything more than a general warning of the hazard. The current requirements for the label don’t include listing specific incident energy levels or PPE requirements and it’s not clear who is responsible for applying the marking or label (see Proposal 1-107 explanation of negative). The installing contractor may or may not have the resources and information to conduct an arc flash study, and if they do their contract would have to include that in the scope of work. If the degree of the hazard or minimum level of PPE is not going to be identified on the label, the required label does nothing to increase the safety of the qualified person(s) working on the equipment. The proposed text is general and will not have to be revised to coordinate with revisions to NFPA 70E.

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### 1-57 Log #405 NEC-P01

**Submitter:** Russel LeBlanc, The Peterson School of Engineering  
**Comment on Proposal No:** 1-110  
**Recommendation:** Continue to accept this proposal as modified by the CMP.  
**Substantiation:** Thank you. This has been a long battle (since the 2002 NEC) for me trying to get the wording just right and trying to get this requirement in the NEC. This workspace encroachment problem has been and continues to be a real threat to worker safety. While no signage is ever a guarantee for safety, if just one injury or catastrophe is prevented because somebody DID pay attention to the sign, then it is worth the time and effort to install the signage!

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### 1-58 Log #1007 NEC-P01

**Submitter:** Mike Holt, Mike Hold Enterprises  
**Comment on Proposal No:** 1-110  
**Recommendation:** Revise text to read as follows:

#### 110.17 Working Space Marking

Equipment working space required by 110.27(A) elsewhere in this code shall be field marked to indicate the working space required…(remainder unchanged).

**Substantiation:** According to the opening statement of Section 110.27, all electrical equipment requires working space. Section 110.27(A) gives specific dimensions for equipment that is likely to require examination, adjustment, etc. while energized. As currently proposed, literally every piece of electrical equipment would have to have the markings discussed in this section.
Louis Barrios, American Chemistry Council

The committee action should have been to reject this proposal. Equipment markings to indicate safe working spaces are typically intended for non-qualified persons who may place boxes and other obstacles in front of electrical equipment within the working space. Labels on equipment and lines on the floor have not proven to be a 100% effective deterrent in preventing obstacles from being placed in the safe working space. There is also a concern that additional labeling will add additional clutter on the front panels of electrical equipment, further complicating the ability to read the other safety markings.

Alan Manche, Schneider Electric

The panel should reconsider this proposal and only accept the newly proposed Informational Note and reject the prescriptive marking requirements in the new text proposed in 110.21(B).

(B) Field-Applied Markings. Where caution, warning, or danger signs or labels are required by this code, the labels shall meet the following requirements:

1. The following colors shall be used for the hazard labels:
   a. DANGER Label: Black text, with white and red background
   b. WARNING Label: Black text with white and orange background
   c. CAUTION Label: Black text with yellow and white background

2. The label shall be permanently affixed to the equipment or wiring method and shall not be hand written.

3. The label shall be suitable for the environment where it is installed.

ANSI Z535.4 is the industry standard that establishes appropriate markings. Attempting to boil this industry standard down into a few bullets has multiple issues:

1) The language is not enforceable. Look at the Danger label requirement – Black Text with white and Rd background. The inspector would have to accept a candy-cane stripe background with black letters or how about yellow poke-a-dots on a white background with black letters, that is far from the requirements in ANSI Z535.4

2) The language can be in conflict with the ANSI Z535.4 requirements which can drive an ambiguous requirement that makes a compliant ANSI Z535 compliant label not acceptable to the enforcer. ANSI Z535 has very definite lettering and color schemes and if the installer and enforcer has specific concerns about the lack of warning signage on equipment, they have the Informational Note to lean on as serving to provide an acceptable means to mark the equipment.

3) Manufacturers of electrical equipment have rigorous safety messaging that can be called into question based on the proposed prescriptive requirements.

The addition of the Information Note is a good addition; however the prescriptive requirements in (B) should be rejected.
Submitter: Michael J. Johnston, National Electrical Contractors Association
Comment on Proposal No: 1-114
Recommendation: Revise original proposal as follows:

110.21 Marking.

(A) Manufacturers Markings. The manufacturer's name, trademark, or other descriptive marking by which the organization responsible for the product can be identified shall be placed on all electrical equipment. Other markings that indicate voltage, current, wattage, or other ratings shall be provided as specified elsewhere in this Code. The marking shall be of sufficient durability to withstand the environment involved.

(B) Field-Applied Hazard Markings. Where caution, warning, or danger signs or labels are required by this code, the labels shall meet the following requirements.

1. The marking shall adequately warn of the hazard using effective words and/or colors and/or symbols following colors shall be used for the hazard labels:
   a. DANGER Label: Black text, with white and red background
   b. WARNING Label: Black text with white and orange background
   c. CAUTION Label: Black text with yellow and white background

Informational Note: ANSI Z535.4-2011, Product Safety Signs and Labels, provides guidelines for suitable font sizes, words, colors, symbols and location requirements for labels.

2. The label shall be permanently affixed to the equipment or wiring method, shall be clearly visible, and shall not be handwritten.

   Exception to 2: Portions of labels or markings that are variable or could be subject to changes, shall be permitted to be hand written and shall be legible.

3. The label shall be of sufficient durability to withstand the environment involved suitable for the environment where it is installed.

Informational Note: ANSI Z535.4-2011, Product Safety Signs and Labels, provides guidelines for the design and durability of safety signs and labels for application to electrical equipment. This standard provides more specific information related to suitable font sizes, colors, various symbols and location requirements for labels.

Substantiation: This comment incorporates editorial adjustments to address concerns expressed in the negative balloting. The revisions to the original proposal are in the interest of resulting in practical requirements for these markings that are applied consistently across the NEC where the signal words “danger” “caution” and “warning” are used. The new exception to list item 2 is an effort to allow hand written information on some labels or markings that may be subject to change periodically to remain accurate, such as labels required by Section 110.22 for series rated systems and 110.24 for available fault current.

Submitter: Louis Barrios, American Chemistry Council
Comment on Proposal No: 1-114
Recommendation: Modify the committee action by deleting the phrase “and shall not be hand written” in 110.21(B)(2).

Substantiation: There may be some content on labels that changes periodically, where it may be acceptable or desirable to “hand write” the information with durable markers suitable for the environment.
James Dorsey, Douglas County Electrical Inspector 

1-117

Revise text to read as follows:

The marking shall meet the requirements in 110.21(B) and (C) and shall be readily visible and state the following

CAUTION – SERIES COMBINATION SYSTEM RATED ________ AMPERES. IDENTIFIED REPLACEMENT COMPONENTS REQUIRED. The field markings shall also include, the sum of the motors full load current in amperes and the date the calculation was performed.

Substantiation: I have been a commercial inspector for 11 years in a county which has high fault currents. A large portion of the projects end up with a series rating installation. The problem I would like the code panel to address is requiring that the labeling includes the sum of the motor loads and the date of installation somewhat mirroring 110.24 . I have witnessed on multiple occasions where the breakers may add up to well over the 1% for perhaps an oversight, inefficient design or for whatever reason, but with manipulating of the fla’s and non-coincidential loads the engineer can often brings the fla’s say to just under 1% in the original installation.

