8-274 Log #1272 NEC-P08 **Final Action: Accept in Principle**
(392-7(A))

Submitter: David H. Kendall, Carlon, Lamson & Sessions

Recommendation:

Revise text to read as follows:

(A) Metallic Cable Trays. Metallic cable trays that support electrical conductors shall be grounded as required for conductor enclosures per 250.96 ~~in Article 250~~.

Substantiation:

Per the National Electrical Code Style Manual, Section 4.1, references covered by 90.3 shall not be used.
4.1 References to Other *NEC* Rules. Use references to improve clarity of the rule. Avoid redundant use of references. Do not use a reference if the requirement is already covered by 90.3. Explanatory references shall be in fine print notes.
4.1.1 References to a Part Within an Article. References shall not be made to an entire article, such as ''grounded in accordance with Article 250'' unless additional conditions are specified. References to parts within articles shall be permitted.

Panel Meeting Action: Accept in Principle

Revise 392.7(A) of the code to read as follows:
(A) Metallic Cable Trays. Metallic cable trays that support electrical conductors shall be grounded as required for conductor enclosures in accordance with Part IV of Article 250.

Panel Statement:

The correct reference for grounding of enclosures is Part IV of Article 250.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Cox

8-275 Log #1914 NEC-P08 **Final Action: Reject**
(Table 392-7(B))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
Table 392.7(B) Metal Area Requirements for Cable Trays Used as Equipment ~~grounding~~ bonding Conductor
a Total cross-sectional area of both side rails for ladder or trough cable trays; or the minimum cross-sectional area of metal in channel cable trays or cable trays of one-piece construction.
b Steel cable trays shall not be used as equipment ~~grounding~~ bonding conductors for circuits with ground-fault protection above 600 amperes. Aluminum cable trays shall not be used as equipment ~~grounding~~ bonding conductors for circuits with ground-fault protection above 2000 amperes.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Refer to the panel action and statement on Proposal 8-1.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Cox

Explanation of Negative:

DUREN: See my Explanation of Negative for 8-1.

Comment on Affirmative:

DAUBERGER: See my Comment on Affirmative on Proposal 8-1.
GRIFFITH: See my Comment on Affirmative on Proposal 8-1 (Log #2453h).

8-276 Log #233 NEC-P08 **Final Action: Reject**
(392-7(B)(4))

Submitter: Ronald Lai, FCI USA Inc.

Recommendation:

Revise text as follows:
Cable tray sections, fittings, and connected raceways shall be bonded in accordance with 250.96 using bolted mechanical connectors, other listed methods or bonding jumpers sized and installed in accordance with 250.102.

Substantiation:

This clause is a design requirement that mandates the use of bolted mechanical connectors and does not allow new and alternate methods that are as secure.
A new method of joining cable tray sections without the use of bolts is now available as depicted in the attachment.
(NOTE: No attachment was provided)

Panel Meeting Action: Reject

Panel Statement:

There is no technical substantiation to demonstrate a need to make a change to the present wording. Also, attachment was not provided.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Cox

8-277 Log #688 NEC-P08 **Final Action: Reject**
(392-8(D))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text:
Where single conductor cables ~~comprising each phase~~ are connected in parallel as permitted in 310.4, the conductors of alternating-current circuits shall be installed in groups consisting of not more than one conductor per phase, grounded conductor, or neutral...(remainder unchanged).

Substantiation:

The deleted wording is superfluous as it is covered in 310.4 which includes grounded conductors which may not be neutrals. Since conductors of DC circuits may be paralleled, they should be included. See my proposal for 310.4.

Panel Meeting Action: Reject

Panel Statement:

The proposal submitted does not reflect the present Code text using legislative text. The submitter's intent is not clear.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Cox

8-278 Log #251 NEC-P08 **Final Action: Reject**
(392-8(E))

Submitter: David A. George Linden, MI

Recommendation:

Add a new last sentence as follows:
Single-conductor cables sizes 1000 kcmil or larger shall be installed in a single layer.

Substantiation:

Since the rules in 392.10(A)(2) and (3) size the cable tray based upon cross-sectional area of the single-conductor cables smaller than 1000 kcmil, it is therefore assumed the cables are permitted to be installed in multiple layers. In 392(A)(1), it seems to be saying the single-conductor cables 1000 kcmil and larger are to be installed in a single layer.

Panel Meeting Action: Reject

Panel Statement:

392.10(A)(3) applies to conductors of 1000 kcmil and larger sizes as well those smaller than 1000 kcmil.
It is assumed that one of the references is to 392.10(A)(1), as there is no 392(A)(1).
The requirements in 392.10 relate to the maximum number of single conductors permitted in a cable tray. The requirements in 392.8(E) relate to cables 1/0 through 4/0 being installed in single layers, except for circuit groups, to reduce the effect of mutual heating.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Cox

8-279 Log #2717 NEC-P08 **Final Action: Reject**
(392-9)

Submitter: James Ledger, Degussa Corp.

Recommendation:

Revise section to allow full depth use of tray when it contains only control and signal cables. Requires revising the following paragraphs:
392.9(B) - Replace entire paragraph with the following:
"Where a cable tray of any type contains multiconductor control and/or signal cables only, the full depth of the cable tray may be used."
392.9(D) - Delete entire paragraph.
392.9(E) - Replace first sentence with following:
"Where ventilated channel cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, and signal cables, the following shall apply:".
392.9(F) - Replace first sentence with following:
"Where solid channel cable trays contain multiconductor power or lighting cables, or any mixture of multiconductor power, lighting, control, and signal cables, the following shall apply:"

Substantiation:

When a cable tray contains only control and signal cables, there are no concerns for ampacity or heat generation, no increased hazard from filling the tray to the full depth, and therefore, no basis for limiting the usable depth of the tray. The only limitation should be weight, which is already covered by 392.5(A) and 392.6(A). (Control and signal cables are typically small gauge and lightweight anyway.)
For a typical six inch depth tray, the existing limitation results in a usable depth of only 3.5 to 4 inches. Even that is misleading, since that depth includes the top partial layer which may only contain one or two cables. Requiring an additional tray when 40% of the existing tray is still available places an unnecessary financial burden on the user with no increase in safety (since there is no hazard to reduce).
Prudent design would still require that sufficient spare capacity be provided in the tray for future use. However, if this is the purpose of the existing limitation, it is beyond the scope of the NEC and at most should be changed to a fine print note or commentary.

Panel Meeting Action: Reject

Panel Statement:

The substantiation is insufficient to demonstrate a need to make a change to the present wording. Weight is not the only concern that needs to be addressed.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Cox

8-280 Log #3262 NEC-P08 **Final Action: Accept**
(Table 392-9)

Submitter: Brett Becker, S. L. Becker Electric

Recommendation:

In column 2 change 1.2 in the formula to 30 for the SI calculation so the formulas will appear as follows:

4,500 - (~~1.2~~ Sd)[b]	4,500 - (30 Sd)[b]
6,800 - (~~1.2~~ Sd)	6,800 - (30 Sd)
9,000 - (~~1.2~~ Sd)	9,000 - (30 Sd)
13,500 - (~~1.2~~ Sd)	13,500- (30 Sd)
18,000 - (~~1.2~~ Sd)	18,000 - (30 Sd)
22,500 - (~~1.2~~ Sd)	22,500 - (30 Sd)
27,000 - (~~1.2~~ Sd)	27,000 - (30 Sd)

In footnote "a" to Table 392.9 change 1.2 to 30 in the formula in the second line so the footnote will read as follows:
[a]The maximum allowable fill areas in Columns 2 and 4 shall be computed. For example, the maximum allowable fill in mm^2 for a 150-mm wide cable tray in Column 2 shall be 4500 minus (~~1.2~~ 30 - by Sd)...

Substantiation:

The 1.2 is a dimension in inches not a factor. The 1.2 must be multiplied by 25.4 to convert it from inches to millimeters giving the number 30.48 which should be rounded to an even 30.

This table first appeared in the 1975 NEC and there is no explanation as to its origin in the preprint on proposals for that edition of the NEC. Apparently, it was decided that the maximum fill for a cable tray was the total cable cross-sectional area not be permitted to exceed an area equal to the width of the cable tray in inches times a 1.2 inch depth which happens to be approximately 40 percent of the cross-sectional area of a cable tray with a 3 inch usable depth. Let me illustrate the error with the following example worked both in inch-pound and si dimensions.

Example: A ladder type cable tray contains four multiconductor cables size 500 kcmil with an overall diameter of 57.4 mm (2.26 in.) in a single layer, and five multiconductor cables size 3/0 AWG with a cross-sectional area of 1264 mm^2 (1.96 in^2). Using the formula in Column 2 of Table 392.9, the results are minimum cable tray width is 450 mm (18 in.) although this result was determined using inch-pound dimensions as the SI formula gives meaningless results. There are 645 mm^2 per in^2. Dividing the 13,225 mm^2 determined using the SI formula from Table 392.9 gives 20.5 in^2. Clearly the two methods do not give the same result. If 30 is substituted in the SI formula in place of 1.2, the results are equivalent.

Sd = 4 x 57.4 mm = 229.6 mm	Sd = 4 x 2.26 in = 9.04 in.
13,500 - (1.2 x Sd) = 13,225 mm^2	21 - (1.2 x Sd) = 10.15 $in.^2$
13,500 - (30 x Sd) = 6,612 mm^2	(6,612 mm^2 ÷ 645 = 10.25 $in.^2$)
Total size 3/0 cable area = 5 x 1264 mm^2 = 6320 mm^2	(5 x 1.96 $in.^2$ = 9.80 $in.^2$)

Panel Meeting Action: Accept

Panel Statement:

The panel notes that the table requires the use of cable diameters, not cable cross-sectional areas, as shown in the substantiation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Cox

8-281 Log #567 NEC-P08 **Final Action: Accept**
(392-9(A)(1))

Submitter: Bill Whitlow, Lockwood Greene

Recommendation:

Revise text to read as follows:
(1) Where all of the cables are 4/0 or larger, or where single conductor cables and multiconductor cables are installed in the same cable tray, the sum of the diameters of all cables shall not exceed the cable tray width, and the cables shall be installed in a single layer.

Substantiation:

There is no rule in the NEC to allow calculation of the number of cables allowed when single conductor cables and multiconductor cables are mixed in one cable tray. This proposal combines the requirements of 392.9(A) for multiconductor cables, and 392.10(A) for single conductor cables.

Panel Meeting Action: Accept

Panel Statement:

The panel notes the "AWG" should be added editorially after "4/0" in the submitter's recommendation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Cox

Explanation of Negative:

GRIFFITH: Panel action should have been to Reject this proposal to revise 392.9(A)(1). Although I fully agree with the submitter's goal and appreciate that there is a need to include language in Article 392 to acknowledge the common industry practice of mixing multi-conductor cables with single conductor cables in tray, the subject is incorrectly and incompletely covered by the proposed text. For example, the title of 392.9 refers only to multi-conductor cables. Similarly, the ensuing text of 392.9 and 392.9(A) refers only to multi-conductor cables. Both the title and, at the very least, the text would have to be revised to logically accept this proposal. Finally, to completely accommodate the practice of mixing multi-conductor cables with single conductor cables, the text of 392.9(A)(2) would also have to be revised for sizes smaller than 4/0 AWG. The submitter's proposed language does not acceptably achieve the intent of the proposal although, again, I wish it did.

If the panel ultimately votes to retain the proposed text revision, the panel action should be changed to Accept in Principle and a sentence should be added after the new text, reading as follows:

"Single conductor cables bound together to comprise a circuit group shall be permitted to be installed as a conductor assembly." Without this addition the revised text could be interpreted to prohibit, without substantiation, the practice of installing single conductors bound together as circuit assemblies as presently permitted by 392.8(E), last sentence and 392.10. In addition, 392.9(A)(2) should be modified to include language corresponding to 392.9(A)(1), as revised.

8-282 Log #1319 NEC-P08 **Final Action: Accept**
(392-9(B), 392.9 (D))

Submitter: National Electrical Code Technical Correlating Committee

Recommendation:

Replace the term "compute" with the term "calculate" in the following locations:
392.9(B)
392.9(D)

Replace the term "computed" with the term "calculated" in the following sections:
Table 392.9 Note a
Table 392.10 Note a

Replace the term "computation" with the term "calculation" in the following sections:
392.9(A)(3)
392.10(A)(3)

Substantiation:

This proposal is the result of an effort by the NEC Usability Task Group to standardize the language throughout the NEC relative to the use of the terms computed and calculated. After analyzing the usage, the group agreed that the term "calculated" was the best term for use throughout the NEC. This is one in a series of proposals to standardize on the term calculated.

The term "calculate" and its derivatives is presently used in the article title, section titles, and throughout portions of the existing article. Other Articles of the NEC such as for calculating conductor ampacties (under engineering supervision), calculating the size of enclosures, and in Annex D use the term calculate. Additionally, the term "calculate" is more commonly used in other NFPA codes and standards e.g. NFPA 70E, arc flash calculation. Adversely, the term "computation" has a connotation of using a computer, although "load calculations" are frequently determined using a calculator. It appears that the term "computation" was used more frequently beginning with the 1975 NEC based on an editorial revision project.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Cox

8-283 Log #1651 NEC-P08 **Final Action: Reject**
(Table 392-10(A))

Submitter: Richard J. Buschart, Cable Tray Institute / Rep. NEMA

Recommendation:

(1) Add the words "or solid bottom" between "ventilated trough" and "cable trays".
(2) Add new columns 3 and 4 covering fill areas for single conductor cables in solid bottom cable trays.
(3) Add the words "solid bottom cable trays - Section 10(c)" above these columns. See proposed revisions to Table 10a - Solid Bottom Cable Tray. (See revision to Table 392.10(A) below.
Proposed revisions to Table 392.10(A):
Addition of columns 3 and 4 covering Solid Bottom Cable Trays.
Addendum to proposal Table 392.10(A).

Insert Table 392.10(A) Here

(Table shown on page 2733)

Substantiation:

Single conductor cables in solid bottom cable trays were added to the 2002 NEC but the criteria for maximum allowable fill areas were not included. This proposal provides this information. This proposal significantly reduces the maximum permitted allowable fill areas compared to ladder and ventilated trough cable trays. The maximum allowable fill area is approximately 50% of the areas required for ladder and ventilated trough.

Panel Meeting Action: Reject

Panel Statement:

The submitter's substantiation acknowledges that this proposal significantly reduces the maximum permitted wire fill compared to ladder and ventilated trough cable tray. However, no technical substantiation has been provided to support these values.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Cox

8-284 Log #2779 NEC-P08 **Final Action: Reject**
(Table 392-10(A))

Submitter: Richard J. Buschart, Cable Tray Institute

Recommendation:

Add new text:
(1) Add the words "or solid bottom" between "ventilated trough" and "cable trays".
(2) Add new columns 3 and 4 covering fill areas for single conductor cables in solid bottom cable trays.
(3) Add the words solid bottom cable trays - Section 10(c) above these columns. See attached proposal revisions to Table 10a - Solid Bottom Cable Tray.

Insert Table 392.10(A) Here

(Table shown on page2733)

Substantiation:

Single conductor cables in solid bottom cable trays were added to the 2002 NEC but the criteria for maximum allowable fill areas were not included. This proposal provides this information. This proposal significantly reduces the maximum permitted allowable fill areas compared to ladder and ventilated trough cable trays. The maximum allowable fill area is approximately 50% of the areas required for ladder and ventilated trough.

Panel Meeting Action: Reject

Panel Statement:

Refer to the panel action and statement on Proposal 8-283.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Cox

8-285 Log #3228 NEC-P08 **Final Action: Accept**
(Table 392-10(A))

Submitter: Patrick J. Edgecomb, Edgecomb & Son's Builders

Recommendation:

In column 2 change 1.1 in the formula to 28 for the SI calculation so the formulas will appear as follows:

4,200 - (1.1 Sd)[b]	4,200 - (28 Sd)[b]
6,100 - (1.1 Sd)	6,100 - (28 Sd)
8,400 - (1.1 Sd)	8,400 - (28 Sd)
12,600 - (1.1 Sd)	12,600- (28 Sd)
16,800 - (1.1 Sd)	16,800 - (28 Sd)
21,000 - (1.1 Sd)	21,000 - (28 Sd)
25,200 - (1.1 Sd)	25,200 - (28 Sd)

In footnote "a" to Table 392.10(A) change 1.1 to 28 in the formula in the second line so the footnote will read as follows:
[a]The maximum allowable fill areas in Columns 2 shall be computed. For example, the maximum allowable fill in mm^2 for a 150-mm wide cable tray in Column 2 shall be 4192.5 minus (~~1.1~~ 28 multiplied by Sd)...