The problem becomes when future build outs or simply adding a roof top unit, exhaust fan or any other motor load. The service electrician, inspector or owner has no ideal that they have now exceeded the 1% and has put the installation in a vulnerable and dangerous predicament. The additional labeling would give all parties the knowledge to design and install in a safe manner. This may also change the original design to a fully rated panel for present and future motor loads. With the premise of the NEC & practical Safeguarding, I hope you consider this additional verbiage to the original proposal. Thank you

William Fiske, Intertek

1-121, 1-124

Accept Proposal 1-121 in Principle, and Accept Proposal 1-124 as submitted.

Available fault current is a factor in determining arc-flash hazard, but it is not the only factor. It is misleading to say that marking the Available Fault Current relates only to short-circuit current ratings of the equipment. Note also Mr. Hickman’s comment in vote on the ROP ballot of Proposal 1-124.

Rob Redfoot, Eaton Corp.

1-123

Delete the following text:

110.24 Available Fault Current...

Substantiation: The submitter recommended deleting this section in it’s entirety because they were worried the information on the field label would not remain accurate. I think this valuable information to have shown and I don’t recommend deleting it but there is merit to the idea that the information may not always be accurate. In my experience, most contractors will take fault current shown on engineers drawings and use that for their field markings. The problem is that the engineers use worse case values from the utility and the true values could vary widely from project to project. The calculations should be done using actual transformer KVA and impedance. I would recommend adding these values to the field label as a means to verify accuracy of the available fault current.
Submitter: Vincent J. Saporita, Cooper Bussmann  
Comment on Proposal No:  1-121  
Recommendation:  Change to read as follows  
   Arc Flash hazard analysis information is available in NFPA 70E. Maximum available fault current at the service is intended for application to the interrupting ratings of equipment, the short-current ratings of equipment, and the use of the "Table Method" of Hazard/Risk Category Classifications per NFPA 70E-2012 Table 130.7(C)(15)(a), and not for arc flash hazard analysis.  
Substantiation:  (1) It needs to be clarified that the maximum available fault current is also needed for compliance with equipment short-circuit current ratings (NEC 110.10)  
(2) The maximum available fault current is also perfectly suited for use with the "Table" method in NFPA 70E.  
(3) Clarity would be improved if "arc flash hazard analysis" were replaced with "calculation of incident energies".

Submitter: Keith Fager, Bayer CropScience  
Comment on Proposal No:  1-121  
Recommendation:  The panel action should be Reject.  
110.24 Informational Note: Arc Flash hazard analysis information is available in NFPA 70E. Maximum available fault current at the service is intended for application to the interrupting ratings of the equipment and not for arc flash hazard analysis.  
Substantiation:  This informational note should be in NFPA 70E instead of NFPA 70. Arc flash hazard analysis relates to work practices rather than installation and is outside the scope of the NEC. If someone performing an arc flash hazard analysis needs to be advised of data to be used in the analysis, that advisement should be in the applicable code.

Submitter: Keith Fager, Bayer CropScience  
Comment on Proposal No:  1-124  
Recommendation:  The panel action should be Reject.  
Informational Note: The available fault current marking(s) addressed in 110.24 are related to required short-circuit current ratings of equipment. NFPA 70E-2012, Standard for Electrical Safety in the Workplace, provides assistance in determining severity of potential exposure, planning safe work practices, and selecting personal protective equipment.  
Substantiation:  This informational note relates to work practices rather than installation and is outside the scope of the NEC.
1-69  Log #1422  NEC-P01
(110.24)

Submitter: Keith Fager, Bayer CropScience
Comment on Proposal No: 1-123
Recommendation: The panel action should be Accept. Delete this section.
Substantiation: This section was added to make it easier to enforce sections 110.9 and 110.10. As part of the permitting process, our AHJ requires documentation on the construction drawings that the requirements of those sections are met. The inspector only has to verify the equipment installed has the short-circuit current rating indicated on the approved permit drawings. The field marking requirement in 110.24 has obviously created some confusion, based on the proposals submitted to add an informational note to explain the purpose of the posted value. It is important to know the maximum available fault current and the service equipment short circuit current rating, but the field marking requirement is not the best way to communicate that information.

1-70  Log #1543  NEC-P01
(110.24)

Submitter: Frederic P. Hartwell, Rep. Massachusetts Electrical Code Advisory Committee
Comment on Proposal No: 1-123
Recommendation: Accept the proposal to delete this section.
Substantiation: The panel statement rejecting the proposal asserts that it provides no new substantiation beyond that submitted during the comment period in the prior cycle. That statement is only partially true, and entirely beside the point. This proposal included additional information relative to the placement of this section in Part I of the article and thereby making it applicable to medium voltage installations. The available fault currents on these networks change frequently. In addition, CMP 1 has failed to provide any arguments that respond to the other merits of this proposal, either directly or by reference. In the prior cycle all comments were dealt with through a reference to Comment 1-115. That comment came from a task group formed to correlate actions between CMP 1 and 10. That task group recommended a minor wording change that was designed to address concerns that the posted fault current would be used for arc flash calculations. CMP 1 correctly addressed that concern, both in the previous cycle and on Proposal 1-121 in this cycle and the Advisory Committee recognizes this as a positive development. However, the new section is still fatally flawed for reasons unaddressed by CMP 1 up to this point. The marking can and likely will become dangerously outdated after it has been posted. As such it requires wording that should not be believed, in order for safety to be served. Only contemporaneous consultations with the serving utility can prevent the misapplication of equipment. This is why NFPA 70E (a workplace safety standard) diverges in scope from NFPA 70 (an installation standard). Section 90.1(B) expressly provides notice that an NEC compliant installation is essentially free from hazard, but not necessarily adequate in the future. This proposal made the argument that Section 110.24 "would require an action to be taken on an electrical installation even if no activity, by reason of simple maintenance or otherwise, were performed on site." As such, the requirement exceeds the scope of the NEC and cannot be enforced after the final inspection has been completed. The Advisory Committee respectfully requests that CMP 1 reconsider the merits of this section.
Submitter: Edward G. Kroth, Verona, WI

Comment on Proposal No: 1-111

Recommendation: Rather than number the new section as 110.25 this new section should be numbered 110.21 and current 110.21 could be renumbered 110.20 (see also proposal 1-130).

Alternatively, 110.25 could be numbered 110.23 and current 110.23 could be renumbered 110.25. In either case other proposals submitted by the task group would need to be modified since those proposals specifically mention new 110.25.

Substantiation: From a codeology view point it would seem to make sense to have sections 110.22 numerically proceed or follow this new proposal since both are concerned with disconnects and a person looking for general rules on disconnects may not read far enough to get to the lockable rule. Refer also to my comment proposal 1-130.