Substantiation:

The 1.1 is a dimension in inches not a factor. The 1.1 must be multiplied by 25.4 to convert it from inches to millimeters giving the number 27.94 which should be rounded to an even 28.

This table first appeared in the 1975 NEC and there is no explanation as to it's origin in the preprint on proposals for that edition of the NEC. Apparently it was decided that the maximum fill for a cable tray was that the total cable cross-sectional area not be permitted to exceed an area equal to the width of the cable tray in inches times a 1.1 inch depth. This error in the SI formula is illustrated with the following example worked both in inch-pound and SI dimensions.

Example: A ladder type cable tray contains four single-conductor cables size 1000 kcmil with an overall diameter of 33.27 mm (1.310 in.) in a single layer, and six single-conductor cables size 3/0 AWG with a cross-sectional area of 172.8 mm^2 (0.2679 $in.^2$). Using the formula in Column 2 of Table 392.10(A), the results are a minimum cable tray width of 225 mm (9 in.) This result was determined using inch-pound dimensions as the SI formula gives meaningless results. There are 645 mm^2 per in^2. Dividing the 2,373 mm^2 determined using the SI formula from table 392.10(A) gives 3.68 in^2. Clearly the two methods do not give the same result. If 28 is substituted in the SI formula in place of 1.1, the results are equivalent.

Sd = 4 x 33.27 mm = 133.1 mm	Sd = 4 x 1.310 in. = 5.24 in.
6,100 - (1.1 x Sd) = 5,954 ~~mm~~ mm^2	9.5 - (1.1 x Sd) = 3.74 $in.^2$
6,100 - (28 x Sd) = 2,373 mm^2	(2,373 mm^2 ÷ 645 = 3.68 $in.^2$)
Total size 3/0 cable area = 6 x 172.8 mm^2 = 1,037 mm^2	(6 x 0.2679 $in.^2$ = 1.61 $in.^2$)

Panel Meeting Action: Accept

Panel Statement:

The panel notes that the table requires the use of cable diameters, not cable cross-sectional areas, as shown in the substantiation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Cox

8-286 Log #3224 NEC-P08 **Final Action: Accept**
(Table 392-10(A) Note)

Submitter: Sam A. Malone Saginaw, MI

Recommendation:

In the second line of footnote "a" change 4192.5 to 4,200 so the footnote reads as follows:
For example, the maximum allowable fill, in mm^2 for a 150 mm wide cable tray in Column 2 shall be ~~4192.5~~ 4,200 minus (1.1 multiplied by Sd)...

Substantiation:

The value of 4192.4 was apparently an exact calculation and rounded off values were used in Table 392.10(A). It is confusing to use a different number in the calculation than from the formula in the table.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Cox

8-287 Log #3218 NEC-P08 **Final Action: Accept**
(392-10(A)(1))

Submitter: Brenda A. Carter Bad Axe, MI

Recommendation:

Add to the end of the sentence, and the cables shall be installed in a single layer so the paragraph reads as follows:
(1) Where all of the cables are 1000 kcmil or larger, the sum of the diameters of all single-conductor cables shall not exceed the cable tray width, and the cables shall be installed in a single layer.

Substantiation:

It is made clear in 392.9(A)(1) when multiconductor cables are required to be installed in a single layer, but it is not made clear when single-conductor cables are required to be installed in a single layer. This point needs to be made clear. Cable tray width is determined based upon the diameter of single-conductor cables 1000 kcmil and larger, and the cross-sectional area of single-conductor cables smaller than 1000 kcmil.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 1

Ballot Not Returned: 1 Cox

Explanation of Negative:

GRIFFITH: Panel action should have been to Reject this proposal. Present language permits installation of 1000 kcmil and larger conductors in a single layer in in tray. It is not believed the present intent of the code is to restrict these larger sized conductors to single layer installation. More importantly, the preferred and most common installation of these conductors, although mostly seen only for large industrial circuits, is for them to be bound together in a common (3 phase) circuit group in order to minimize circuit voltage unbalance/voltage drop. Because their larger size results in greater geometric spacing with single layer installation, bundling of these larger size conductors is important for control of voltage unbalance and voltage drop, particularly on major "system backbone" circuits where they are more often applied.

8-288 Log #1652 NEC-P08 **Final Action: Reject**
(392-10(C) (New))

Submitter: Richard J. Buschart, Cable Tray Institute / Rep. NEMA

Recommendation:

Add a new Section (c) to Section 392.10, number of single conductor cables, rated 2000 volts or less, in cable trays as follows:
(c) Solid Bottom Cable Trays - Where solid Bottom cable trays contain single conductor cables, the maximum number of single conductor cables shall conform to the following:
(1) Where all of the cables are 1000 Kcmil or larger, the sum of the diameters of all single conductor cables shall not exceed 80 percent of the cable tray width (CTI note - for ladder trays it is 100 percent) and the cables shall be installed in a single layer.
(2) Where all of the cables are 250 Kcmil up to 1000 Kcmil, the sum of the cross sectional area of all single conductor cables shall not exceed the maximum allowable cable tray fill area in column 3 (new) of Table 392.10(a) for the appropriate cable tray width (Note for ladder tray it's column 1).
(3) Where 1000 Kcmil or larger single conductor cables are installed in the same cable tray with single conductor cables smaller than 1000 Kcmil, the sum of the cross sectional areas of all cables smaller than 1000 Kcmil shall not exceed the maximum allowable fill area resulting from the computation in column 4 (new) of Table 392.10(a) for the appropriate cable try width.
(4) Where any of the single conductor cables are 1/0 through 4/0 the sum of the diameters of all single conductor cables shall not exceed 80 percent of the cable tray width.

Substantiation:

Single conductor cables in solid bottom cable trays were added to the 2002 NEC but the specific criteria for maximum number of single conductors permitted, maximum allowable full areas, and ampacity were not added. This proposal and two other proposals add this criteria to Article 392. Another proposal will add columns 3 and 4, referenced in this proposal to Table 392.10(a) covering allowable fill areas for single conductor cables in solid bottom cable trays. A third proposal adds ampacity criteria for single conductor cables in solid bottom cable trays.

To allow for the reduction in ventilation of solid bottom cable trays, the maximum of single conductor cables permitted is reduced to 80 percent compared to ladder and ventilated trough cable trays.

The NEC permits the installation of single conductor cables in totally enclosed metal enclosures, where the ventilation is limited more severely than solid bottom cable trays. The application of single conductor cables is limited to industrial establishments where conditions of maintenance and supervision ensure that only qualified persons service the installations.

Another proposal revise Table 392.10 with two new columns, 3 and 4 (See attached proposed revised table) to cover maximum permitted fill areas for solid bottom cable trays. The maximum permitted fill areas are approximately 50 percent of the areas required for ladder and ventilated trough cable trays.

Panel Meeting Action: Reject

Panel Statement:

The technical substantiation is insufficient to demonstrate a need to make a change to the present wording.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Cox

8-289 Log #2780 NEC-P08 **Final Action: Reject**
(392-10(C) (New))

Submitter: Richard J. Buschart, Cable Tray Institute

Recommendation:

Add a new section (C) to 392.10, number of single conductor cables, rated 2000 volts or less, in cable trays.
(C) Solid Bottom Cable Trays - Where solid bottom cable trays contain single conductor cables, the maximum number of single conductor cables shall conform to the following:
(1) Where all of the cables are 1000 Kcmil or larger, the sum of the diameters of all single conductor cables shall not exceed 80% of the cable tray width (CTI note - for ladder trays it is 100%) and the cables shall be installed in a single layer.
(2) Where all of the cables are 250 Kcmil up to 1000 Kcmil, the sum of the cross sectional area of all single conductor cables shall not exceed the maximum allowable cable tray fill area in column 3 (new) of Table 392.10(A) for the appropriate cable tray width (Note for ladder tray it is column 1).
(3) Where 1000 Kcmil or larger single conductor cables are installed in the same cable tray with single conductor cables smaller than 1000 Kcmil, the sum of the cross sectional areas of all cables smaller than 1000 kcmil shall not exceed the maximum allowable fill area resulting from the computation in column 4 (new) of Table 392.10(A) for the appropriate cable tray width.
(4) Where any of the single conductor cables are 1/0 through 4/0, the sum of the diameters of all single conductor cables shall not exceed 80% of the cable tray width.

Substantiation:

Single conductor cables in solid bottom cable trays were added to the 2002 NEC but the specific criteria for maximum number of single conductors permitted, maximum allowable full areas, and ampacity were not added. This proposal and two other proposals add this criteria to 392. Another proposal will add columns 3 and 4, referenced in this proposal to Table 392.10(A) covering allowable fill areas for single conductor cables in solid bottom cable trays. A third proposal adds ampacity criteria for single conductor cables in solid bottom cable trays.
To allow for the reduction in ventilation of solid bottom cable trays, the maximum of single conductor cables permitted is reduced to 80% compared to ladder and ventilated trough cable trays.
The NEC permits the installation of single conductor cables in totally enclosed metal enclosures, where the ventilation is limited more severely than solid bottom cable trays. The application of single conductor cables is limited to industrial establishments where conditions of maintenance and supervision ensure that only qualified persons service the installations.
Another proposal revises Table 392.10 with two new columns, 3 and 4 to cover maximum permitted fill areas for solid bottom cable trays. The maximum permitted fill areas are approximately 50% of the areas required for ladder and ventilated trough cable trays.

Panel Meeting Action: Reject

Panel Statement:

Refer to the panel action and statement on Proposal 8-288.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Cox

8-290 Log #432 NEC-P08 **Final Action: Reject**
(392-11)

Submitter: Hugh D. Butler, Jr. Carrollton, GA

Recommendation:

Delete 392.11 in entirety and move to Article 310 with same wording.

Substantiation:

By 392.1 and 392.2, ampacity is not within the scope of this article or Panel 8. By Section 310.1 ampacity ratings are within the scope of Article 310 and the purview of Panel 6.

Panel Meeting Action: Reject

Panel Statement:

Panel 8 has addressed the special conditions associated with cable tray conductor and cable ampacity as is recognized by 310.1.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13

Ballot Not Returned: 1 Cox

8-291 Log #1653 NEC-P08 **Final Action: Accept**
(392-11(B)(3) Exception (New))

Submitter: Richard J. Buschart, Cable Tray Institute

Recommendation:

At the end of 392.11(B)(3) add the following:
Exception: For solid bottom cable trays the ampacity of single conductor cables shall be determined by 310.15(C).

Substantiation:

The issue is the ampacity of single conductor cables in solid bottom cable trays where the ventilation is restricted relative to ladder and ventilated through cable trays. The situation is somewhat analogous to the condition of solid unventilated covers.

Section 392.11(B)(1) indicates a reduction in ampacity, as given in Tables 310.17 and 310.19 from 75 percent to 70 percent. These ampacity tables apply to single conductors in free air.

Sections (2) and (2) of 392.11(B) derate the free air ratings in 310.17 and 310.19 by 75 percent and are already derated for solid bottom cable trays.

Item (3) however, allows the use of 100 percent of the free air ampacity ratings in Tables 310.17 and 310.19 if the cables are spaced a cable diameter apart. Solid bottom cable trays will restrict the free air slow to these conductors; therefore the ampacity should be determined under engineering supervision per 310.15(C).

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Cox

8-292 Log #433 NEC-P08 **Final Action: Reject**
(392-13)

Submitter: Hugh D. Butler, Jr. Carrollton, GA

Recommendation:

Delete 392.13 in entirety and move to Article 310 with same wording.

Substantiation:

By Section 392.1 and 392.2 ampacity is not within the scope of this article or Panel 8. By Section 310.1 ampacity ratings are within the scope of Article 310 and the purview of Panel 6.

Panel Meeting Action: Reject
Panel Statement:

Panel 8 has addressed the special conditions associated with cable tray conductor and cable ampacity as is recognized by 310.1.

Number Eligible to Vote: 14
Ballot Results: Affirmative: 13
Ballot Not Returned: 1 Cox

7-208 Log #3372 NEC-P07 **Final Action: Accept in Principle in Part**
(396-12(B))

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panels 4 and 5 for comment.

Submitter: Donald W. Zipse, Zipse Electrical Engineering, Inc.

Recommendation:

Rearrange Section and add new.
396.12 Uses Not Permitted.
(A) (move existing sentence to here and add a new-) Messenger supported wiring shall not be used in hoistways or where subject to physical damage.
(B) (new) The messenger shall not be used as a continuous current carrying conductor such as a neutral conductor.

Substantiation:

The messenger has been used for three dissimilar functions:
1. As a messenger used to support insulated conductors.
2. As a ground or equipment grounding conductor.
3. As a continuous current carrying neutral conductor.

Approximately 35 years ago the panel that had metallic house trailers and travel trailers realized the combining of the equipment ground conductor with the continuous current carrying neutral as in a cable connecting electrical power to the metallic trailers which had the two conductors combined into one and was connected to the metallic frame, grounding the frame resulted in stray neutral current flowing on the metallic surfaces. When someone standing in water touched the metallic side, they were either shocked or electrocuted.

The panel, one of the more astute panels with keen insight and perception, required the separation of the equipment grounding conductor or ground conductor from the continuous current carrying neutral conductor. Insulated phase(s) conductor(s) were still required, but then an insulated neutral conductor and a separate equipment-grounding conductor were required. This could be referred to as a 3-wire replaced with a 4-wire safe connection.

The next code cycle the marina panel required 4-wire connections. However, Panel 5 was very slow to realize the dangers associated with combining of the continuous current carrying neutral and the equipment-grounding conductor and it took Panel 5, 21 years to require ranges and dryers to be wired with 4-wires, separating the continuous current carrying neutral conductor from the equipment-grounding conductor. This became code in 1996.

The next logical step in the progression of safety for the public is separation in the section for the messenger.

However, you no doubt are concerned about this change after many, many years of unsafe wiring 3-wire messenger cable. The safer 4-wire, 2 phase conductors, (3rd) an insulated neutral and a (4th) combination ground/equipment-grounding conductor combined with the messenger where it connects with the utilities unsafe 3-wire service drop. Let the utilities make the error of combining the neutral and the ground and the messenger together. At least the NEC will be clean and free from future potential legal action.

Someone has to make the first move and let it be the more safer code, the NEC to do so. With your action, the NESC code cycle follows the NEC and that will allow them your concern for safety. The NESC will have to "you know What" or get off the pot.

In previous cycles, changes have been proposed to both the NESC and the NEC allowing 4-wire service. In the case of the NESC, it was worded that the customer would pay for the 4th conductor.

Concern pervades the industry about stray current and cows. Cows are much more sensitive to stray current than humans. However, as the electrical load increases more and more humans will be experiencing electrical shocks and possible electrocutions.

Stray current has contributed to the death of 5 cows per day on one dairy farm. This lasted for over a year before stray current was realized.

Go to www.app.com and scroll down to "stray voltage" and read about the many persons in NJ who are experiencing electric shocks from stray current. In fact, one family was told by the utility not to let their 3 boys play bare foot in their own back yard. This lasted all summer, in addition the inability to use their own above ground swimming pool and their hot tub lasted all summer and fall and the utility has yet to find and fix the problem.

Now I have come across a case where persons in a swimming pool complained about bugs biting them under water. All electric power was turned off to the pool. Not confirmed that one person while trying to climb out of the pool muscles froze. It is preliminarily assumed another boy's muscles froze while in the water and after he was found, missing, the dark and cloudy pool was dragged. He was found dead.