Submitter: Edward G. Kroth, Verona, WI

Comment on Proposal No: 1-130

Recommendation: Rather than number the new section as 110.25 this new section should be numbered 110.21 and current 110.21 could be renumbered 110.20 (see also proposal 1-111).

Alternatively, 110.25 could be numbered 110.23 and current 110.23 could be renumbered 110.25. In either case other proposals submitted by the task group would need to be modified since those proposals specifically mention new 110.25.

Substantiation: From a codeology view point it would seem to make sense to have sections 110.22 numerically proceed or follow this new proposal since both are concerned with disconnects and a person looking for general rules on disconnects may not read far enough to get to the lockable rule. Refer also to my comment proposal 1-111.
Reject Proposal 1-131.

Code-Making Panel 1 should have rejected the proposal. General statements were used to substantiate the proposal. The inadequate substantiation does not justify the need to add new material describing GFCI and AFCI shall be in a readily accessible location as opposed to accessible.

This comment was developed by a CMP-3 Task Group and balloted through the entire panel with the following ballot results:

- 15 Eligible to Vote
- 13 Affirmative (see affirmative comment below)
- 2 Ballots Not Returned (A.D. Corbin and D.T. Mills)

The following Comments on Vote were received:

**AFFIRMATIVE:**

S.L. STENE: The ready access for both GFCI and AFCI devices should not be mandated by Panel 1 but rather by the Panel having jurisdiction over the use of GFCI and AFCI devices for their particular application. An example of requiring the GFCI devices to be accessible as applied to equipment versus readily accessible would be the GFCI devices required by 620.85 that each 125-volt, single-phase, 15- and 20-ampere receptacle installed in pits, in hoistways, on elevator car tops, and in escalator and moving walk wellways shall be of the ground-fault circuit-interrupter type. The difference would be that these receptacles are accessible, rather than the readily accessible required by the proposed new text in 110.25. Even though 90.3 permits Chapters 5, 6, and 7 to modify or supplement the text in Article 110, this additional text makes the NEC more complex without any technical substantiation for the change.

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

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.
This proposal should be Rejected. The current wording of 210.8, requires that all GFCIs required in this section, regardless of type, to be installed in a readily accessible location. Any other locations in the code are special applications such as for temporary wiring or vending machines, etc. and those panels responsible for those applications are better suited to take into consideration the possibly unique characteristics of these different types of installations that will affect the accessibility requirements for a GFCI. The accessibility of a GFCI should be considered within the context of the specific Article that requires installation of these products. No substantiation was provided to support the inclusion of an AFCI in this proposed requirement.

This comment was developed by a CMP-18 Task Group and balloted through the entire panel with the following ballot results:

12 Eligible to vote
9 Affirmative
1 Abstention (see below)
2 Ballots Not Returned (M.N. Ber and K.J. Clemente)

The following Affirmative Comment on Vote was received:

M.S. O’BOYLE: I agree that the proposal should be Rejected. I also agree that accessibility should be considered within the context of specific articles that require installation of a device. Additionally, I agree that no substantiation was provided to support inclusion of AFCI devices.

As defined in Article 100, “Readily Accessible” means that a device is capable of being reached for inspections without climbing over or removing obstacles. When a GFCI (or AFCI) is installed in an outlet box, it is not always possible to predict if furniture or another obstacle might be placed in a way that would render the device not readily accessible. Accordingly, the requirement would be difficult to enforce.

The following Negative Comment on Vote was received:

M.J. KOCHAN: All three negative votes by L. Barrios, P. Hickman and D. Hittinger have stated the substantiation does not justify the approval of the proposal. In this I concur. In the Informational Note Mr. Larsen suggests and assumes that by placing the GFCI in a readily accessible location will facilitate periodic testing required by the product installation instruction that are supplied with the receptacle. Not so, the electrician who is installing the GFCI does what they know to do and installs the GFCI receptacle and throws the box and instructions away. When a new homeowner or business facility moves in there is no instruction and if there were, who would see that these receptacles are tested periodically. Maybe the electrical contractor should be responsible to notify all homeowners and business facilities with a list of all GFCI receptacles and their locations and a copy of all instructions. In many cases, the GFCI has been installed in a readily accessible location like a kitchen, bathroom or a garage, but not always. There is that whirlpool tub in the master bathroom where the GFCI receptacle is located under the tub. There are bathrooms in national chains that require a key access as well as office buildings that require key access.

210.8 states GFCI receptacles be installed in a readily accessible location which is too broad of a statement. Mr. Larsen also mentions that the 2 dozen or so other areas in the code should be addressed the same way. Many of those come under Chapters 5, 6 and 7 which does allow for modifications and should be addressed in accordance with the articles of those chapters.

I would like a better understanding as to why this proposal is being placed as 110.25. The SCOPE of Article 110 states the following:

“This article covers general requirements for the examination and approval, installation and use, access to and space about electrical conductors and equipment enclosures intended for personnel entry; and tunnel installations.”

The following Abstention was received:

F.L. CARPENTER: There was no clear consensus on whether NEMA should support or oppose the proposed comment on Proposal 1-131.
Submitter: Code-Making Panel 2,  
Comment on Proposal No: 1-131  
Recommendation: Reject the entire proposal.  

Substantiation: The proposal is overly broad and does not take into consideration the possibly unique characteristics of different types of installations covered by the code that will affect the accessibility requirements for GFCIs and AFCIs. The current wording of 210.8 requires all GFCIs required in this section, regardless of type, to be installed in a readily accessible location. CMP 2’s action on Proposal 2-116 would require all AFCIs specified by section 210.12, regardless of type, to likewise be installed in a readily accessible location. Any other locations in the code where these protection devices are required are special applications such as for temporary wiring or vending machines, and the panels responsible for those applications are better suited to take into consideration the possibly unique characteristics of these different types of installations that will affect the accessibility requirements for GFCI’s and AFCI’s. The accessibility of GFCI’s and AFCIs should be considered within the context of the Articles that require installation of these products. The accessibility of GFCI’s and AFCI’s should be considered within the context of the Articles that require installation of these products.

This comment was developed by a CMP-2 Task Group and balloted through the entire panel with the following ballot results:

11 Eligible to vote  
7 Affirmative  
3 Negative (See voting comments below)  
1 Ballot Not Returned (R.E. Duren)

The following Comments on Vote were received:

NEGATIVE:  
M.R. Hilbert: The recommendation on Proposal 1-131 should have been to accept in principle. CMP 2 addressed the accessibility issues for branch circuit GFCI devices covered under 210.8(A) – (C) in the 2011 NEC and has accepted a proposal for 2014 that would do the same for branch circuit AFCI devices. Therefore, it seems logical to include a general requirement in Article 110. This requirement can, as it already is in some cases, be modified for a specific application.

Although including a general requirement in Article 110 as proposed has merit, consideration should be given to expanding it to address all AFCI and GFCI devices not just the receptacle type. Shouldn’t the same ready access requirements apply to the test and reset buttons for all AFCI and GFCI devices?

For example, take a vending machine located indoors. If the vending machine comes equipped with GFCI protection integral with the attachment cap or cord, there is no specific requirement in 422.51 to provide ready access to the GFCI device. However with a general requirement in Article 110 for receptacle type devices, a receptacle type GFCI device installed for a vending machine without integral GFCI protection would require the ready access. These accessibility requirements would be better afforded to all types of devices.

For consistency in terminology, the heading of the proposed new section should be changed to read “Ground-Fault Circuit-Interrupter and Outlet Branch-Circuit Arc-Fault Circuit-Interrupter receptacles.”

In my opinion, a general requirement in Article 110 will not create any conflict with the ready access to a GFCI device installed on a rooftop as part of a branch circuit to meet 210.63. As defined in Article 100, equipment is readily accessible when it is capable of being reached by “those to whom ready access is requisite.” In the case of a receptacle placed on a rooftop for servicing heating or air conditioning equipment, it is the rooftop service personnel to whom the access is requisite and therefore a receptacle type GFCI device would only need to be readily accessible from on the rooftop.

J. Pauley: NEMA voted affirmative on proposal 1-131 during the ROP stage. Both GFCIs and AFCIs have test and reset functions that need ready access. The GFCI industry has over many years gotten a black eye with consumers because they lose power on a circuit and then cannot find the reset mechanism (or find whether a GFCI is even installed) because it is buried behind furniture, equipment or similar items.

Proposal 1-131 would require that all AFCIs and GFCIs be readily accessible. I cannot think of a single instance where ready access is inappropriate. Some have brought up the issue of being located on a rooftop and that this would not be readily accessible. That's not an accurate assessment. The definition of readily accessible is specific to include the words "those to whom ready access is requisite." In a rooftop situation, the people who require access are already on the roof and as such the device is readily accessible. I believe we are missing a significant opportunity...
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by not putting in a simple rule that will help everyone who uses a GFCI and/or an AFCI.

R.G. Wilkinson: The substantiation does not support the frequency of failures. Monthly testing and recording has been addressed.

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1-76 Log #351 NEC-P01 (110.25 New)

Final Action:

Submitter: Vince Baclawski, National Electrical Manufacturers Association (NEMA)

Comment on Proposal No: 1-130

Recommendation: Revise the text of the Panel Action on Proposal 1-130 to read as follows:

**110.25 Lockable Disconnecting Means.** Where a disconnecting means is required to be lockable open, elsewhere in this Code, it shall be capable of being locked in the open position. The provisions for locking shall remain in place with or without the lock installed.

**Exception: Where a disconnecting means for cord-and-plug-connected equipment is required to be lockable open and is permitted to be an attachment plug, the provision for locking of the attachment plug shall remain in place with the lock installed.**

**Substantiation:** Without addition of the Exception indicated above, the new 110.25 requirement and many companion requirements proposed throughout the Code do not draw any distinction between lockable disconnecting means for permanently connected equipment and lockable disconnecting means for cord-and-plug-connected equipment where the attachment plug serves as the disconnecting means. As such, these unconditional provision-for-locking-without-the-lock-installed requirements negate substantive compliance with OSHA’s lock-out regulations for worker safety [29 CFR 1910.147] regarding cord-and-plug-connected equipment. Where the attachment plug serves as the disconnecting means, provision for locking consists of lockable “clamshell” that surrounds the attachment plug, thereby precluding energization of cord-and-plug-connected equipment being serviced. When not locking out such equipment, the “clamshell” is stored on the flexible cable above the plug. In either mode of “clamshell” usage or storage, it is intended that the lock must be used. This “provision for locking” therefore does NOT “remain in place … without the lock installed.”

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****Insert Artwork Here****

Many requirements for disconnecting means, including 410.130(G)(1) Exception No. 3, 422.33(A), 426.50(A), 427.55(B), 430.109(F), 440.13, 440.63, 517.71(C) and 590.4 and references thereto, permit attachment plugs to serve as the disconnecting means for cord-and-plug-connected equipment. Requirements proposed and accepted throughout the Code in this Code cycle that disconnecting means be lockable are generalized and in many instances are located in other Sections or by reference.
Submittor: John Houdek, Allied Industrial Marketing, Inc.

Recommendation: Add new text to read as follows:

Total power factor at the utility service point of a facility, shall be 0.90 or higher (lagging).
Motor loads totaling 50 HP or higher shall have a power factor of 0.90 or higher.
Harmonic voltage distortion shall be limited to 5% THD-v or less at the primary side of the utility transformer serving a facility.

Substantiation: The NEC needs to define requirements for electrical power quality to assure the most efficient supply of electricity by utilities and to minimize disturbances caused by one facility from disrupting the service to another (neighboring) facility.

Both low power factor and elevated harmonic distortion are wasteful of electricity. Total power factor is a function of both fundamental frequency displacement power factor and distortion power factor. Low power factor causes elevated current to flow into the branch circuit conductors, transformer and switchgear. It is more costly for utilities to distribute electricity when power factor is low. To maximize total power factor, minimize distribution losses and losses within facilities, total power factor should be near 1.0.

Submittor: James F. Williams, Fairmont, WV

Recommendation: 110.25 Lockable Disconnecting Means. Where a disconnecting means is required to be lockable open, elsewhere in this Code, it shall be capable of being locked in the open position. The provisions for locking shall remain in place with or without the lock installed.

Substantiation: The deleted phrase is redundant and adds nothing to the section. Requiring something to be capable of meeting the requirement is overkill.

Submittor: Charles J. Palmieri, Town of Norwell

Recommendation: The panel should continue to accept this proposal see my substantiation to Proposal 1-81 Log# 1641 70-A2013-ROP below.

Substantiation: The installation of ground fault circuit interrupter and arc fault circuit interrupter type receptacles is expanding throughout this Code. The 2011 edition has introduced language-recognizing devices such as AFCI receptacles (see articles 210.12(B), and 406.4(D)(4)). It is important that these devices be located so their listing instructions requiring periodic testing may be performed without discouragement. During the 2011 renew process Code Panel 2 adopted language requiring GFCI type receptacles be readily accessible for the aforementioned testing. They did not include a similar requirement in 201.12(A), or (B) regarding the use of listed outlet type AFCI Receptacles. Note that the definition of the term "Equipment" in article 100 includes the word devices amongst the general terms included in that definition. The scope of Article 110 states in part, "This article covers general requirements for the examination and approval, installation and use, access to and spaces about electrical conductors and equipment". Clearly it is appropriate to include a requirement in this article that equipment be readily accessible when the listing instructions require periodic testing.
1-80  Log #1351  NEC-P01
(110.25)  Final Action:

Submitter: Louis Barrios, Shell Global Solutions
Comment on Proposal No: 1-131
Recommendation: The panel action should have been to reject this proposal.