Panel Meeting Action: Accept in Principle in Part

The panel accepts the second sentence of the recommended wording without the word "continuous", and adds it as a seperate second paragraph.

The panel and does not accept the use of (A) and (B).

The section will now read as follows:

"396.12 Uses Not Permitted.

Messenger supported wiring shall not be used in hoistways or where subject to physical damage.

The messenger shall not be used as a current carrying conductor."

Panel Statement:

The section is not sufficiently long to justify subdivision. The proposed first sentence currently exists in 396.12. The phrase "such as a neutral conductor" is not considered necessary.

The word "continuous" was deleted to clarify that the messenger is not to be a current carrying conductor under normal use.

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

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

7-209 Log #2033 NEC-P07 (398-12) **Final Action: Accept in Principle in Part**

TCC Action:

The Technical Correlating Committee understands that 398.10 is deleted to correlate with the action on this proposal.

Submitter: National Electrical Code Technical Correlating Committee

Recommendation:

Revise 398.12 as follows:

398.12 Uses Not Permitted.

Open wiring on insulators shall not be installed in installations other than industrial or agricultural establishments and

(1) where concealed by the building structure.

(2) where the voltage exceeds 600 volts

Substantiation:

During the processing of the 2002 NEC, a code-making panel identified concerns with the concept of trying to describe the "uses permitted" for a particular wiring method and not be in conflict with the "uses not permitted". In some cases, the permitted and "not permitted" uses can be easily segregated. However, there are a number of instances where the "use permitted" ends up being the exception to a "use not permitted". Because of the problems becoming apparent with the lists, the Correlating Committee asked the Usability Task Group to review the issue and make a recommendation on how to best handle the lists.

This is one of the proposals that resulted from that review. The overall recommendation is that the "Uses Permitted" section be deleted (via a separately submitted proposal) and the "Uses Not Permitted" section be revised to properly accommodate any limitations from the uses permitted language. With these revisions, the NEC language would only cover those specific "uses not permitted" for a wiring method. All applications not covered by those limitations would be acceptable.

This would make it easier for inspectors, manufacturers, electricians, and others in the electrical industry to determine what uses were not permitted for this wiring method without making it necessary for the Code Panels to provide a running laundry list of uses permitted.

This is a companion proposal to delete Uses Permitted in this Article.

The Useability Task Group on Uses Permitted/Uses Not Permitted is comprised of Mr. George Dauberger, Mr. John Minick, Mr. Jim Dollard, Mr. Dick Owen, Mr. Phil Sutherland, and Mr. Mark Ode.

Panel Meeting Action: Accept in Principle in Part

Revise the first sentence of the recommended text to read as follows:

"Open wiring on insulators shall not be permitted in other than industrial or agricultural installations and".

(1) and (2) are accepted.

Panel Statement:

The panel assumes that this Proposal also requires the deletion of 398.10. Existing 398.10 permits open wiring indoors or outdoors. The proposed wording in the Proposal for 398.12 could be interpreted to limit the use of open wiring to indoors only.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

BROWN: Accepting this proposal makes the assumption that 398.10 is going to be deleted. The panel received no proposal that would delete 398.10.

SCHUMACHER: Accepting this proposal assumes that 398.10 is going to be deleted, there was no proposal doing that.

7-210 Log #3086 NEC-P07 **Final Action: Reject**
(398-12)

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 19 for action in Article 547. This action will be considered by Code-Making Panel 19 as a public comment.

Submitter: Barry Bauman, Alliante Energy

Recommendation:

Add new text as follows:
398.12 Uses Not Permitted. Open wiring on insulators shall not be installed where concealed by the building structure or in agricultural buildings meeting the requirements of 547.1.

Substantiation:

Equipment enclosures, boxes, conduit bodies and fittings required in 547.5(C) and luminaires required in 547.8 are not available for Article 398 wiring methods.
A companion proposal has been submitted for 547.5.

Panel Meeting Action: Reject

Panel Statement:

Code-Making Panel 19 has the responsibility for Article 547. Any restrictions on wiring methods in agricultural buildings should appear in that Article.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

7-211 Log #947 NEC-P07 **Final Action: Accept**
(398-15(A))

Submitter: James M. Daly, General Cable

Recommendation:

Delete the word "severe" in the first sentence.

Substantiation:

There is no distinction between "physical damage" and "severe physical damage" in the Code; open wiring on insulators should not be subjected to any physical change.
3.2.5.4 of the 2001 NEC Style Manual also shows "protection against physical damage" as the preferred terminology.
3.2.1 of the 2001 NEC Style manual states that "The NEC shall not contain references or requirements that are unenforceable or vague." The term "severe" is subjective and vague and should not be used if it can be avoided.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

7-212 Log #545 NEC-P07 **Final Action: Accept in Principle**
(398-15(C)(4))

Submitter: James M. Daly, General Cable

Recommendation:

Delete text as follows:
(4) Rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, or electrical metallic tubing, ~~in which case the rules of Article 342, 344, 352, or 358 shall apply;~~ or by metal piping, in which case the conductors shall be encased in continuous lengths of approved flexible tubing.

Substantiation:

4.1.1 of the NEC Style Manual states that "references shall not be made to an entire article unless additional conditions are specified."
90.3 states that Chapters 1, 2, 3 and 4 apply generally.

Panel Meeting Action: Accept in Principle

Revise the wording in the recommendation to read as follows:

"(4) Rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, or electrical metallic tubing. When installed in metal piping, the conductors shall be encased in continuous lengths of approved flexible tubing."

Panel Statement:

The revised wording meets the intent of the submitter, and provides further clarity.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

6-74 Log #3119 NEC-P06 **Final Action: Accept**
(Table 400-4)

Submitter: Austin D. Wetherell, Underwriters Laboratories, Inc.

Recommendation:

Alphabetize the Table as to cord/cable type.

Substantiation:

Several cycles ago, this table was alphabetized. When Types EV, EVJ, EVE, EVJE, EVT, and EVJT were added, they were put in at the end by mistake.

Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-75 Log #3120 NEC-P06 **Final Action: Accept**
(Table 400-4)

Submitter: Austin D. Wetherell, Underwriters Laboratories, Inc.

Recommendation:

Delete elevator cable types ET and ETLB from the table.

Substantiation:

These types have been removed from UL's Standard 62 since they are both obsolete.

Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

6-76 Log #1919 NEC-P06 **Final Action: Reject**
(Table 400-4 Note 7)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
7. The individual conductors of all cords, except those of heat-resistant cords, shall have a thermoset or thermoplastic insulation, except that the equipment ~~grounding~~ bonding conductor where used shall be in accordance with 400.23(B).

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel statement on Proposal 6-1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Explanation of Negative:

Comment on Affirmative:

FRIEDMAN: NEMA supports the panel action to reject. The proposal fostered significant debate during the code process. After considering all of the debate, it is clear that the issue is one of education and not terminology. Changing the term from "equipment grounding conductor" to "equipment bonding conductor" in no way changes the need for qualified persons and continuing education. The present terminology is well understood by those who understand the purposes of grounding and bonding. The panel members and the public need to consider the magnitude of this change compared to the benefits. The change will create a nightmare of revisions and changes in terminology across the entire electrical system. The benefit is practically nonexistent.
MCCLUNG: See my affirmative comment on Proposal 6-1.

6-77 Log #1379 NEC-P06 **Final Action: Reject**
(Table 400-4 Note 10)

Submitter: Andy Juhasz, KONE Inc. / Rep. National Elevator Institute Inc. (NEII)

Recommendation:

Revise Note 10 to read as follows:
10. Elevator cables in sizes 20 AWG through 14 AWG are rated 300 volts or 600 volts, and sizes 10 through 2 are rated 600 volts. 12 AWG is rated 300 volts with a 0.76-mm (30-mil) insulation thickness and 600 volts with a 1.14-mm (45-mil) insulation thickness.

Substantiation:

In the 2002 NEC, 620.3(A) permits voltages up to 600 volts on the car to power door operator controllers and door motors. Presumably, this 600 volts is carried by the elevator traveling cable. 620.11(B) refers to Table 400.4 for traveling cable requirements. Table 400.4 calls out various types of elevator traveling cable, all of which refer to Note 10 in the Table. Standard elevator traveling cables are only available with wire sizes up to 14 AWG which would be limited to 300 volt insulation by the existing Note 10.

Panel Meeting Action: Reject

Panel Statement:

No technical substantiation was provided to support listing of 20 AWG through 14 AWG conductors at 600V.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-80 Log #1088 NEC-P06 **Final Action: Reject**
(Table 400-5 (New))

Submitter: Russell LeBlanc, Peterson School of Engineering

Recommendation:

Add another table for temperature correction factors. The Code-Making Panel should determine the proper temperature correction factors.

Substantiation:

Tables 400.5A, and 400.5B are based on 30 degrees C.
How do we determine the ampacity of a cord installed in 40 degree C, or 50 degree C, etc, etc?

Panel Meeting Action: Reject

Panel Statement:

The submitter has not complied with the requirements of 4-3.3(c) of the Regulations Governing Committee Projects that proposals must provide the specific "wording to be added, revised (and how revised), or deleted."

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-78 Log #1521 NEC-P06 **Final Action: Accept in Part**
(400-5)

Submitter: Noel Williams Herriman, UT

Recommendation:

Revise Section 400.5 by inserting a new third and fourth sentence (after "...to ensure selection of the proper size and type.") to read as follows:

"Where cords are used in ambient temperatures exceeding 30°C (86°F) the temperature correction factors from Table 310.16 that correspond to the temperature rating of the cord shall be applied to the ampacity from Table 400.5(A) or Table 400.5(B). The temperature correction factors for 90°C conductors shall be permitted to be used with cords with temperature ratings higher than 90°C."

Substantiation:

This proposal is intended to improve the usability of this section. Temperature ratings are not given for most of the cord types in Article 400, but listing standards state that cords are 60°C unless marked otherwise, so the temperature rating of a cord may usually be easily determined by a user. However, the ampacity tables (400.5(A) and (B)) are based on a stated ambient temperature, but Article 400 does not say how to correct these values for other ambient temperatures. The existing statement that the tables are to be used with "applicable end-use product standards" is not helpful to the majority of users of cords, as these standards are not furnished with the cords, and are unavailable or prohibitively expensive for most users, especially for those users who in compliance with the limitations on their use, do not install large quantities of flexible cord. The existing third sentence (to become the fifth sentence) does say how to correct for other nonstandard conditions, so this section should also provide guidance to the user on how to deal with nonstandard ambient conditions. Since the proposed rule about cords with higher temperature rations is in permissive language, the product standards may still be used for special-purpose or high-temperature cords, so this will not change the way manufacturers of listed equipment and appliances use these cords. An alternative method of providing this information would be to copy the correction factors into a new Table 400.5(C) in the same manner that the existing Table 400.5 is copied from 310.15(B)(2)(a). It might be helpful to also add a FPN to explain that listed cords without temperature markings are rated at 60°C. (Fahrenheit equivalents to the cord ratings were not included as they generally are not found on cord markings.) Any method of making this section more complete for the users of flexible cord would be welcomed by this submitter.

Panel Meeting Action: Accept in Part

In the recommended text, delete the wording "Table 400.5(A) or". In addition, delete the last sentence of the recommended text in its entirety.

Panel Statement:

Table 400.5(A) temperature ratings have nothing to do with ampacity which is based on 60 degrees. These products are normally used in households. The last sentence has been deleted since there are no cords rated higher than 90 degrees C in Table 400.5(B).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-79 Log #1920 NEC-P06 **Final Action: Reject**
(400-5)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:

400.5 Ampacities for Flexible Cords and Cables. …An equipment grounding conductor shall not be considered a current-carrying conductor.

Where a single conductor is used for both equipment ~~grounding~~ bonding and to carry unbalanced current from other conductors, as provided for in 250.140 for electric ranges and electric clothes dryers, it shall not be considered as a current-carrying conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel statement on Proposal 6-1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Explanation of Negative:

Comment on Affirmative:

FRIEDMAN: NEMA supports the panel action to reject. The proposal fostered significant debate during the code process. After considering all of the debate, it is clear that the issue is one of education and not terminology. Changing the term from "equipment grounding conductor" to "equipment bonding conductor" in no way changes the need for qualified persons and continuing education. The present terminology is well understood by those who understand the purposes of grounding and bonding. The panel members and the public need to consider the magnitude of this change compared to the benefits. The change will create a nightmare of revisions and changes in terminology across the entire electrical system. The benefit is practically nonexistent.

MCCLUNG: See my affirmative comment on Proposal 6-1.

6-81 Log #462 NEC-P06 **Final Action: Reject**
(400-5(6))

Submitter: William G. Hill, William Glenn Hill Electric

Recommendation:

Flexible cords and cables should be protected against overcurrent in accordance with their ampacities. Most residential fires start because of lamp and extension cords being overloaded. Any current in excess of the rated current ampacity of a conductor may result in overload or short circuit. Lamp and extension cords should be protected for what the cord rating is, not the branch circuit rating. A fuse where it receives its supply.

Substantiation:

The loss of life and property.
NOTE: Supporting Material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement:

There is no 400-5(6) in the 2002 NEC. The submitter did not provide the text to be added as required by 4-3.3(c) of the NFPA Regulations Governing Committee Projects.
The Submitter's concerns are better addressed in Article 240.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-82 Log #1058 NEC-P06 **Final Action: Reject**
(400-7)

Submitter: Thomas Mason Akron, OH

Recommendation:

Add new text to read as follows:
Manufactured assemblies consisting of a connector, heavy duty flexible cable not over 8 ft in length and multi-outlet assembly (plug strip) shall be permitted in protected locations for periods exceeding 90 days.

Substantiation:

Personal computer installations commonly consist of a system unit, monitor and printer. A task light and radio are common at each workstation. Plugstrips are in almost universal use and violate the present 90 day limit.

Panel Meeting Action: Reject

Panel Statement:

Article 400 does not limit the use of flexible cords and cables to 90 days.
527.3(B), Temporary Installations, states that "Temporary electrical power and lighting installations shall be permitted for a period not to exceed 90 days for holiday decorative lighting and similar purposes",
and 527.3(A) defines the conditions for temporary lighting. 400.7(A)(3) addresses the submitter's concern.
Also, see panel action and statement on 6-88a (Log #CP602).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-83 Log #2069 NEC-P06 **Final Action: Reject**
(400-7)

Submitter: Timothy Palaski, Middle Department Inspection Agency (MOIA)

Recommendation:

Add text to read as follows:
(7) Where run on shelving, movable partitions or sharp edged surfaces.

Substantiation:

Many areas of retail space are constantly moving their display areas and the cords are being damaged. Many electrical appliances are left energized when the business is closed and fires have resulted.

Panel Meeting Action: Reject

Panel Statement:

400.7(7) already exists. The submitter may be referring to adding 400.8(7). Protection against physical damage is already covered in 300.4.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-84 Log #3518 NEC-P06 **Final Action: Reject**
(400-7)

Submitter: Stephen W. McCluer, American Power Conversion Corp

Recommendation:

Add:
(12) Interconnection between multiple bays of a single system of utilization equipment, including bays that are not in one continuous line-up

Substantiation:

When a three-phase branch circuit is connected to a large piece of utilization equipment, the equipment typically must be housed in more than one enclosure. An example would be information technology equipment housed in multiple racks that share a common power supply. The equipment is not part of the building, and cables between bays are not part of fixed structure wiring. Because of space constrains or obstructions at a particular site, some bays may have to be separated, in which case the interconnections would be run using an approved method in accordance with this Code.
Key words:
Utilization equipment - Equipment that utilizes electric energy for electronic, electromechanical, chemical, heating, lighting, or similar purposes.

Panel Meeting Action: Reject

Panel Statement:

The panel was unsure as to the intent of the submitter. The submitter's concern relative to information technology equipment is already addressed in 645.5(C). If the submitter is requesting frequent interchange, it is currently permitted in 400.7(6). Flexible cords and cables are not intended to replace permanent wiring.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-85 Log #717 NEC-P06 **Final Action: Reject**
(400-7(A))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add:
(12) Where specifically permitted elsewhere in this Code.