Substantiation: Specific requirements associated with ground-fault and arc-fault circuit interrupters should be located in specific sections that apply to these devices and not in Article 110.

1-81  Log #1501  NEC-P01
(110.25)  Final Action:

Submitter: Alan Manche, Schneider Electric
Comment on Proposal No: 1-131
Recommendation: Continue to accept this proposal.

Substantiation: The committee’s decision to require a general accessibility requirement for AFCIs and GFCIs is an appropriate addition to support the use of these products in accordance with the Listing and markings found on these products. In order to test monthly, the device must be readily accessible. So one might infer that this requirement already exists as part of the listing and labeling of these protective devices, unfortunately they are often located where they cannot be reach to do the monthly test placing the protection for which they were designed at risk from improper maintenance.

The reason for this comment is to address the voting comments.

The HVAC roof-top unit which has a disconnect is required in accordance with 404.8 to be readily accessible, the same requirement exists where an overcurrent device is located with that HVAC unit, it must be readily accessible in accordance with 240.24 so I would suggest that a receptacle located on the roof is also readily accessible. The GFCI protection can be relocated at grade level and feed the receptacle on the roof for monthly testing thereby enhanced worker safety by position the device where it can be periodically tested.

A thought conveyed by the voting comments is that accessibility should be addressed by each panel that has each location GFCI protection. I do not see any requirement in the code that would permit AFCI or GFCI protection to NOT be readily accessible and provide the occupant the appropriate installation to periodically test the devices in accordance with the Listing of the products. I would contend each code panel should be required to consider any location for permitting a device in a non-accessible location. This would be the reflected as an exception that would most likely be in direct conflict with the installation and operational instructions.

Once again this comment supports the code panel’s actions on this proposal establishing a general location requirement to facilitate monthly testing in accordance with the product Listing and marking.
1-82  Log #242  NEC-P01  Final Action:
(110.26)

Submitter: Mike Weaver, C&M Enterprises
Comment on Proposal No: 1-131
Recommendation: Revise text to read as follows:
110.26 Ground-Fault and Arc-Fault Circuit Interrupter Receptacles and Dead Front Devices. Ground-fault
circuit-interrupter receptacles and outlet branch circuit type arc-fault circuit-interrupter receptacles and dead front
configurations of these devices shall be installed in a readily accessible location.

Informational Note: Locating GFCI and outlet branch circuit type AFCI receptacles and dead front configurations of
these devices in a readily accessible location will facilitate the periodic testing required by the product instructions.

Substantiation: The literal Code language (as proposed and as it appears in the draft document) excludes dead front
configurations of GFCI and AFCI devices. Dead front configurations of GFCI devices are often installed and should be
afforded the same accessibility requirement which is now mandated for AFCI and GFCI receptacle devices, for the
same reason depicted in the informational note.

1-83  Log #120  NEC-P01  Final Action:
(110.26(A)(1))

Submitter: Technical Correlating Committee on National Electrical Code®,
Comment on Proposal No: 9-14b
Recommendation: The Correlating Committee understands that the panel action in this proposal incorporates the

It was the action of the Correlating Committee that this proposal be referred to Code-Making Panel 1 for action.

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.

1-84  Log #395  NEC-P01  Final Action:
(Table 110.26(A)(1))

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 1-138
Recommendation: Continue to reject the Proposal.
Substantiation: A review and comparison of the present Table to the requirements of Table K-1 of OSHA
1926.403(i)(1)(i) shows the dimensions to be the same in both for the stated voltages. Changing Table 110.26(A)(1) will
create a conflict between the two documents causing voltages above 600 Volts to be in violation of OSHA requirements.
Further, there was no Proposal to change the title of Part II of Article 110 which would result in confusion. In addition, a
Note within the OSHA document states that “If the electrical installation is made in accordance with the National
Electrical Code ANSI/NFPA 70-1984, exclusive of Formal Interpretations and Tentative Interim Amendments, it will be
deemed to be in compliance with 1926.403 through 1926.408, except for 1926.404(b)(1) and 1926.405(a)(2)(ii)(E), (F),
(G), and (J).” This would further conflict with the proposed text without significant amendment.
Submitter: Mike Holt, Mike Hold Enterprises  
Comment on Proposal No:  1-145  
Recommendation:  Reject the proposal.  
Substantiation:  Requiring listed hardware makes no sense. I can have a door with no hardware at all and be as safe (if not safer) than a door with listed panic hardware. A door with no latch that utilizes a push/pull plate style hardware is safer than panic hardware as well. Furthermore, there was no substantiation that unlisted hardware is not safe.

Submitter: Salvatore DiCristina, Rutgers University / Rep. NFPA Building Code Development Committee (BCDC)  
Comment on Proposal No:  1-140  
Recommendation:  Accept the original proposal in principle and revise the text to read as follows:

110.26 C 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, and provide continuous and unobstructed travel between the entrance and the working space.

We agree with Panel members Anthony and Hickman that without this change, “none of the NEC rules for access and working space are practical if these spaces are crowded with obstructions” and that this concept would “enhance safety”. As to the Panel’s reference to “large equipment” in 110.26(C) (2) (a), already providing for this path, this section merely requires that if the single egress path is not continuous or obstructed (undefined by the way), then a second possibly obstructed path is required. No where does the NEC require a continuous unobstructed path.

Further, it is the intent to expand the requirement beyond equipment rated 1200A or more. Equipment of 1200A or greater is traditionally found in dedicated electrical equipment rooms. This proposal is precisely intended to address rooms and spaces containing unrelated equipment such as air handlers, piping, ductwork, etc, which is often given priority to location and routing and electrical equipment being secondary regardless of voltage or amperage. Reading the commentary for 110.26 (C) in the handbook, regarding Entrance to and Egress from Working Space, “This section was revised for the 2008 Code. The requirements are intended to provide access to electrical equipment. However, the primary intent is to provide egress from the area so that workers can escape if there is an arc flash incident”. The hazard associated with arc flash does not begin at 1200A. This proposal seeks to provide direction to designers and contractors who continue to unnecessarily put mechanics at risk of well documented hazards by overcrowding spaces containing electrical equipment.

This also assists the first responder in attending to victims who may be incapable of evacuating the area after an incident.
**Recommendation:** Replace “1200 amperes” with “1000 kW” in the first paragraph: (2) Large Equipment. For equipment rated 1000 kW 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 and egress from the required working space not less than 610 mm (24 in.) wide and 2.0 m (61/2 ft) high at each end of the working space.

**Substantiation:** The hazard addressed by this Section is long-term arc-burning of equipment trapping a worker. Power (voltage and amperage) is the measure of arc-flash hazard, not amperage alone. [With a reduction from 1200 Amps to 800 Amps, then the correct kW figure to use would be 666 kW.] Your Panel Statement says: "The industry normally rates the electrical equipment within 110.26(C)(2) in amperes and not in kW." I believe that is my point of the problem. For other sections/sub-sections, amperage is fine. But for this sub-section “amperes” ignores the reality of the physics hazard to be addressed by this rule – power, not amperage. An 800-amp 208Y/120-volt piece of equipment presents no where near the long-term arc-burning, electrician-killing hazard which an 800-amp 480Y/277-volt system does. Yet we treat them the same with the existing language. The switch to 1,000kW [or 666 kW] solves the discrepancy, and still leaves equivalent power capacity, lower-voltage systems (which can almost never sustain an arc-fault at all) fully protected.

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**Comment on Proposal No:** 1-143

**Substantiation:** The Correlating Committee understands that the panel action in this proposal incorporates the modified definition of “Metal Enclosed Power Switchgear” to “Switchgear” in Proposal 9-7.

It was the action of the Correlating Committee that this proposal be referred to Code-Making Panel 1 for action.
### 1-89 Log #768 NEC-P01

**Submitter:** James Dorsey, Douglas County Electrical Inspector  
**Comment on Proposal No:** 1-147  
**Recommendation:** Revise text to read as follows:  
110.26 (D) Illumination.  
Illumination shall be provided for all working spaces about service equipment, switchboards, panelboards, or motor control centers installed **indoors** and shall not be controlled by automatic means only. (The remainder of the article left alone)

**Substantiation:** The original submitter requested a minimum of 10 foot candles of illumination. The panel rejected claiming that there is no substantiation of what amount of light is sufficient. OSHA standard for general construction is 5’ & 10’ candles for electrical equipment rooms, which I have attached. Without being too restrictive on how much illumination to require, the deletion of indoors would be a step in the right direction  

**standard 1926.56(a)**  
**Requires 5 foot candles for General Construction & 10 foot candles for mechanical and electric rooms**

Justifying the requirement for illumination outdoor as well as indoors could aid the rapidly growing requirements of labeling. The NEC requires labeling in many areas of the code, such as 240.86 series rating stickers, 230.2 placarding for more than 1 service, 110.24 fault current calculation. 408.4 identification for Feeder panels. 705 interconnected systems, the list does go on, having the ability to read those labels would be a plus. For every electrician or homeowner that has the unfortunate task of servicing or resetting a breaker & having the ability to flip a switch and not have to have a flashlight under ones chin would be to their advantage.

### 1-90 Log #122 NEC-P01

**Submitter:** Technical Correlating Committee on National Electrical Code®,  
**Comment on Proposal No:** 9-14d  
**Recommendation:** The Correlating Committee understands that the panel action in this proposal incorporates the modified definition of “Metal Enclosed Power Switchgear” to “Switchgear” in Proposal 9-7.

It was the action of the Correlating Committee that this proposal be referred to Code-Making Panel 1 for action.  
**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.
Exception 1: Control equipment that by its very nature or because of other rules of the Code must be adjacent to or within sight of its operating machinery shall be permitted in those locations.

Add new text to read as follows:

Exception 2. Equipment such as switchboards, panelboards, industrial control panels, motor control centers, meter sockets, enclosed switches, transfer switches, power outlets, circuit breakers, adjustable speed drive systems, pullout switches, portable power distribution equipment, termination boxes, general-purpose transformers, fire pump controllers and motor controllers rated not over 600 volts and installed in industrial installations shall not require dedicated space above the equipment where designed and listed for wiring methods to be installed bottom entry only.

Substantiation: Listed equipment installed in a new or upgraded industrial installations often face challenges to fit in electrical rooms or machinery spaces. Where designed and listed for the purpose, (and installed and used in accordance with the manufacturer's instructions), wiring methods will have the required space to enter and exit the equipment, and the objective of the Code will be met.

This Exception is proposed as limited to industrial locations only. Requiring the equipment to be designed and listed is provided as justification for this new exception. This new language is offered as an alternative for "Engineered and constructed" language originally proposed, as a more palatable alternative to CMP 1, and adds enforceability for the AHJ. Some AHJ's are comfortable with making a determination based upon their experience. Other AHJ's or some federal regulators will not consider any exception or deviation from verbatim text. This Exception provides the verbatim text in the Code.

The substantiation supports the objective of the dedicated space requirements. The requirement for design, listing, (and AHJ approval per 90.4 – which any NEC section requires) is consistent with other permitted Exceptions in the Code. This Exception provides and recognizes the reality that sometimes in a new or replacement installation, it may be difficult to route cables, conduits, or other wiring methods into equipment from above the equipment. There are structural or space constraints that make it difficult or near impossible to comply with the Code verbatim. This exception provides a workable alternative in those situations. The proposal does not duplicate the requirements in Section 110.3(B). It simply provides a limited exception to an existing Code rule for space above equipment, that's all.

Recommendation: Continue to reject the Proposal.

Substantiation: The present text of OSHA 1926.403(i) limits that paragraph to applications up to 600 Volts. 1926.403(i)(2)(i)(D) requires the same 8 ft as the present NEC text. Table K-3 of OSHA 1926.403(j)(3)(iii) shows the requirements in the present NEC text meet the requirements in the OSHA Table above 600 Volts. Changing the application of the text in 110.27(A)(4) will create a conflict between the two documents causing voltages from 601 to 1000 Volts to be in violation of OSHA requirements. In addition, a Note within the OSHA document states that "If the electrical installation is made in accordance with the National Electrical Code ANSI/NFPA 70-1984, exclusive of Formal Interpretations and Tentative Interim Amendments, it will be deemed to be in compliance with 1926.408 through 1926.408, except for 1926.404(b)(1) and 1926.405(a)(2)(ii)(E), (F), (G), and (J)." This would further conflict with the proposed text without significant amendment.
1-93 Log #927 NEC-P01  
(110.27(A)(a))  

Submitter: James F. Williams, Fairmont, WV  
Comment on Proposal No: 9-14b  
Recommendation: Revise text to read as follows:  

110.27 Spaces About Electrical Equipment.  
(A) Working Space.  
(a) Dead-Front Assemblies. Working space shall not be required in the back or sides of assemblies, such as dead-front switchboards, switchgear, or motor control centers, where all connections and all renewable or adjustable parts, such as fuses or switches, are accessible from locations other than the back or sides. Where rear or side access is required to work on nonelectrical parts on the back of enclosed equipment, a minimum horizontal working space of 762 mm (30 in.) shall be provided. [ROP 9-14b]  
Substantiation: If we need to access it from the side we need working space.