Substantiation:

Flexible cords and cables are permitted for fixed permanent wiring by 501.4(A)(2)(B)(2), 501.11, 502.4(A)(1)(e), 502.4(B)(2), 503.3(A)(2), 550.10(B), 553.7(B), 555.13(A)(2), for example. The permitted uses do not appear to cover the proposed sections. While it may be argued those sections modify this article (4), (5), (9), and (11) are noted even though covered by modifying articles. The time constraints of 527.3 indicate cord wiring covered by the proposed referenced sections is permanent wiring.

Panel Meeting Action: Reject

Panel Statement:

90.3 stipulates that "Chapters 1, 2, 3, and 4 apply generally; Chapters 5, 6, and 7 apply to special occupancies, special equipment, or other special conditions. These latter chapters supplement or modify the general rules. Chapters 1 through 4 apply, except as amended by Chapters 5, 6, and 7 for the particular conditions."

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-86 Log #764 NEC-P06 **Final Action: Reject**
(400-7(A))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add the following next text:
(12) For flexibility, as permitted in 501.11 and 502.4(A).
(13) For floating buildings as permitted in 553.7(B).
(14) for marinas and boatyards as permitted in 555.13(A)(2).
Or alternatively, delete text as follows:
~~(4) Elevator cables~~
~~(5) Wiring of cranes and hoists~~
~~(9) data processing cables as permitted by 645.5~~
~~(11) temporary wiring as permitted in 537.(B) and 527.4(C).~~

Substantiation:

Although the proposed added references are not in compliance with 4.1 of the Manual of Style, neither are (4), (5), (9), and (11), but such references are helpful to Code users.

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 6-85.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-87 Log #236 NEC-P06 **Final Action: Accept**
(400-7(A)(9))

Submitter: James M. Daly, General Cable

Recommendation:

Delete "(9) Data processing cables as permitted by 645.5."

Substantiation:

This reference is not required since 90.3 states:
"...Chapters 1, 2, 3 and 4 apply generally; Chapters 5, 6, and 7 apply to special occupancies, special equipment, or other special conditions. These latter chapters supplement or modify the general rules. Chapters 1 through 4 apply except as amended by Chapters 5, 6, and 7 for the particular conditions."
If the reference to 645.5 is included, then references to 520.5(B), 535.20(A) and (B), 530.12, 540.15, etc. should also be included.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-88 Log #136 NEC-P06 **Final Action: Accept in Principle**
(400-7(A)(11))

Submitter: James M. Daly, General Cable

Recommendation:

Change "Temporary wiring" to "Temporary installations".

Substantiation:

Article 305, Temporary Wiring, in the 1999 Code was changed to Article 527, Temporary Installations, in the 2002 Code. This change will correct the reference.

Panel Meeting Action: Accept in Principle

Delete the existing 400-7(A)(11).

Panel Statement:

See the panel action and the submitter's substantiation on Proposal 6-87.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-88a Log #CP602 NEC-P06 **Final Action: Accept**
(400-7(C))

TCC Action:

The Technical Correlating Committee directs the Panel to clarify the use of SI units according to 90.9 of the NEC and 3.2.7 and Annex C of the NEC Style Manual. This action will be considered by the Panel as a Public Comment.

Submitter: Code-Making Panel 6

Recommendation:

Add a new Section 400.7(C) to read:
(C) Attachment Plug and Multi-Outlet Receptacle Assembly. Where used as permitted in 400.7(A)(3), (A)(6), and (A)(8), each assembly shall consist of an attachment plug, a flexible cord, and a multi-outlet receptacle strip, and the following should also apply:
(1) Each assembly shall be energized from a receptacle outlet
(2) The assembly shall be listed
(3) The overall length of the assembly shall not exceed 2.44 m (8 ft).

Substantiation:

There is currently confusion and misconception regarding the application and use of these "power strips". The panel has developed the new wording to address these concerns.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

FRIEDMAN: UL presently permits relocatable power taps with cord in lengths up to 25 feet. There is no justification to limit length to 8 feet.
KOMASSA: This proposal should be rejected. This should be part of a product standard and is not part of the premises wiring system.
WETHERELL: I believe that the panel should propose a maximum permitted length, in item (3), of 25 ft. Listed products of this type exist up to 25 ft in length and no problems have been reported to UL. One example is that they are often needed longer than 8 ft in meeting rooms to get from the outlet to the conference table so that everyone can plug their computers in. Limiting the length would encourage the use of more extension cords.

6-89 Log #722 NEC-P06 **Final Action: Accept in Principle**
(400-8)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add:
(7) Where likely to be subject to physical damage.

Substantiation:

Present syntax of the first paragraph is only suitable for (1). Nothing in this article specifically addresses use where cord is likely to be damaged. Section 110.27(B) is a general requirement, but many wiring methods have a specific requirement where subject to damage.

Panel Meeting Action: Accept in Principle

Revise the text in the recommendation to read as follows:
"(7) Where subject to physical damage."

Panel Statement:

The term "likely to be" is too vague.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-90 Log #2877 NEC-P06 **Final Action: Reject**
(400-8)

TCC Action:

The Technical Correlating Committee directs that the panel clarify their actions and statements as Accepting one proposal is not a reason to Reject another proposal.

Submitter: Joseph A. Hertel, Safety and Buildings / Rep. Dept. of Commerce, State of Wisconsin

Recommendation:

Revise the exception to read:
Exception: Flexible cords and cables permitted by 400.7(A) connected to sources other than busways shall be permitted to be attached to adequately supported equipment or building surfaces provided the type of cord or cable, the attachment of the building and equipment, and the support comply with the provision of 368.8(B).

Substantiation:

The current language sends the user to Section 368.8 for the attachment of cords or cables to building surfaces. This section allows a connection from busways only. The proposed exception would cite the requirements of 368.8(B) for installation purposes but recognize the uses for cable and cord of 400.7 where connected to other than busways. This would permit a single connection to the building for cord or cable used in 400.7 applications.

Panel Meeting Action: Reject

Panel Statement:

See the panel action on Proposal 6-92.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-91 Log #2992 NEC-P06 **Final Action: Reject**
(400-8)

TCC Action:

The Technical Correlating Committee directs that the panel clarify their actions and statements as Accepting one proposal is not a reason to Reject another proposal.

Submitter: Monte Ewing, State of Wisconsin

Recommendation:

Revise as follows:
(4) Where attached to building surfaces or equipment. Exception: Flexible cords and cables permitted by 400.7(A) and where connected to sources other than busways shall be permitted to be attached to a building surface or adequately supported equipment provided the type of cord or cable, attachment to the building or equipment, and support complies with the provisions of 368.8(B).

Substantiation:

The present wording implies that cord drops are only permitted from busway. The revision will allow cord drops from other than busway (junction boxes, conduit bodies, wireways, etc.) as long as the same support requirements are followed.

Panel Meeting Action: Reject

Panel Statement:

See the panel action on Proposal 6-92.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-92 Log #3175 NEC-P06 **Final Action: Accept**
(400-8(4) Exception)

TCC Action:

The Technical Correlating Committee directs that the action on this Proposal be rewritten to comply with 2.6.1 of the NEC Style Manual regarding the use of Exceptions made to items within a numbered list.

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc. / Rep. Mass Electrical Code Adv. Committee

Recommendation:

Revise the existing exception as follows:
Exception: Flexible cord and cable shall be permitted to be installed in accordance with 368.8(B). For other applications, where the length of the cord from the supply termination to a suitable tension take-up device is limited to 2.5 m (8 ft), flexible cord shall be permitted to have one connection to the building surface.

Substantiation:

This proposal allows for traditional cord extensions from other, non-busway sources such as overhead wireways. The present NEC isn't clear whether or not that entire family of cord use dropped out of the 1999 Code. The 2002 rule (unchanged from 1999) only mentions 364.8, and the scope of that section only covers extensions from busways. One theory holds that "the provisions" involved here are the installation rules for similar applications, such as that the vertical drop be vertical and so on. The other, more literal theory, holds that no cords can extend to a take-up device unless they originate at the busway.

The latter view represents an enormous change in standard installation practice, and there was no technical substantiation in the last Code cycle to support such a restriction. This proposal, by covering other non-busway applications in a separate sentence, clearly allows those other applications to continue.

CMP-6 complained about the lack of technical substantiation in the Advisory Committee's 2002 proposal on this subject. The essence of that proposal, however, was that the 1999 NEC change must have been inadvertent, since the panel provided no substantiation to make this change. If that is not the case, then the panel should consider the technical merits of the present wording. By not allowing a connection to the building surface, the NEC is inviting the arrangement of cords at oblique angles, instead of the neat and workmanlike arrangement involved in a swag to a point directly over the load. In addition, the vertical strain is better accommodated by a take-up connected to the building instead of a basket or gland connector at the cord exit. Such arrangements are much more likely to fail over time.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

LAIDLER: The exception to 400-8(4) in the 1996 Code read "Flexible cord and cable shall be permitted to have one connection to the building surface or a suitable tension take-up device. Length of the cord or cable from the supply termination to the take-up device shall be limited to 6 ft (1.83 m). The submitter is correct that the present wording in the exception is significantly different from the exception as it appeared in the 1996 NEC. Unfortunately, the wording in this proposal does not resolve the problem. The location of the exception is intended to provide permission to attach to building surfaces only. The first sentence of the proposed exception references an entire set of conditions that must be met in order to use cord and cable as a branch from a busway. Yet, its location under (4) limits the relevance to only attachment to building surfaces. This sounds more like an attempt to correlate the two provisions rather than to provide an exception from the requirement that cords and cable not be attached to building surfaces. Secondly, the last sentence does expand the scope of the exception to other than Article 368 applications, but it establishes, without adequate technical substantiation, an eight foot maximum length to the take-up device, rather than the present 6 ft requirement. The proposed exception really contains to separate requirements and perhaps should be treated as separate exceptions.

6-93 Log #2991 NEC-P06 **Final Action: Reject**
(400-8(5))

Submitter: Monte Ewing, State of Wisconsin

Recommendation:

Revise as follows:
(5) Where installed behind wall, floor, or ceiling finishes including suspended or dropped ceilings.

Substantiation:

The present language uses the word "Concealed" which is defined in Article 100 (rendered inaccessible by the building finish). However the intent was to also apply this rule to cords installed above a ceiling with lift out removable panels. Removable tiles or panels is considered "Accessible"(As applied to wiring methods) per Article 100. The revision makes simply says that cords are not to be located behind a building finish.

Panel Meeting Action: Reject

Panel Statement:

The present text is adequate.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-94 Log #3177 NEC-P06 **Final Action: Reject**
(400-8(6) Exception (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc. / Rep. Mass Electrical Code Adv. Committee

Recommendation:

400.8(6). Add an exception as follows:
Exception: Flexible cord shall be permitted to be installed in raceways where its calculated ampacity has been further derated by a factor of 0.8, or where its ampacity has been calculated under 310.15(C).

Substantiation:

This exception recognizes a legitimate use of cord now formally prohibited. The only reason for the general prohibition against running cord in raceways (new in the 1990 NEC) is that the table ampacities are figured with the cord able to dissipate its heat freely. Unfortunately, there are many, many legitimate uses for cord in raceway, far too many to give this up entirely. There are many machine tool applications where putting a suitable cord fitting on the end of a piece of conduit was the only way to go. The cord might provide some necessary flexibility to a movable solenoid, for example. Then, the cord would run through the raceway to the terminal blocks in a remote enclosure.

Typically, these applications never approached the ampacity of the cord. A designer frequently will be more than willing to pay a meaningless derating penalty (given the low loading) in exchange for reducing the numbers of splices in their system. The Code should allow the cord in a raceway whenever the heating has been considered. This change allows the engineering calculation, as well as a Table 400-5 type factor of 80%. The 80% factor is very conservative; reviewing similar tables in Appendix B and looking at the spread between 3/C cable in air vs. in raceway, the differences are less than 80%.

The industry needs a practical way to quickly figure a revised ampacity here, so the cords can go back in some of these raceways. This revision provides the method.

In the 1999 cycle, the panel made some points in rejecting this proposal, which we would like to respond to at this time. With respect to the life expectancy of cord in raceway, we think just about anyone would be willing to compare the life expectancy of flexible cord in a raceway with, for example, nonmetallic cables (Type NM) in a similar location, which the NEC clearly allows. Furthermore, splices are always potential failure points. By standing firm on this engineering question, CMP-6 is overlooking the practical effect of forcing everyone to splice more, resulting in a decrease of safety, reliability, and workability.

Panel Meeting Action: Reject

Panel Statement:

See the panel action on Proposal 6-95. Flexible cord is not to be used as a replacement for permanent wiring.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-95 Log #911 NEC-P06 (400-14) **Final Action: Accept**

TCC Action:

It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting regarding the unlimited length of the cord in the requirement. This action will be considered by the panel as a public comment.

Submitter: Samuel B. Friedman, General Cable

Recommendation:

Add a new second paragraph to 400.14:

In industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation, flexible cords and cables shall be permitted to be installed in above ground raceways to protect the flexible cord or cable from physical damage. Where more than three current-carrying conductors are installed within the raceway, the allowable ampacity shall be reduced in accordance with Table 400.5.

Substantiation:

Section 400.8(6) states that flexible cords or cables are not permitted to be installed in raceways. However, in many industrial applications, as permitted in 400.7(A)(5), (6), (7), (8), or (10), it is necessary to install a length of flexible cord or cable to the utilization equipment from the power source, control panel, junction box at the end of the fixed wiring, or between related pieces of equipment. One way of protecting the flexible cords and cables from physical damage is to place them in an above ground support (raceway). This practice is often interpreted to be prohibited per Section 400.8(6), and therefore, dictates the use of other wiring methods.

This proposal is intended to permit physical protection against damage only where necessary and is not intended to permit flexible cords and cables to be a substitute for the fixed wiring of a structure.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 9 Negative: 2

Explanation of Negative:

KENT: Proposal 6-95 should not have been accepted using the current wording. Based on the wording approved, cord may now be used as a wiring method in conduit at any length. The limit to industrial application does not change the outcome. The protection of cord by "sleeving" it through conduit was an acceptable idea if limitations were imposed. Without limitations, we effectively make this an acceptable wiring method.

LAIDLER: I originally voted to accept this proposal but, with further consideration, I cannot support this proposal. Permitting flexible cords and cables to be run unrestricted as regards length in a raceway above ground could create an unsafe installation. As an installer, I have found there may be some cases where flexible cord and cables may have to be run in a raceway; an example of this would be where the cable needs to be protected from physical damage for a short distance. I was of the opinion that this proposal would give some relief to that situation. However, upon consideration, I have determined that, even by restricting the use of flexible cord and cable in a raceway in the described location, it still opens the chance of flexible cord and cable becoming a substitute for fixed wiring. The code allows flexible cord and cable to be run in a raceway where permitted. The installer can also ask for special permission per 90.4 if the Code does not address his or her specific need.

6-96 Log #2420 NEC-P06 **Final Action: Reject**
(400-15 (New))

Submitter: Livingston Reynolds, Texas Instruments, Incorporated

Recommendation:

All general use extension cord sets rated 125VAC 15A and 20A shall be protected by an appropriate and listed, integral AFCI device.

Substantiation:

AFCI technology was introduced into the National Electric Code two code cycles ago. The development and application of this technology has created products that will prevent fires and save lives in newly constructed homes, or in homes where an electrical service upgrade requires the use of AFCI devices. This is a good first step, but the use of this technology is limited strictly to newly constructed homes.

According to the NFPA's January 2002 report "The U.S. Home Product Report (Appliances and Equipment Involved in Fires)", an average of 40,400 fires, 329 deaths, and 1,357 injuries occur each year as a result of problems in electrical distribution equipment. The submitter respectfully acknowledges that introduction of this technology will not prevent all of these fires, as protection will be limited to cords and loads attached to AFCI-protected extension cord sets, but would like to point out that the majority of these fires occur in older homes – those not protected by any AFCI devices. Adding the requirement for AFCI protection on general use extension cord sets is an excellent means of introducing the technology into the homes most susceptible to the dangers associated with arcing faults.

Panel Meeting Action: Reject

Panel Statement:

Use of this device is not prohibited in current Code text.

Requirements for AFCI protection are within the scope of Code-Making Panel 10 in Article 240, and Code-Making Panel 2 in Article 210.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

LAIDLER: The panel statement that this device is not prohibited in the current code should be looked at as a positive statement. With the introduction of AFCI technology, the prevention of fires will be greatly enhanced. The manufacturer of this product can produce AFCI protection devices in the same manner that has been done with the GFCIs. This proposal has more to do with product standards than with the NEC.

6-97 Log #2838 NEC-P06 **Final Action: Reject**
(400-15)

TCC Action:

The Technical Correlating Committee directs this Proposal be referred to Code-Making Panels 2 and 10 for consideration in their articles. This proposal will be considered by Code-Making Panels 2 and 10 as a public comment.

Submitter: Edward A. Schiff, Technology Research Corp.

Recommendation:

Add new text to read as follows:

400.15

(A) Definition Leakage Current Detection and Interruption (LCDI) Protection. A device provided in a power supply cord or cord set that senses leakage current flowing between or from the cord conductors and interrupts the circuit at a predetermined level of leakage current.

(B) Leakage Current Detection and Interruption (LCDI) Indoor extension cord sets shall be provided with factory-installed LCDI protection. The LCDI protection shall be an integral part of the attachment plug or be located in the power supply cord within 300 mm (12 in.) of the attachment plug.

Substantiation:

[Text of Proposal 6-97 substantiation is shown on page 2310]

Panel Meeting Action: Reject

Panel Statement:

Use of this device is not prohibited in current Code text.

Requirements for LCDI protection are within the scope of Code-Making Panel 10 in Article 240, and Code-Making Panel 2 in Article 210.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

ZIMNOCH: While CDA agrees with the submitter that use of this device would provide increased, safety, we agree with the panel that requirements for LCDI protection are not within the scope of Panel 6.

6-98 Log #2240 NEC-P06 **Final Action: Reject**
(400-22)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
400.22 ~~Grounded~~ Earth Conductor Identification. One conductor of flexible cords that is intended to be used as an ~~grounded~~ earth circuits conductor shall have a continuous marker that readily distinguishes it from the other conductor or conductors. The identification shall consist of one of the methods indicated in 400.22(A) through (F).

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement on Proposal 6-5.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-99 Log #774 NEC-P06 **Final Action: Accept in Principle**
(400-22(F))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
Surface Marking. One or more white stripes, ridges, or grooves... (remainder unchanged).

Substantiation:

Edit. The color of the stripe should be specific; any color literally complies.

Panel Meeting Action: Accept in Principle

Revise the wording in the recommended text to read as follows:
"Surface Marking. One or more ridges, grooves, or white stripes...".

Panel Statement:

The revised wording meets the intent of the submitter and provides further clarity.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-100 Log #1915 NEC-P06 **Final Action: Reject**
(400-23)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
400.23 Equipment ~~grounding~~ bonding Conductor Identification. A conductor intended to be used as an equipment ~~grounding~~ bonding conductor shall have a continuous identifying marker readily distinguishing it from the other conductor or conductors. Conductors having a continuous green color or a continuous green color with one or more yellow stripes shall not be used for other than equipment ~~grounding~~ bonding purposes. The identifying marker shall consist of one of the methods in 400.23(A) or (B).

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel statement on Proposal 6-1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

FRIEDMAN: NEMA supports the panel action to reject. The proposal fostered significant debate during the code process. After considering all of the debate, it is clear that the issue is one of education and not terminology. Changing the term from "equipment grounding conductor" to "equipment bonding conductor" in no way changes the need for qualified persons and continuing education. The present terminology is well understood by those who understand the purposes of grounding and bonding. The panel members and the public need to consider the magnitude of this change compared to the benefits. The change will create a nightmare of revisions and changes in terminology across the entire electrical system. The benefit is practically nonexistent.

MCCLUNG: See my affirmative comment on Proposal 6-1.

6-101 Log #1916 NEC-P06 **Final Action: Reject**
(400-24)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
400.24 Attachment Plugs. Where a flexible cord is provided with an equipment ~~grounding~~ bonding conductor and equipped with an attachment plug, the attachment plug shall comply with 250.138(A) and (B).

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See the panel statement on Proposal 6-1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

FRIEDMAN: NEMA supports the panel action to reject. The proposal fostered significant debate during the code process. After considering all of the debate, it is clear that the issue is one of education and not terminology. Changing the term from "equipment grounding conductor" to "equipment bonding conductor" in no way changes the need for qualified persons and continuing education. The present terminology is well understood by those who understand the purposes of grounding and bonding. The panel members and the public need to consider the magnitude of this change compared to the benefits. The change will create a nightmare of revisions and changes in terminology across the entire electrical system. The benefit is practically nonexistent.

MCCLUNG: See my affirmative comment on Proposal 6-1.

6-102 Log #1917 NEC-P06 **Final Action: Reject**
(400-31)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
400.31 Construction. …
(C) Equipment ~~Grounding~~ Bonding Conductor(s). An equipment ~~grounding~~ bonding conductor(s) shall be provided. The total area shall not be less than that of the size of the equipment ~~grounding~~ bonding conductor required in 250.122.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel statement on Proposal 6-1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

FRIEDMAN: NEMA supports the panel action to reject. The proposal fostered significant debate during the code process. After considering all of the debate, it is clear that the issue is one of education and not terminology. Changing the term from "equipment grounding conductor" to "equipment bonding conductor" in no way changes the need for qualified persons and continuing education. The present terminology is well understood by those who understand the purposes of grounding and bonding. The panel members and the public need to consider the magnitude of this change compared to the benefits. The change will create a nightmare of revisions and changes in terminology across the entire electrical system. The benefit is practically nonexistent.

MCCLUNG: See my affirmative comment on Proposal 6-1.

6-103 Log #3118 NEC-P06 **Final Action: Accept**
(Table 402-3)

Submitter: Austin D. Wetherell, Underwriters Laboratories, Inc.

Recommendation:

Revise text as follows:
Types R FHH-2 and RFHH-3.
1) Far left column should say "solid or 7-strand" instead of "solid or stranded".
2) Far right column, delete "multi-conductor cable".

Substantiation:

Both constructions are single conductor and are solid or 7-strand as with all other types with one "F".

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-104 Log #755 NEC-P06 **Final Action: Accept in Principle**
(402-8)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text as follows:
~~One conductor of fixture.~~ Fixture wires that ~~is~~ are intended to be used as a grounded conductor shall be identified by ~~means of~~ one or more continuous white stripes on other than green insulation or by the means described in 400.22(A) through (E).

Substantiation:

While the intent may be discerned, literal wording only applies to one conductor; all fixture wires used as a grounded conductor should be identified. "By means of stripes" is not specific; they should be noted as white, continuous, and not on green insulation. Note: Wording of 200.6 for other grounded conductors which states that fixture wire shall comply with 402.8.

Panel Meeting Action: Accept in Principle

In the recommended text, delete the word "a" before the word "grounded" and change "conductor" to "conductors".

Panel Statement:

Editorial changes were made to provide clarity.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-105 Log #2217 NEC-P06 **Final Action: Reject**
(402-8)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise to read as follows:
401.8 ~~Grounded~~ Earth Conductor Identification. One conductor of fixture wires that is intended to be used as an ~~grounded~~ earth conductor shall be identified by means of stripes or by the means described in 400.22(A) through (E).

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement on Proposal 6-5.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-74 Log #3268 NEC-P09 **Final Action: Reject**
(404)

Submitter: Mike Weitzel, City of Wenatchee, WA

Recommendation:

Add NEMA standard sizes of disconnects to the NEC.

Substantiation:

NEC 430.91 Motor Controller Enclosure Section was added in the 2002, and it is helpful to code users. Please consider adding this NEMA information regarding disconnects to the NEC.

Panel Meeting Action: Reject

Panel Statement:

The submitter presents no substantiation that this material is essential to avoid shock or fire hazards. Refer to 90.1. There is no specific recommendation by the submitter.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-75 Log #2218 NEC-P09 **Final Action: Reject**
(404-2)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
404.2 Switch Connections.
(A) Three-Way and Four-Way Switches. Three-way and four-way switches shall be wired so that all switching is done only in the ungrounded circuit conductor. Where in metal raceways or metal-armored cables, wiring between switches and outlets shall be in accordance with 300.20(A).
Exception: Switch loops shall not require an ~~grounded~~ earth conductor.
(B) ~~Grounded~~ Earth Conductors. Switches or circuit breakers shall not disconnect the ~~grounded~~ earth conductor of a circuit.
Exception: A switch or circuit breaker shall be permitter to disconnect an ~~grounded~~ earth circuit conductor where all circuit conductors are disconnected simultaneously, or where the device is arranged so that the ~~grounded~~ earth conductor cannot be disconnected until all the ungrounded conductors of the circuit have been disconnected.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

See the panel statement on Proposal 9-1 (Log #2453i).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-76 Log #3333 NEC-P09 **Final Action: Reject**
(404-2 Exception)

Submitter: Saul Rosenbaum E. Meadow, NY

Recommendation:

Delete the existing exception to Section 404.2(A) and insert in its place a new second paragraph to read as follows:
"An insulated grounded conductor shall be provided with wiring methods used for switch loops on single pole and three way 120v circuits."

Substantiation:

More and more listed wiring devices are being produced which require a connection to the neutral conductor when installed in a switch box. If the neutral is not available, the grounding conductor is often used creating an unsafe condition. The intent of my proposal is to require that a neutral wire is made available at all single pole and three way 120v switch boxes.

Panel Meeting Action: Reject

Panel Statement:

There is no added safety to the inclusion of the grounded conductor in the initial installation. The NEC is not a design manual and this issue is covered in Section 90.1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-77 Log #3208 NEC-P09 **Final Action: Reject**
(404-2(A) (New))

Submitter: Charles M. Trout, Maron Electric Co. Inc.

Recommendation:

Add a sentence to read:
"Where cable systems are used, an insulated grounded conductor shall be provided on all single pole and 3-way switch loops."
Delete the existing exception in its entirety.

Substantiation:

Cable wiring methods are very restrictive when it comes to expanding the use of electricity in a residence. I don't agree with the idea that requiring a hot and a neutral in every outlet box would be considered a design consideration only and not a safety issue. Some of the things that installers do when attempting to install outlets from existing openings that do not have a grounded and an ungrounded conductor present such as using the equipment-grounding conductor as a neutral conductor can be extremely hazardous. Permitting the use of conductors "supposedly permanently reidentified" for purposes not intended by the listing can be extremely dangerous to persons attempting to make changes to the use of electricity in a residence.

Panel Meeting Action: Reject

Panel Statement:

See the panel statement on Proposal 9-76 (Log #3333).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-78 Log #777 NEC-P09 **Final Action: Reject**
(404-4)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
A switch or circuit breaker in a wet location ~~or outside of a building~~ shall be enclosed in a weatherproof enclosure or cabinet that shall comply with... (remainder unchanged).

Substantiation:

All locations outside of a building are not wet locations (see definitions of locations). Article 312 covers cabinets, cutout boxes, and meter sockets, but not other type boxes which may enclose switches and not required to be weatherproof in damp locations per 314.15(A). The key phrase in 312.2(A) and this section is "wet locations" which should be the criterion for requiring weatherproof installations.

Panel Meeting Action: Reject

Panel Statement:

This requirement is correct as written and covers wet and damp locations which require a weatherproof enclosure.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-79 Log #1515 NEC-P09 **Final Action: Reject**
(404-4)

Submitter: Harold F. Willman, City of Aurora

Recommendation:

Revise text to read as follows:
Wet locations. A switch or circuit breaker in a wet location or outside of a building shall be enclosed in a weatherproof enclosure or cabinet that shall comply with 312.2(A). Switches shall not be located within wet locations in tub or shower ~~spaces~~ areas unless installed as part of a listed tub or shower assembly.
FPN: See 410.4(D) for tub or shower area definition.

Substantiation:

Because all Code Panels intend exact wording, words with the same meaning are used to avoid the redundancy of a specific word. Space, area and zone are examples of using words synonymously in Chapters 1 through 4. An example is NEC 110.26(F)(1) and 110.26(F)(2) where all three words are used synonymously. By changing "space" to "area" and using the FPN to refer to the definition, it makes the intent clear as to the area the switch shall not be installed. This will also void the argument that the "area" and "space" are not the same word and therefore do not mean the same thing. This wording and definition reference clarifies the hazard of electric devices within a wet area, space, or zone.

Panel Meeting Action: Reject

Panel Statement:

Section 404.4 is using the word "spaces" because it intends a different application than tub and shower areas in 410.4(D). This rule is predicated on actual exposure to driven water, and not a likelihood of a touch problem as in the case of 410.4(D).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-80 Log #2535 NEC-P09 **Final Action: Accept in Principle**
(404-6(B))

Submitter: Alan Manche, Schneider Electric/Square D

Recommendation:

Revise NEC 404.6(B) with the additions (underlined) and deletions (strike through) as shown. The entire text of 404.6(B) is shown for clarity, but only those changes shown underlined or strike through are part of this proposal.

(B) Double-Throw Knife Switches. Double-throw knife switches shall be permitted to be mounted so that the throw is either vertical or horizontal. Where the throw is vertical, ~~a locking device~~ mechanical means shall be provided to hold the blades in the open position when so set.

Substantiation:

The present wording is confusing and can be easily misunderstood. The wording has been interpreted to require a lockout means, or as mechanical latch / catch to hold the handle in the "OFF" / disengaged position. A prominent design of the double throw switches that goes back many years included a single set of knife blades that engaged a set of blade jaws either at the top or bottom of the switch enclosure. In order to ensure the blades had an "OFF" position, a mechanical latch / catch holds the operating handle in a position that disengaged the blades from either set of terminals. This mechanical latch / catch is referred to in 404.6(B) as a locking device.

New product designs from numerous manufactures have established that a "mechanical means" is being accomplished without a latch or catch being placed in the center position to "catch" the handle in the off position. These new designs include the two sets of blades where the handle operates one set of blades from the top-to-center actuation of the handle and another set of blades from the center-to-bottom actuation of the switch handle. The "mechanical means" in the "OFF" position is incorporated into the internal operating mechanism design for the switch and therefore a latch / catch is no longer needed.

The wording of this proposal will reduce the misinterpretations of this section and clarify that a defined "Off" position requires the mechanism design of the switch have a mechanical means that ensures the blades are disengaged, in the "OFF" position.

Panel Meeting Action: Accept in Principle

Revise the submitter's second sentence to add the word "integral" ahead of the words: "mechanical means."

Panel Statement:

This action meets the intent of the submitter and clarifies that the mechanical means used to hold the blades in the open position are integral to the switch mechanism.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

SENGUPTA: A locking device is required for locking an open circuit and assuring a "lock and tag" safety work practice. All disconnect devices must have means for padlocking in the open (OFF) position. Regulatory authorities also require this normal practice. Replacing "a locking device" with "mechanical means" could create a safety hazard if the proposed "mechanical device" lacks a provision for locking an open circuit.

The current code specifically states "locking device" requirement for both Single-Throw Knife Switches (Article/Section 404-6(A)) and Double-Throw Knife Switches (Article/Section 404-6(B)). CMP 9 should consider keeping switching operation of both switches on a same safety requirement level.

9-80a Log #CP903 NEC-P09 **Final Action: Accept**
(404-7 Exception No. 2 New)

Submitter: Code-Making Panel 9

Recommendation:

Designate the existing Exception as Exception No. 1 and insert a new exception as follows:

Exception No. 2: On busway installations, tap switches employing a center-pivoting handle shall be permitted to be open or closed with either end of the handle in the up or down position. The switch position shall be clearly indicating and shall be visible from the floor or from the usual point of operation.