1-94 Log #864 NEC-P01  
(110.27(A)(4))  

Comment on Proposal No: 1-158  
Recommendation: The Panel action should have been to Accept in Principle the Proposal with the following changes:  

By elevation of 2.5 m (8 ft) or more above the floor or other working surface as shown in (a) or (b) below:  
(a) a minimum of 2.5 m (8 ft) for 50 - 300 Volts  
(b) a minimum of 2.6 m (8-1/2 ft) for 301 to 600 Volts  
Substantiation: This is based on the negative ballot by Neil LaBrake in the ROP.  
As stated in that ballot, "Clearances of any sort typically are composed of several components. One is some base number or reference height for the activity in the vicinity of the thing to be cleared. Section 230.24(B), for example, lists requirements for four different types of "activity" under overhead service conductors. The clearance is different for each activity. Similarly, the voltage of the line or live part is another component; the higher the voltage, the larger the clearance required. Table 110.34(E) is an example of that requirement. While the reference height for personnel is not explicitly stated in the NEC, it should be noted that 8 ft is often used as the assumed height of a person with arms extended over head. This, in fact, may also be where the 8 ft listed in NEC Section 110.27(A)(4) came from. But to just use only this reference value without consideration for the voltage involved would not be reasonable. Considering the values shown in Table 110.34(E), it would be reasonable to infer that a median value for voltages under 600 Volts would be 0.5 ft. The total then for all components would be 8-1/2 ft. Lastly, Table 124-1 of the NESC does separate voltages of 300 (phase-to-phase) and below from those 301 to 600. 300 Volts and below is listed as "not specified" and for that reason the Panel could accept a similar separation."  
The ballot statement also references and restates OSHA requirements and those are not repeated here for the sake of brevity.
1-95 Log #1519 NEC-P01 Final Action: 

(110.27(E)(2))

Submitter: James F. Williams, Fairmont, WV  
Comment on Proposal No:  1-155  
Recommendation: Revise text to read as follows:  
110.27 Spaces About Electrical Equipment.  
(E) Dedicated Equipment Space.  
(2) Outdoor. Outdoor installations shall comply with 110.26 110.27(E)(2)(a) and (b)  
Substantiation: 600 volt clearance has moved from 110.26 to 110.27.

1-96 Log #123 NEC-P01 Final Action: 

(110.28)

Submitter: Technical Correlating Committee on National Electrical Code®,  
Comment on Proposal No:  9-14e  
Recommendation: The Correlating Committee understands that the panel action in this proposal incorporates the modified definition of “Metal Enclosed Power Switchgear” to “Switchgear” in Proposal 9-7.  
It was the action of the Correlating Committee that this proposal be referred to Code-Making Panel 1 for action.  
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.

1-97 Log #397 NEC-P01 Final Action: 

(110, Part III · Title)  

Submitter: Thomas L. Adams, Macomb, IL  
Comment on Proposal No:  1-161  
Recommendation: Continue to reject the Proposal.  
Substantiation: A review and comparison of the present text of Part III of Article 110 with OSHA 1926 shows the OSHA document breaks at 600 Volts. Changing the Title of Article 110, Part III will create a conflict between the two documents causing voltages from 600 Volts to 1000 Volts to be in violation of OSHA requirements. Secondly, there was no Proposal to change the title of 110, Part II which would result in confusion. In addition, a Note within the OSHA document states that “If the electrical installation is made in accordance with the National Electrical Code ANSI/NFPA 70-1984, exclusive of Formal Interpretations and Tentative Interim Amendments, it will be deemed to be in compliance with 1926.403 through 1926.408, except for 1926.404(b)(1) and 1926.405(a)(2)(ii)(E), (F), (G), and (J).” This would further conflict with the proposed text without significant amendment.

1-98 Log #1243 NEC-P01 Final Action: 

(110, Part III, Title)  

Submitter: John Masarick, Independent Electrical Contractors, Inc.  
Comment on Proposal No:  1-161  
Recommendation: I recommend the panel continues to reject this proposal which would change 600 volts to 1000 volts.  
Substantiation: Replacing 600 volts with 1000 volts will have a major impact on installers, component manufacturers, and industry standards. Increased spacing must be considered when going from 600 volts to 1000 volts. Personal safety must also be considered.  
Because the proposer has not provided enough information to the public to justify and understand all the ramifications of the proposal, the committee should continue to reject the submitter’s proposal.
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**Submitter:** Marcelo M. Hirschler, GBH International  
**Comment on Proposal No:** 1-163  
**Recommendation:** Revise ASTM E119-2011a to read ASTM E119-2012a.  
**Substantiation:** Date update of ASTM E119 standard.

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**Submitter:** Technical Correlating Committee on National Electrical Code®,  
**Comment on Proposal No:** 9-14f  
**Recommendation:** The Correlating Committee understands that the panel action in this proposal incorporates the modified definition of “Metal Enclosed Power Switchgear” to “Switchgear” in Proposal 9-7.  
**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.

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**Submitter:** Technical Correlating Committee on National Electrical Code®,  
**Comment on Proposal No:** 9-14g  
**Recommendation:** The Correlating Committee understands that the panel action in this proposal incorporates the modified definition of “Metal Enclosed Power Switchgear” to “Switchgear” in Proposal 9-7.  
**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.

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**Submitter:** Technical Correlating Committee on National Electrical Code®,  
**Comment on Proposal No:** 9-14h  
**Recommendation:** The Correlating Committee understands that the panel action in this proposal incorporates the modified definition of “Metal Enclosed Power Switchgear” to “Switchgear” in Proposal 9-7.  
**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.
1-103 Log #942 NEC-P01 (110.34(A) Exception)  
Final Action: 

Submitter: James F. Williams, Fairmont, WV  
Comment on Proposal No:  9-14h  
Recommendation: Revise text to read as follows:  
110.34 Work Space and Guarding.  
(A) Working Space.  
Exception: Working space shall not be required in back of equipment such as switchgear 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 or side access is required to work on nonelectrical parts on the back of enclosed equipment, a minimum working space of 762 mm (30 in.) horizontally shall be provided. [ROP 9-14h]  
Substantiation: If we need to access it from the side we need working space. 

1-104 Log #519 NEC-P01 (110.34(C))  
Final Action: 

Submitter: James F. Williams, Fairmont, WV  
Comment on Proposal No:  1-175  
Recommendation: (C) Locked Rooms or Enclosures. The entrance to all buildings, vaults, rooms, or enclosures containing exposed live parts or exposed conductors operating at over 600 volts, nominal, shall be kept locked unless such entrances are under the observation of a qualified person at all times. Where the voltage exceeds 600 volts, nominal, permanent and conspicuous danger signs shall be provided. The danger sign shall meet the requirements in 110.21(B) and shall read as follows:  
DANGER — HIGH VOLTAGE — KEEP OUT  
Substantiation: The first sentence in 110.34(C) already identifies the exposed voltage. The first part of the second sentence is redundant. 