Substantiation:

Some busway switch designs have one end of the handle in the up position at all times, enabling a downward pull to change the switch position at all times. These switches cannot literally comply with the present handle-positioning rule. CMP 9 notes that this allowance has been in the NY City electrical code for some time, and expresses its appreciation to the NYC Bureau of Electrical Control for raising this matter in correspondence with NFPA.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-81 Log #949 NEC-P09 **Final Action: Reject**
(404-8)

Submitter: Roger D. Wilson, The Austin Company

Recommendation:

Paragraph 404.8(C) should be added; it should read as follows:
Double-throw switches shall be supplied by no more than one overcurrent protective device. Any such switch that is supplied by a multi-pole device shall have a voltage-rating not less than the highest voltage between any two poles of this device.

Substantiation:

A double-pole switch (such as a "dual-circuit", wall-mounted, occupancy-sensor switch) could be supplied by two separate circuit breakers, or even two separate panel boards. In the case of a 277 VAC lighting installation, the voltage within the switch-housing could be 480 VAC (if these circuits were on separate phases). In addition, an electrician working on an existing installation, would have to know to de-energize the switch at two separate circuit breakers (or possibly, two separate panel boards).

Panel Meeting Action: Reject

Panel Statement:

See the panel action on Proposal 9-85 which meets the general intent of the submitter. The submitter's concept is addressed in 404.8(B), however fails to allow for a listed multi-circuit alternative.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-82 Log #292 NEC-P09 **Final Action: Reject**
(404-8(c) (New))

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-making Panel 2 for action in Article 210. This action will be considered by Code-Making Panel 2 as a public comment.

Submitter: Douglas A. Baxter, All Electric Inspections / Rep. IAEI

Recommendation:

Add new text to read as follows:
(C) Dwelling Units. The switch for lighting outlets as required in 210.70 shall not be rendered inaccessible by the swing of an entry door.

Substantiation:

Many times the swing of door is changed at the time of installation. This change requires the user to enter a dark room and search for the switch. This would be a violation of 90.1.

Panel Meeting Action: Reject

Panel Statement:

This subject should be addressed by CMP 2 in Article 210. Article 404, now in the equipment chapter, does not cover the placement of these devices.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-83 Log #3075 NEC-P09 **Final Action: Reject**
(404-8(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Recommendation:

Use a hard conversion, resulting in the height limitation reverting to 2.0 m (6 1/2 ft) as it was prior to the 1996 NEC.

Substantiation:

The dimensional increase from 6 ft 6 in. to 6 ft 7 in. in the 1996 NEC resulted from international politics and not loss experience, and it occurred at a time when the NEC Style Manual precluded hard metric conversions. The only reason for making the change was to influence international standards making entities. Code-Making Panel 9 was told that making this change would be influential in getting them to measure acceptable switch heights to the center of the operating handle (as in the NEC) instead of to the center of the operating shaft (as in IEC documents). American manufacturers were at a competitive disadvantage and wanted a 6 ft 10 in. switch height (the middle of a 6 in. handle above a maximum operating shaft height of 2.0 m in the international market), which Code-Making Panel 9 properly refused to allow for safety reasons. Unless one assumes someone operates a switch by pinching the operating shaft instead of grasping the handle, the NEC methodology is much better. Now that hard conversions are allowed (and in fact encouraged) this section should go back to the old height limit. This item was overlooked when Code-Making Panel 9 reviewed Proposal 9-68 in the 2002 cycle because the only suggestion from the Technical Correlating Committee Task Group was to reverse the English/metric order. The hard conversion of 2.0 m (6 1/2 ft) is consistent with similar usage in 110.26(E).

Panel Meeting Action: Reject

Panel Statement:

6' 7" is the nearest inch conversion to 2 meters. There is no reason or justification to change from the accepted practice in the industry.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-84 Log #2070 NEC-P09 **Final Action: Reject**
(404-8(A) Exception No. 2)

Submitter: Bill Davis, Eastman Kodak-Electrical Inspections

Recommendation:

Add text to read as follows:
An additional switch or circuit breaker that can be operated from a readily accessible place shall also be provided.

Substantiation:

I believe the intent of Exception No. 2 is to allow equipment supplied with switches from the manufacturer to remain on the equipment at a height greater than the required maximum of 6 ft 7 in. and be accessible by portable means. The text of the main rule however still needs to be complied with and a switch or circuit breaker would still have to be provided that can be reached and operated from a readily accessible place. As an electrical inspector, I see all to often the installer will not comply with the main rule because they're misinterpreting the exception and using it as an excuse not to install the required switch that I believe is necessary.

Panel Meeting Action: Reject

Panel Statement:

Specific accessibility requirements should be addressed (and are addressed) in other articles. For example, 430.107 already requires what the submitter requests in the case of motors.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-85 Log #1273 NEC-P09 **Final Action: Accept**
(404-8(B))

Submitter: David H. Kendall, Carlon, Lamson & Sessions

Recommendation:

Revise text to read as follows:
404.8 Accessibility and Grouping.
(B) Voltage Between Adjacent Devices. A snap switch shall not be grouped or ganged in enclosures with other snap switches, receptacles, or similar devices, unless they are arranged so that the voltage between adjacent devices does not exceed 300 volts, or unless they are installed in enclosures equipped with permanently installed barriers between adjacent devices.
A multipole, general use snap switch shall not be permitted to be fed from more than a single circuit, unless listed and marked as a two circuit or three circuit switch. The voltage to the same single circuit snap switch shall not exceed 300 volts.

Substantiation:

The same hazard of circuits exceeding 300 volts fed to the same device exists as does voltages in excess of 300 volts for adjacent devices. There have been installations where a 277 volt lighting circuit and a 120 volt fan circuit in a commercial/industrial facility have been fed to a two pole, single circuit snap switch. While this practice may not be wide spread, there are major safety hazards associated with this type of installation.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Abstain: 1

Comment on Affirmative:

HARTWELL: This proposal simply incorporates long standing requirements from listing directories (see UL Guide Card category WJQR). By public comment I will propose the following revised text for the new paragraph:
"A multipole, general use snap switch shall not be permitted to be fed from more than a single circuit unless it is listed and marked as a two-circuit or three-circuit switch, or unless its voltage rating is not less than the nominal line-to-line voltage of the system supplying the circuits. The voltage to the same single-circuit snap switch shall not exceed 300 volts. A means to simultaneously disconnect the ungrounded conductors feeding a multipole snap switch shall be provided at the panelboard where the branch circuits originate."
If this provision is going to enter the NEC, it is time to address a long-standing innocuous use of multipole snap switches, the control of two 120-volt loads with a similar purpose and using a 277-volt two-pole (or three on a three-pole) switch. The entire voltage exposure is less than the switch rating, and the suggested language includes the disconnect concept in 210.7(C) for multi-circuit receptacles. I have been cajoling various NEMA companies for almost twenty years to pursue the allowance in the product standard to produce such switches, to no avail. It is time to force the issue, or to invite public comment as to why such snap switches are not available.

Explanation of Abstention:

RUPP: The proposed requirement relates to 401.8(B), which requires separation of switches where the voltage between switches exceeds 300 Volts. No substantiation has been provided to identify any hazard associated with a snap switch rated more than 300 Volts. UL listed 347 Volt snap switches have been in use for many years without incident.

9-86 Log #1274 NEC-P09 **Final Action: Reject**
(404-8(B))

Submitter: David H. Kendall, Carlon, Lamson & Sessions

Recommendation:

Revise text to read as follows:
(B) Voltage Between Adjacent Devices. A snap switch shall not be grouped or ganged in enclosures with other snap switches, receptacles, or similar devices, unless they are arranged so that the voltage between adjacent devices does not exceed 300 volts, or unless they are installed in enclosures equipped with permanently installed barriers or listed outlet box dividers between adjacent devices.

Substantiation:

Manufacturers of outlet boxes have designed their boxes to allow dividers to be installed into their boxes to separate devices or services. The dividers are listed and are slid into place between grooves in the outlet box.

Panel Meeting Action: Reject

Panel Statement:

Listed outlet box dividers would qualify as permanently installed barriers. The proposal does not add anything essential to this requirement.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

HARTWELL: By public comment I will propose changing "permanently installed barriers" to "securely installed barriers" in the existing Code. That, or something similar, should assist the submitter in securing more uniform enforcement allowance for his dividers, which should be acceptable.

9-87 Log #2802 NEC-P09 **Final Action: Accept in Principle**
(404-8(B))

TCC Action:

The Technical Correlating Committee directs the panel to clarify their action with regard to the recommendation to change the Title. This action will be considered by the Panel as a public comment.

Submitter: Henry A. Jenkins, Wake County

Recommendation:

Add the following phrase to the title of Section 404.8(B)
(B) Voltage Between Adjacent Devices or Within the Same Device.
Add a second paragraph as follows:
A multiple general use snap switch shall not be permitted to be fed from more than a single circuit unless listed and marked as a two circuit or three circuit switch. The voltage to the same multiple, single circuit snap switch shall not exceed 300 volts.

Substantiation:

The same hazard of circuits exceeding 300 volts fed to the same device exists as does voltages in excess of 300 volts for adjacent devices. There have been installations where 277-volt lighting circuit and 120-volt van circuit in a commercial/industrial facility have been fed to a two pole, single circuit snap switch. While this practice may not be wide spread, there are major safety hazards associated with this type of installation.

Panel Meeting Action: Accept in Principle

Panel Statement:

See the panel action on Proposal 9-85 (Log #1273).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Abstain: 1

Explanation of Abstention:

RUPP: See my Explanation of Abstention on Proposal 9-85.

9-88 Log #131 NEC-P09 **Final Action: Reject**
(404-8(C))

Submitter: Douglas A. Baxter, All Electric Inspections

Recommendation:

Add new text to read as follows:
(c) Dwelling Units. The switch for lighting outlets as required in 210.70 shall not be rendered inaccessible by the swing of an entry door.

Substantiation:

Many times the swing of the door is changed at the time of installation. This change requires the user to enter a dark room and search for the switch. This would be a violation of 90.1.

Panel Meeting Action: Reject

Panel Statement:

See the panel statement on Proposal 9-82 (Log #292).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-89 Log #3438 NEC-P09 **Final Action: Accept in Principle**
(404-8(C) (New))

Submitter: Joseph McCann, City of Coral Springs

Recommendation:

A snap switch shall not have more than one circuit, or different voltages connected to a single yoke unless specifically listed for more than one circuit or different voltages.

Substantiation:

The way the Code now reads, it does not prohibit a 2 pole single throw switch from being used to open 277 V circuit on one side and 120 V circuit on the other.

Panel Meeting Action: Accept in Principle

Panel Statement:

See the panel action on Proposal 9-85 (Log #1273), which meets the intent of the submitter.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Abstain: 1

Explanation of Abstention:

RUPP: See my Explanation of Abstention on Proposal 9-85.

9-90 Log #3167 NEC-P09 **Final Action: Reject**
(404-9(B))

Submitter: Eric Stromberg, The Dow Chemical Company

Recommendation:

Replace "effectively grounded" with "bonded to an effective ground fault current path, as per 250.118 and 250.4(A)(3)."

Substantiation:

The current wording might lead one to believe that the grounding terminal on a switch yoke can be connected to its own ground rod in the absence of an effective ground fault current path. This proposal is part of a larger effort to find instances in the code where the word Bond is used when the meaning is Ground and where Ground is used where the meaning is Bond.

Panel Meeting Action: Reject

Panel Statement:

The term is used correctly and in accordance with its definition in Article 100. Contrary to the proposal substantiation, a ground rod connection does not comply with current NEC requirements for equipment grounding return paths.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-91 Log #2785 NEC-P09 **Final Action: Reject**
(404-9(B) Exception)

Submitter: Dale Rooney, Municipality of Anchorage

Recommendation:

Add text to the end of the last sentence - "or be protected by a ground-fault circuit interrupter."

Substantiation:

If the circuit is already protected by a GFCI due to replacement receptacles, there is no need to restrict the use of metallic faceplates.

Panel Meeting Action: Reject

Panel Statement:

GFCI devices are not intended to be a substitute for effective grounding.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-92 Log #3013 NEC-P09 **Final Action: Accept in Principle**
(404-9(B)(1))

Submitter: Donald R. Offerdahl, North Dakota State Electrical Board

Recommendation:

Revise text as follows:
(1) The switch is mounted with ~~metal screws~~ metal-to-metal contact between the device yoke and the box screws to a metal box or to a nonmetallic box with integral means for grounding devices.

Substantiation:

Switches shall be grounded in the same manner as the receptacles in 250.146.

Panel Meeting Action: Accept in Principle

Panel Statement:

See the panel action and statement on Proposal 9-94 (Log #3271).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

RUPP: See my Explanation of Negative Vote on Proposal 9-94.

9-93 Log #1085 NEC-P09 **Final Action: Accept in Principle**
(404-9(B)(1))

Submitter: Russell LeBlanc, Peterson School of Engineering

Recommendation:

Revise to read:
(1) The switch is mounted with metal screws to a (grounded) metal box or to a nonmetallic box with integral means for grounding devices.

Substantiation:

If the box is not grounded, then the switch would not be effectively grounded either.

Panel Meeting Action: Accept in Principle

Panel Statement:

See the panel action and statement on Proposal 9-94 (Log #3271).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

RUPP: See my Explanation of Negative Vote on Proposal 9-94.

9-94 Log #3271 NEC-P09 **Final Action: Accept in Principle**
(404-9(B)(1))

TCC Action:

See Technical Correlating Committee Note on 5-244a. This issue is under the purview of Code-Making Panel 9.

Submitter: Leonard F. Devine, Jr. W. Palm Beach, FL

Recommendation:

Revise as follows:
404.9(B)(1) The switch is mounted with metal screws to a metal box with a metal yoke in direct contact with the metal box, or unless the switch is of the self grounding type or to a nonmetallic box with an integral means for grounding devices.

Substantiation:

In at least one case that I am aware of, a woman with a serious heart condition in the bathroom of a two story house with a plywood floor, received a severe shock when she touched the faceplate of a bathroom switch while in contact with the vanity sink spout. From time to time, our local inspection department is called upon to investigate similar hazardous situations, although not as severe as stated above.

Panel Meeting Action: Accept in Principle

Revise the existing code text to read as follows:
404.9(B)(1) The switch is ~~mounted with metal screws to a metal box~~ installed with a metal yoke in direct contact with a metal box, unless the switch is of the self-grounding type, or ~~to~~ the switch is installed on a nonmetallic box with integral means for grounding devices.

Panel Statement:

CMP-9 recognizes the need to properly ground switches and faceplates. The action meets the intent of the submitter.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 9 Negative: 2

Explanation of Negative:

HARTWELL: This proposal represents a major change in the Code, with very thin substantiation. There is a fundamental difference in the level of hazard between a snap switch faceplate and a receptacle that is merely the point of origin for a quasi-branch circuit extension when it is in use. That is why the grounding continuity requirements for receptacles are more demanding than those for snap switches, and properly so. That is also why receptacle grounding requirements occur in Article 250.146 instead of Article 406.

There is another issue, however. CMP 5 has voted (Proposal 5-244a) to poach this requirement and place it as a new 250.147, but in the form of the 2002 NEC 404.9. This will introduce a direct conflict with this section if it is changed as suggested in the proposal. Note that the CMP 5 substantiation consists only of the bald assertion that 250.147 would be a more "logical" location. Since almost all equipment in the NEC requires grounding in some way, perhaps it would be logical to place most of the NEC in Article 250 (or at least those portions not headed into Article 110). The TCC should put an end to whimsical relocations of long-standing requirements.

RUPP: A switch installed in accordance with 404.9(B)(1) provides effective grounding of the switch and the metal cover and screws mounted on the switch. The substantiation for this proposal does not provide sufficient information to support the proposed change. In addition, NEMA notes that CMP 5 rejected a similar proposal (Log #CP501).

9-95 Log #1344 NEC-P09 **Final Action: Reject**
(404-9(B)(2))

Submitter: Robert R. Sallaz, City of Munroe Falls, OH

Recommendation:

Add this second sentence to 404.9(B)(2):
"Where more than one device is located in the box, this conductor or jumper shall be insulated."

Substantiation:

I have experienced, witnessed, and heard of more than one hundred instances where wiremen were shocked due to the proximity of bare equipment grounding conductors/jumpers to the live terminals of devices in multi-gang NM boxes. This installation practice poses a real shock and fire hazard to homeowners attempting to replace devices.