1-105 Log #127 NEC-P01 (110.34(F))  
Final Action:  

Submitter: Technical Correlating Committee on National Electrical Code\textsuperscript{a},  
Comment on Proposal No:  9-14i  
Recommendation: The Correlating Committee understands that the panel action in this proposal incorporates the modified definition of “Metal Enclosed Power Switchgear” to “Switchgear” in Proposal 9-7. It was the action of the Correlating Committee that this proposal be referred to Code-Making Panel 1 for action.  
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.
1-106 Log #398 NEC-P01
(110, Part IV Title)

Submitter: Thomas L. Adams, Macomb, IL
Comment on Proposal No: 1-180
Recommendation: Continue to reject the Proposal.
Substantiation: A review and comparison of the present text of Part IV of Article 110 with OSHA 1926 shows the OSHA document breaks at 600 Volts. Changing the title of Article 110, Part IV will create a conflict between the two documents causing voltages from 600 Volts to 1000 Volts to be in violation of OSHA requirements. Secondly, there was no Proposal to change the title of 110, Part II which would result in confusion. In addition, a Note within the OSHA document states that “If the electrical installation is made in accordance with the National Electrical Code ANSI/NFPA 70-1984, exclusive of Formal Interpretations and Tentative Interim Amendments, it will be deemed to be in compliance with 1926.403 through 1926.408, except for 1926.404(b)(1) and 1926.405(a)(2)(ii)(E), (F), (G), and (J).” This would further conflict with the proposed text without significant amendment.

1-107 Log #1520 NEC-P01
(110.53)

Submitter: James F. Williams, Fairmont, WV
Comment on Proposal No: 1-181
Recommendation: Revise text to read as follows:
Substantiation: The list of metal conduit or other metal raceways suggested above may include those not suitable for high-voltage conductors in tunnels. If that is the case, then it should be pruned. This addresses the committee’s objection to listing only RMC.

1-108 Log #1577 NEC-P01
(110.74(A))

Submitter: James F. Williams, Fairmont, WV
Comment on Proposal No: 9-28
Recommendation: Revise text to read as follows:
Substantiation: The voltage boundary in 110 is 600. The voltage boundary (changed by ROP 9-28) in 314 is 1000. The voltage span in 110.74(B) is included in both 314.28 and 314.71.

1-109 Log #26 NEC-P01
(210.8(B) Exception No. 1 to (3))

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 2-52
Recommendation: The Correlating Committee directs that this proposal be referred to Code-Making Panel 1 for action as it relates to the action on Proposal 1-131.
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.
Submitter: William Fiske, Intertek

Comment on Proposal No: 1-186

Recommendation: Delete the following text:

- Batteries for Use in Light Electric Rail (LER) Applications and Stationary Applications, Subject 1973
- Concentrator Photovoltaic Modules and Assemblies, Subject 9703
- Connectors for Use in Photovoltaic Systems, Subject 9703
- Distributed Wiring Harnesses, Subject 9703
- Electric Vehicle Supply Equipment, Subject 2594
- Enclosed and Dead-Front Switches for Use in Photovoltaic Systems, Subject 98B
- Low Voltage Fuses – Fuses for Photovoltaic Systems, Subject 2579
- Molded-Case Circuit Breakers, Molded-Case Switches, and Circuit-Breaker Enclosures for Use With Photovoltaic Systems, Subject 499B
- Multi-Pole Connectors for Use in Photovoltaic Systems, Subject 4703A
- Photovoltaic Junction Boxes, Subject 4703
- Photovoltaic Wire, Subject 4703
- Rack Mounting Systems and Clamping Devices for Flat-Plate Photovoltaic Modules and Panels, Subject 2703
- Solar Trackers, Subject 3703
- Wind Turbine Generating Systems, Subject 6140
- Wind Turbine Generating Systems – Small, Subject 6142
- Circuit integrity (CI) Cable – UL Outline of Investigation for Fire Tests for Electrical Circuit Protective Systems, Subject 4724

Substantiation: An American National Standard, such as ANSI/NFPA 70, should not include references to publications that are not consensus standards. UL “Subjects,” identified as “Outlines of Investigation” on the documents themselves, are not consensus standards. Moreover, it is by no means certain that any given Outline of Investigation will become a consensus standard in the near future. That is evidenced by the fact that Circuit Integrity (CI) Cable – UL Outline of Investigations for Fire Tests for Electrical Circuit Protective Systems, Subject 1724, that was added to Annex A in the 2008 NEC, is not yet a published UL Standard, more than four years after NEC 2008 was approved by the NFPA Standards Council. That is the reason we recommend Subject 1724 be withdrawn from the NEC, in addition to recommending that the other Outlines of Investigation be withheld from Annex A and any Informational Notes within Code Articles until such time as they have attained consensus and been published as ANSI/UL standards.

This is not original material; its reference/source is as follows:
Underwriters Laboratories Inc. holds the copyright to all documents we recommend withholding or removing.
Add the following additional UL standard to Annex A:

- Aboveground Reinforced Thermosetting Resin conduit (RTRC) and Fittings UL 2515
- Antenna-Discharge Units UL 452
- Arc-Fault Circuit-Interrupters UL 1699
- Armored Cable UL 4
- Attachment Plugs and Receptacles UL 498
- Audio, Video and Similar Electronic Apparatus — Safety Requirements UL 60065
- Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements UL 62368-1
- Batteries for Use in Electric Vehicles UL 2580

**Substantiation:** This is one in a series of proposals to update NFPA 70 to add a reference to UL 62368-1. ANSI/UL 62368-1, Audio/video, information and communication technology equipment – Part 1: Safety requirements, was published on February 17, 2012. This new standard will eventually replace (later this decade) both, UL 60065, Audio, Video, and Similar Electronic Apparatus-Safety Requirements, and UL 60950-1, Information Technology Equipment Safety - Part 1: General Requirements. In the meantime, a reference to UL 62368-1 should be added to Annex A since similar equipment complying with, and Listed to these standards will be installed per the Code. In fact, equipment already is being Listed to UL 62368-1.

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**Recommendation:** Revise text to read as follows:

- Transient Voltage Surge Protective Devices Suppressors UL 1449

**Substantiation:** Correct name of UL Standard UL 1449 referenced in the Informative Annex A.

This is not original material; its reference/source is as follows:

UL Catalog of Standards publicly accessible on www.UL.com

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**Recommendation:** The following is to be added to Informative Annex A Product Safety Standards:

<table>
<thead>
<tr>
<th>Product Standard Name</th>
<th>Product Standard Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household and Similar Electrical Appliances, Part 2: Particular Requirements for Heating and Cooling</td>
<td>UL 60335-2-40</td>
</tr>
</tbody>
</table>

**Substantiation:** An update to the proposed revisions to the UL standards listed in Informative Annex A Product Safety Standards of NFPA 70, is required to reflect the addition of the following new UL standard:

- Household and Similar Electrical Appliances, Part 2: Particular Requirements for Heating and Cooling Equipment, UL 60335-2-40
H.80.15(B)(4)i. A member of an organization that represents the non-union electrical workforce.

In order to equally and fairly represent all segments of the electrical workforce, representatives of both the union and the non-union workforce should be considered for membership on the Electrical Board. This is not to imply that either one of the organization’s representative is more qualified for membership, but only to provide for a mechanism whereby, if the major workforce is not represented by a labor (union) organization, these members of the workforce will be equally represented. Circumstances can arise where the entire electrical workforce (not just the primary one) are not affiliated with any labor organization. The way the proposal is presently written can appear to offer a distinct advantage to the labor (union represented) electrical workforce.