Panel Meeting Action: Reject

Panel Statement:

The appropriate work practice is to turn off the power before working on electrical equipment. See NFPA 70E.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

HARTWELL: This belongs in a wiring handbook. See 110.7.

9-96 Log #1921 NEC-P09 **Final Action: Reject**
(404-9(B)(2))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(2) An equipment ~~grounding~~ bonding conductor or equipment bonding jumper is connected to an equipment grounding termination of the snap switch.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See the panel statement on Proposal 9-1 (Log #2453i).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-97 Log #754 NEC-P09 **Final Action: Accept**
(404-10(B))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text as follows:
Flush-type snap switches that are mounted in boxes that are set back of the finished ~~wall~~ surface as permitted in 314.20 shall be installed so that the extension plaster ears are seated against the surface. ~~of the wall.~~ Flush-type snap switches that are mounted in boxes that are flush with the ~~wall~~ finished surface or project from it shall be installed so that the mounting yoke or strap of the switch is seated against the box.

Substantiation:

Edit. The rule should apply, (and I think is intended to,) flush type switches in boxes mounted in ceilings, cabinets, and other type surfaces. (See my proposal for 314.20).

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-98 Log #3217 NEC-P09 **Final Action: Reject**
(404-14(E) Exception (New))

Submitter: Robert Spehalski, Lutron Electronics Co., Inc.

Recommendation:

Add an exception to read as follows:
Exception: Dimmers shall be permitted to control a 15 or 20A, 125V receptacle specifically designed and listed to supply only cord-and-plug connected portable lamp loads. Where such a receptacle(s) is installed to satisfy the requirements of 210.52(A) for spacing of receptacle outlets in dwellings, it shall be a split-wired, duplex receptacle, and the dimmer shall supply only the identified receptacle on the duplex device.

Substantiation:

New in the 2002 NEC, 404.14(E) reiterates UL's intent as stated in UL Guide information (EOYX) to limit General Use dimmers to the control of permanently installed incandescent fixtures unless listed for the control of other loads. For other dimmers, such as Commercial and Theater dimmers (UL categories EOXT, EPAR, and NMTR), this restriction does not exist. Likely, this is because the application of these products is much more controlled. We have already heard from our field representatives that inspectors are not differentiating between general-use and "other" types of dimmers. The result is that the wording of the 404.14(E) has effectively eliminated the control of cord-and-plug connected lamp loads by any dimmer. This proposed exception will provide clear and unambiguous guidance for the inspection community, as well as designers and installers, where someone does wish to provide for dimming of a portable cord-and-plug connected lamp. Very often, to satisfy the rules in 210.70(A)(1), Exception No. 1 for lighting outlets in dwelling units, a switched-receptacle outlet is installed to supply a cord-and-plug connected portable lamp and consumers demand the ability to dim these lamps from the switched location. However, regardless of dimmer categories, the intent of this rule is clear. A receptacle represents an unknown load to the dimmer since any appliance (TV's, vacuum cleaners, etc.) can be plugged into the switched-receptacle.

This proposal resolves this issue by providing for a clearly defined, enforceable, and safe means for a dimmer to control cord-and-plug connected portable lamps. It permits a dimmer to control a receptacle only when it is specifically designed and UL listed such that it will only supply cord-and-plug connected portable lamp loads for which the dimmer is listed. Such a receptacle rejects standard plugs of other appliances, only accepting a special mating plug listed for use with and attached to the cord-and-plug connected portable lamp. This addresses potential misuse of dimmers and provides for a safe and effective way to satisfy consumer demands to dim cord-and-plug connected portable lamps with dimmers.

The last sentence of the proposal also takes into consideration applications where such a receptacle is installed to satisfy the rules of 210.52(A) for receptacle spacing in habitable rooms of dwelling units by requiring a split-wired duplex receptacle where one receptacle is of the standard configuration and is not connected to a dimmer. This ensures that a standard configuration receptacle will always be available at the required spacing interval for the connection of other cord-and-plug connected portable loads.

Panel Meeting Action: Reject

Panel Statement:

The current code language allows the application of such a device as described by the submitter.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-5 Log #1484 NEC-P18 **Final Action: Reject**
(406)

Submitter: Lisa M. Reich, Encompass Electrical Technologies Rocky Mountain Inc.

Recommendation:

The cover plates for the electrical receptacles or all electrical receptacles themselves should have a distinctive color or marking so as to be readily identifiable.

Substantiation:

The problem that will be solved is that when any one person is going to service this receptacle they will know exactly where to start looking. An example would be for the use of lockout/tagout practices. In the NFPA 70E document, it states in Chapter 5 that a plan shall be developed to install lockout/tagout. With the receptacle markings on all receptacle and coverplates, this would utilize their up-to-date diagrammatic drawings because they would already have the circuit number and panel number on them. Allowing the service technician or maintenance man/woman to verify that they have removed all the voltage to the potential circuits they will be working on.

Panel Meeting Action: Reject

Panel Statement:

Section 110.22 requires, "Each disconnecting means shall be legibly marked to indicate its purpose unless located and arranged so the purpose is evident." Requiring additional marking of the covers or receptacles should not be necessary with proper compliance with 110.22. Consumers do not like marking on receptacles or covers.

The proposal does not identify specific sections of the Code to which the recommended text would apply.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-6 Log #2215 NEC-P18 **Final Action: Reject**
(406)

Submitter: Seth Thompson, Moorhead Electric

Recommendation:

Add text to read as follows:
Where 120 volt 15 and 20 amp grounding receptacles installed, the grounding conductor shall be on the top position.

Substantiation:

Nowhere in Code is this addressed.
If the faceplate happened to be metal and the screw loosened or fell out the faceplate could possibly touch the ungrounded and grounded conductor if a cord were already plugged in.

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 18-25.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-7 Log #2492 NEC-P18 **Final Action: Reject**
(406-2–Thermal Protector (as applied to receptacles) (New))

Submitter: Thomas J. D'Agostino, Firefighter Products, Inc.

Recommendation:

Create a new definition for the term "Thermal Protector (as applied to receptacles)" as follows:
Thermal Protector (as applied to receptacles). A protective device that is an integral part of a receptacle that protects the receptacle against dangerous overheating due to deteriorated or improper wire connections at receptacle terminal connections and attachment plug connections.
Renumber the existing 406.2 and other sections as necessary.

Substantiation:

This is a companion proposal to the proposal on 406.3(A) to require receptacles installed on 15- and 20- ampere branch circuits to have integral thermal protection. This term is proposed to be defined in Article 406 rather than in Article 100 as the term will be used in only Article 406.
Locating the defined term in 406.2 will comply with the NEC Style Manual regarding numbering of Articles.

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 18-10.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 9 Abstain: 1

Explanation of Abstention:

WELLS: I am abstaining on this proposal because my company could be significantly impacted by the results of this proposal.

18-7a Log #CP1804 NEC-P18 **Final Action: Accept**
(406-2(A))

Submitter: Code-Making Panel 18

Recommendation:

Revise 406.2(A) to read:
Receptacles. Receptacles shall be listed and marked with the manufacturer's name or identification and voltage and ampere ratings.

Substantiation:

Based on the Usability Task Group's request to review all occurrences of the phrase "listed for the purpose" to ensure that it provides clear direction, the panel concludes the revised language clarifies its use in this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-8 Log #741 NEC-P18 **Final Action: Reject**
(406-2(B) Exception (New))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add new text to read as follows:
Exception: The rating specified in 410.30(C)(2) shall be permitted.

Substantiation:

For correlation with 410.30.

Panel Meeting Action: Reject

Panel Statement:

The panel does not accept that there is a correlation problem between 406.2(B) and 410-30(C)(2). Section 406.2(B) provides for minimum ampacity ratings for receptacle and cord connectors. Section 410-30(C)(2) provides for a maximum circuit ampacity rating for electric-discharge luminaires provided with mogul-base, screw-shell lampholders.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-9 Log #3433 NEC-P18 **Final Action: Reject**
(406-2(D))

Submitter: Robert Schuerger, EYP Mission Critical Facilities, Inc.

Recommendation:

Revise as follows:
406.2(D) ~~Isolated~~ Insulated Ground Receptacles. Receptacles incorporating ~~an isolated~~ grounding connection purposely insulated from the receptacle mounting means, intended for the reduction of electrical noise (electromagnetic interference) as permitted in 250.146(D), shall be identified by an orange triangle located on the face of the receptacle.
(1) Receptacles so identified shall be used only with dedicated equipment grounding conductors that are ~~isolated~~ installed in accordance with 250.146(D).
(2) ~~Isolated~~ Insulated ground receptacles installed in nonmetallic boxes shall be covered with a nonmetallic faceplate.
Exception: Where ~~an isolated~~ insulated ground receptacle is installed in a nonmetallic box, a meal faceplate shall be permitted if the box contains a feature or accessory that permits the effective grounding of the faceplate.

Substantiation:

The use of the term "isolated" has caused confusion which has led to improper and unsafe installations in which a separate grounding electrode and grounding system is installed isolated from the rest of the building's grounding system. Since the separate grounding system is not properly bonded to the building's grounding system, a significant voltage can be developed between the two grounding systems in the case of lightning or an electrical fault. This creates a significant hazard for both personal injury and fire. There have been many cases of this type of installation in the past, particularly with machine tools, data processing equipment and other sensitive electronic equipment installations.
Changing "isolated" to "insulated" also brings this section in alignment with the existing Section 517.16 Receptacles with Insulated Grounding Terminals.
This text is also being proposed for the revision of IEEE Std 1100, Powering and Grounding Electronic Equipment.

Panel Meeting Action: Reject

Panel Statement:

The requirements of 250.146 are very clear regarding the use of isolated equipment grounding conductors. The panel is not convinced by the substantiation that changing the term "isolated" to "insulated" would correct the problem identified by the submitter and could possibly result in additional misapplication. The basic requirement is in 250.146 and four alternatives are given in 250.146(A) through (D). 250.146(D) which covers "isolated receptacles" is likewise clear that the insulated equipment grounding conductor may be terminated at a panelboard or pass through the panelboard(s) to terminate at equipment grounding terminal of the applicable derived system or service. Nowhere is it permitted, or even mentioned, that it is permissible to connect to another grounding electrode. Changing the term for these receptacles from "isolated" to "insulated" would not prevent installers from incorrectly installing the device, but the change may confuse those who are following the Code and installing them correctly.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-10 Log #2493 NEC-P18 **Final Action: Reject**
(406-3(A))

Submitter: Thomas J. D'Agostino, Firefighter Products, Inc.

Recommendation:

Revised text:
(A) Grounding Type. Receptacles installed on 15- and 20- ampere branch circuits shall be of the grounding type. These receptacles shall have an integral thermal protector. Grounding-type receptacles shall be installed only on circuits of the voltage class and current for which they are rated, except as provided in Tables 210.21(B)(2) and (B)(3).
Retain the existing exception.

Substantiation:

[Text of Proposal 18-10 substantiation is shown on page 2669]

Panel Meeting Action: Reject

Panel Statement:

In his substantiation, the submitter has indicated that receptacles are reliable and the concern is over the potential for failure based only on the gross number of receptacles that are installed. Using this rationale, the number of incidents involving receptacle failure is extremely low and does not support a change of this magnitude.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 9 Abstain: 1

Explanation of Abstention:

WELLS: I am abstaining on this proposal because my company could be significantly impacted by the results of this proposal.

18-11 Log #3169 NEC-P18 **Final Action: Reject**
(406-3(B))

Submitter: Eric Stromberg, The Dow Chemical Company

Recommendation:

Replace "effectively grounded" at the end of the sentence with "bonded to an effective ground fault current path, as per 250.118 and 250.4(A)(3)."

Substantiation:

The current wording might lead one to believe that the grounding terminal on a receptacle can be connected to its own ground rod in the absence of an effective ground-fault current path. (I have personally seen where this has been done). This proposal is part of a larger effort to find instances in the code where the word "Bond" is used when the meaning is Ground and where "Ground" is used where the meaning is Bond.

Panel Meeting Action: Reject

Panel Statement:

The proposal creates confusion because it only changes some of the terms from "grounding" to "bonding" and gives no explanation why only some of the terms were changed. Methods of grounding are already covered in 406.3(C). See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 9 Negative: 1

Explanation of Negative:

WALL: See my Explanation of Negative Vote on Proposal 18-1.

18-12 Log #1922 NEC-P18 **Final Action: Reject**
(406-3(C))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(C) Methods of Grounding. The grounding contacts of receptacles and cord connectors shall be grounded by connection to the equipment ~~grounding~~ bonding conductor of the circuit supplying the receptacle or cord connector.
FPN: For installation requirements for the reduction of electrical noise, see 250.146(D).
The branch-circuit wiring method shall include or provide an equipment ~~grounding~~ bonding conductor to which the grounding contacts of the receptacle or cord connector shall be connected.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects this proposal for the following reasons:
1. The proposal creates confusion because it only changes some of the terms from "grounding" to "bonding" and gives no explanation why only some of the terms were changed.
2. The proposal contained no substantiation regarding the proposal on Article 250.
3.See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 8 Negative: 2

Explanation of Negative:

OWENS: See my Explanation of Negative Vote on Proposal 18-1.
WALL: See my Explanation of Negative Vote on Proposal 18-1.

Comment on Affirmative:

FETZER: UL recognizes that this proposal extends beyond the scope of this panel, and therefore understands that the ultimate resolution will reside with the TCC and Panels 5 and/or 1, which have jurisdiction over the basic requirements for grounding and the definition of terms involving such.

Sequence Number 18-13 is not used.

18-14 Log #1923 NEC-P18 **Final Action: Reject**
(406-3(D)(3), FPN (New))

TCC Action:

It was the action of the Technical Correlating Committee that this proposal be sent to Code-Making Panel 5 for possible action as outlined in the Code-Making Panel 18 panel statement. This action will be considered by Code-Making Panel 5 as a public comment.

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Add a new Fine Print Note after 406.3(D)(3)(c)
FPN: See 250.114 for a list of equipment that requires an equipment grounding conductor.

Substantiation:

There is no exception in 250.114 permitting equipment listed there to be connected to a GFCI protected circuit without an equipment grounding conductor. This is often over looked and GFCI protected receptacles without an equipment grounding conductor are often installed in locations where the equipment listed in 250.114 would be used. If the code intent is that the GFCI provides suitable protection for these circuits, then there should be an exception to 250.114. If there is not an exception intended, then the FPN is needed to call attention to this fact.

Panel Meeting Action: Reject

Panel Statement:

The panel acknowledges the principle that the submitter is communicating. It believes that the appropriate action would be an exception in 250.114 and refers the proposal to CMP 5 for consideration. The panel believes that including the fine print note as proposed without an exception in 250-114 would further confuse the issue. The panel refers this proposal to CMP-5 for possible action.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-15 Log #2494 NEC-P18 **Final Action: Reject**
(406-3(D)(3)(a))

Submitter: Thomas J. D'Agostino, Firefighter Products, Inc.

Recommendation:

Revise existing 406.3(D)(3)(a) as follows:
(a) A nongrounding type receptacle(s) shall be permitted to be replaced with another nongrounding-type receptacle(s). This receptacle(s) shall have integral thermal protection.

Substantiation:

Same as for the proposed revision to 406.3(A).

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 18-10.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 9 Abstain: 1

Explanation of Abstention:

WELLS: I am abstaining on this proposal because my company could be significantly impacted by the results of this proposal.

18-16 Log #3280a NEC-P18 **Final Action: Reject**
(406-3(D)(4))

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 2 for information.

Submitter: Joseph A. Hertel Madison, WI

Recommendation:

Add (4) to Section 406.3(D)(4) that states:
(4) Arc-fault circuit interrupter protection shall be provided where replacements are made at receptacle outlets that are required to be so protected elsewhere in this code.

Substantiation:

If arc-fault circuit interrupter protection is to provide an increased level of protection, it must recognize all available technologies and the application extended to those dwellings that may have aged and inadequate wiring for today's use of electricity.

Panel Meeting Action: Reject

Panel Statement:

Arc-fault circuit-interrupter protection specifically for receptacles is not specified by the NEC. The current requirements of 210.12 apply to branch circuits supplying 15- and 20- ampere, 125 volt outlets in dwelling unit bedrooms. CMP 18 refers this proposal to CMP 2 for information, since they have jurisdiction for the protection of branch circuits.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

Comment on Affirmative:

WELLS: While I believe that this proposal has merit, I believe that CMP 2 should take precedence over the AFCI issue.

Sequence Number 18-17 is not used.

18-18 Log #1523 NEC-P18 **Final Action: Reject**
(406-4(A))

Submitter: David Shapiro, Safety First Electrical Contracting, Consulting, and Safety Education

Recommendation:

In the fourth line, insert "against or" before "at".

Substantiation:

The purpose of this rule is to prevent devices from moving, and perhaps shorting. Traditionally, shims suitable for the location have been one means of achieving this. There is even a flat, C-shaped aftermarket product designed explicitly for interposing between receptacle yoke and remaining wall surface. However, some including the NFPA Electrical Inspection manual, reinterpret "at" as solely meaning "against," suggesting that the yoke must be supported directly by wall. It should not be necessary to use both terms, given that "at" subsumes "against." However, the price of adding two words seems worth it for the clarification.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects the proposed substitution of "against" for "at". The panel concludes that the receptacle does not necessarily need to be held "against" the surface. It could be held "at" the surface through the use of shims. See panel action and statement on Proposal 18-20.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

Sequence Number 18-19 is not used.

18-20 Log #748 NEC-P18 **Final Action: Accept in Principle in Part**
(406-4(A)(b) and (e))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:

Receptacle Mounting. Receptacles shall be mounted in boxes or assemblies designed for the purpose, and such boxes or assemblies shall be securely fastened in place unless otherwise permitted elsewhere in the Code.

(A) Boxes That Are Set Back. Receptacles mounted in boxes that are set back of the ~~wall~~ finished surface as permitted in 314.20, shall be installed so that the mounting yoke or strap is held rigidly ~~at~~ against the finished surface ~~of the wall.~~

(B) Boxes That Are Flush. Receptacles that are mounted in boxes that are flush with the ~~wall~~ finished surface or project therefrom shall be installed so that the mounting yoke or strap is held rigidly against the box or ~~raised~~ box cover.

(E) Receptacles In Countertops And Similar Work Surfaces ~~in Dwelling Units~~..." (remainder unchanged).

Substantiation:

Present wording does not allow for receptacles installed in boxes and supplied by properly installed flexible cord as permitted in 314.23(H). The provisions of (A) and (B) should apply to boxes in floors, ceilings and cabinets also. The Style Manual indicates wording should be explicit. The requirement of (B) should also apply to flat covers. If the requirement of (E) is for safety, it should apply to all occupancies.

Panel Meeting Action: Accept in Principle in Part

Revise 406.4 and 406.4(A) and (B) to read:

406.4 Receptacle Mounting. Receptacles shall be mounted in boxes or assemblies designed for the purpose, and such boxes or assemblies shall be securely fastened in place unless otherwise permitted elsewhere in this Code.

(A) Boxes That Are Set Back. Receptacles mounted in boxes that are set back of the finished surface as permitted in 314.20, shall be installed so that the mounting yoke or strap of the receptacle is held rigidly at the finished surface or box cover.

(B) Boxes That Are Flush. Receptacles mounted in boxes that are flush with the finished surface or project therefrom shall be installed so that the mounting yoke or strap of the receptacle is held rigidly against the box or box cover.

Panel Statement:

The panel accepts the proposal in principle in part with two exceptions. The panel did not accept the proposed substitution of "against" for "at". The panel concludes that the receptacle does not necessarily need to be held "against" the surface. It could be held "at" the surface through the use of shims. In (A) the panel added the words "box cover" to be consistent with (B). The word "the" was changed to "this" before Code in (A). The panel did not accept deletion of "in dwelling units" in (E) as the substantiation did not support expanding this requirement to other than dwelling units.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-21 Log #3209 NEC-P18 **Final Action: Accept in Principle**
(406-4(D))

Submitter: Stewart Rappaport, Stewca Industries Inc.

Recommendation:

Revise as follows:
(D) Position of Receptacle Faces. After installation, spaces between the receptacle and faceplates or covers shall be effectively closed and the position of receptacle faces in faceplates or covers shall not prevent the use of an attachment plug in the manner or use for which the attachment plug is intended.
Receptacle faces shall be flush with or project from faceplates of insulating material and shall project a minimum of 0.4 mm (0.015 in.) from metal faceplates.
Alternate position of receptacle faces is permitted in faceplates of insulating material that are listed and identified for the particular condition of installation.

Substantiation:

The current wording with respect to the position of receptacle faces in faceplates of insulating material is too restrictive. The strict enforcement of this language in recently revised listing standards has resulted in the delisting of faceplates with a very popular and effective child safety feature. These faceplates had been listed and installed for over twelve (12) years without incidence of reported problems.
Part of the proposed revision is taken from existing text in the Canadian Electrical Code Part 1, Rule 26-700 (10)(c). It is our contention that due to the extensive standardization of listed receptacles and attempt plugs, universal compatibility of such covers with these devices is assured. The previous listing investigation for the recently delisted design included test for attachment plug blade retention in receptacles. Supporting documentation for the particular product described is provided.
Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle

Add new exception to 406.4(D) that reads:
Exception: Listed kits or listed assemblies encompassing receptacles and nonmetallic wall plates shall be permitted.

Panel Statement:

The panel recognizes the need to permit the types of cover plates described in the substantiation. However, because there is not a dimensional standard controlling the depth of receptacle contacts below the receptacle face, caution must be exercised to assure that cover plates do not prevent attachment plug blades from properly engaging the receptacle contacts. There is no way the installer, AHJ or consumer would know whether the installation is in accordance with the proposed requirement that "the position of receptacle faces in faceplates or covers shall not prevent the use of an attachment plug in the manner or use for which the attachment plug is intended." To require such covers to be marked with the manufacture name and catalog number of the receptacles with which it is suitable is not sufficiently cautious because the likelihood of the consumer searching for those receptacles is remote. Therefore, it would seem more likely to assure compatible products are installed if the appropriate receptacle is supplied with the cover plate or assembly with instructions and cautions against using other receptacles.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-22 Log #415 NEC-P18 **Final Action: Reject**
(406-4(E))

Submitter: John M. Vargo, Vargo Electric

Recommendation:

Delete 406.4(E). Add the following to 406.4. Receptacles shall not be installed in a face up position in any location in dwelling units.

Substantiation:

Liquids or solids can enter and short out or interfere with their function in any location including countertops and similar work surfaces.

Panel Meeting Action: Reject

Panel Statement:

Section 406.4(E) currently prohibits receptacles from being installed in a face up position in counter tops or similar work surfaces. Receptacles are frequently installed in the face up position in floors using an appropriate floor box as required in 314.27(C). The UL standard for these boxes has a "scrub water" test in anticipation of problem the submitter contemplates. The submitter's substantiation does not provide sufficient technical substantiation to expand this requirement to other than counters and similar work surfaces.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-23 Log #1086 NEC-P18 **Final Action: Reject**
(406-4(E))

Submitter: Russell LeBlanc, Peterson School of Engineering

Recommendation:

Remove the words "in dwelling units" from the section title.
Receptacles in countertops and similar work surfaces ~~in dwelling units.~~

Substantiation:

The same shock and fire hazards exist from spilling liquids, or washing down the work surface in other than dwelling units.

Panel Meeting Action: Reject

Panel Statement:

The submitter does not provide sufficient technical substantiation to support expanding this requirement to other than dwelling units. See panel action and statement on Proposal 18-20.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-24 Log #1463 NEC-P18 **Final Action: Reject**
(406-4(E))

Submitter: Jamie McNamara Hastings, MN

Recommendation:

I put a strike through deleted text.
406.4 Receptacle Mounting.
Receptacles shall be mounted in boxes or assemblies designed for the purpose, and such boxes or assemblies shall be securely fastened in place.
"(A) ..."
(E) Receptacles in Countertops and Similar Work Surfaces ~~in Dwelling Units~~. Receptacles shall not be installed in a face-up position in countertops or similar work surfaces.

Substantiation:

To expand the scope of this excellent safety requirement to all structures not only dwellings.

Panel Meeting Action: Reject

Panel Statement:

The submitter did not provide technical substantiation to support the recommendation as is required by 4-3.3(d) of the NFPA Regulations Governing Committee Projects. See the panel action and statement on Proposal 18-20.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-25 Log #1639 NEC-P18 **Final Action: Reject**
(406-4(G))

Submitter: Ray C. Mullin, Ray C. Mullin

Recommendation:

Add new text to read as follows:
(G) Receptacles mounted vertically shall have the equipment grounding conductor slot on top. Receptacles mounted horizontally shall have the grounded conductor slot (wide slot) on top.

Substantiation:

The problem is that people are being hurt. The largest fast food chain (McDonalds) had a worker seriously burned when a metal pan fell onto a partially inserted attachment plug cap. Had the EGC slot of the receptacle been positioned to the top, it is very likely that the metal pan would have bounced off of the grounding prong, reducing the chance of the huge arcing flash that burned the worker.
Positioning the ground slot as proposed offers an extra line of defense to reduce the chance of arcing and sparking.
This hazard is common in homes as well as commercial and industrial applications where metal faceplates (stainless steel...chrome) are used. These metal plates can and do come loose, dropping downward onto the "hot" and grounded conductor blades of a partially pushed in attachment plug cap.
A number of manufacturers (Hubbell, Eagle, P&S, GE, Arrow Hart) are currently positioning their receptacles and yoke per the above proposal so that the printing on the yoke is readable when the equipment grounding slot is to the top.
Let's make it a Code requirement! A vote of ACCEPTANCE will get the job done!

Panel Meeting Action: Reject

Panel Statement:

The panel rejects the proposal that receptacles should be mounted with the grounding contact in the up position for vertical installations or the gounded conductor in the up position for horizontal installations. The panel has consistently rejected similar proposals and there is no assurance that the orientation of the receptacle will prevent the type of accident described in the recommendation. The orientation of the grounding contact on the receptacle is installation specific.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-26 Log #1672 NEC-P18 (406-4(G)) **Final Action: Reject**

Submitter: Robert M. Haley, IBEW LU 474

Recommendation:

Add new text as follows:
(G) Receptacles shall not be installed above suspended or dropped ceilings.

Substantiation:

Section 400.8 prohibits the use of flexible cords and cables located above suspended or drooped ceilings. If the cords are not allowed, why have receptacles in these locations?

Panel Meeting Action: Reject

Panel Statement:

The submitter's substantiation does not take into account receptacles required by 210.63 that in some cases may have to be located above a suspended or dropped ceiling. The requirements of 400.8(2) and (5) do not permit flexible cords to penetrate or to be concealed above dropped, hung or suspended ceilings.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-27 Log #742 NEC-P18 (406-6) **Final Action: Accept in Principle in Part**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Attachment Plugs. All attachment plugs, flanged surface inlets, and cord connectors shall be listed for the purpose and marked with their manufacturers name or identification and voltage and ampere ratings.
(A) Attachment plugs, flanged surface inlets, and cord connectors shall constructed so that there are no exposed current-carrying parts except the prongs, blades, or pins. The cover for wire terminations shall be a part that is essential for the operation of an attachment plug, flanged surface inlet, or connector (dead-front construction).
(B) Attachment plugs, flanged surface inlets, and cord connectors shall be installed so that their prongs, blades, or pins are not energized unless inserted into an energized receptacle or cord connector. No receptacle or cord connector shall be installed so as to ~~require an~~ be energized by insertion of an attachment plug or flanged surface inlet as its source of supply.

Substantiation:

Edit. Flanged surface inlets should be noted as they are not covered by the definition of attachment plug, since there is no attached supply cord. Present wording can be literally interpreted as not permitting a receptacle or cord connector to be supplied by a cord with an attachment plug.

Panel Meeting Action: Accept in Principle in Part

Revise title and first paragraph of 406.6 to read:
Attachment Plugs, Cord Connectors, and Flanged Surface Devices. All attachment plugs, cord connectors, and flanged surface devices (inlets and outlets) shall be listed and marked with the manufacturer's name or identification and voltage and ampere ratings.

Panel Statement:

The panel agrees that flanged surface inlets and outlets are properly placed in 406.6 but does not concur that the requirements should be located with those for attachment plugs and cord connectors. This action amends the title of the section and the first paragraph to cover these devices. The panel has taken actions in Proposals 18-30 and 18-31 to provide requirements for flanged surface inlets.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-28 Log #769 NEC-P18 (406-6) **Final Action: Accept in Principle in Part**

TCC Action:

The Technical Correlating Committee notes that the action referenced in the panel statement is contained in Proposal 18-27.

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
Attachment Plugs. All attachment plugs, flanged surface outlets, and cord connectors shall be listed for the purpose and marked with the manufacturers name or identification and voltage and ampere ratings.
(A) Attachment plugs, flanged surface inlets, and cord connectors shall be... (remainder unchanged).
(B) Attachment plugs and flanged surface inlets shall be installed so that their prongs, blades, or pins are not energized unless inserted into an energized receptacle or cord connector. No receptacle or cord connector shall be installed so as to ~~require and~~ be energized by insertion of an attachment plug or flanged surface inlet as its source of supply.

Substantiation:

Edit. Flanged surface inlets should also be noted since they are not covered by the definition of attachment plug (they don't have an attached flexible cord). Present wording can be interpreted as literally not permitting a receptacle (or cord connector) from being supplied by a cord with an attachment plug.

Panel Meeting Action: Accept in Principle in Part

Panel Statement:

The panel agrees that flanged surface inlets and outlets are properly placed in 406.6 but does not concur that the requirements should be located with those for attachment plugs and cord connectors. This action amends the title of the section and the first paragraph. The panel has taken actions in Proposals 18-30 and 18-31 to provide requirements for flanged surface inlets and outlets.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-28a Log #CP1805 NEC-P18 (406-6) **Final Action: Accept**

TCC Action:

The Technical Correlating Committee assumes that the panel action on 18-27 is the final action on this section since it incorporates the revision from this proposal as well as the modification suggested in Proposal 18-27.

Submitter: Code-Making Panel 18

Recommendation:

Revise 406.6 to read:
Attachment Plugs. All attachment plugs and cord connectors shall be listed and marked with the manufacturer’s name or identification and voltage and ampere ratings.

Substantiation:

Based on the Usability Task Group's request to review all occurrences of the phrase "listed for the purpose" to ensure that it provides clear direction, the panel concludes the revised language clarifies its use in this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-29 Log #39 NEC-P18 **Final Action: Accept**
(406-6(B) (New))

TCC Action:

The Technical Correlating Committee understands that the panel action deletes the second sentence of 406.6(B) of the 2002 NEC.

NOTE: The following proposal consists of Comment 18-41 on Proposal 18-70 in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 18-70 was:

Add a new Article 420 for receptacles, cord connectors and attachment plugs (cord caps) comprised of existing Sections of the 1999 NEC from Articles 410, 210 and 250 as follows:

[Text of (May 2001) Proposal 18-70 is shown on page 2670]

Submitter: Tom Dunn San Jose, CA

Recommendation:

Delete the second sentence of this paragraph.

Substantiation:

The first sentence clearly states that plugs are not to be installed on the "hot", or "down-stream", end of a cord. The second sentence implies that the wires supplying power to a receptacle cannot have a plug at the other end.

This would eliminate a lot of extension cords.

Another example of what would not be permitted, is the case of carnival rides, where receptacles at the outside end of carousel sweeps are powered by plugs at the inside end which plug into receptacles at the center of the ride.

Panel Meeting Action: Accept

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-30 Log #44 NEC-P18 **Final Action: Accept in Principle**
(406-6(C) (New))

NOTE: The following proposal consists of Comment 3-84 on Proposal 3-119 in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 3-119 was:

Add:

(c) GENERATORS. Where temporary power is provided by a portable or vehicle-mounted generator(s) and is connected to the permanent wiring system, a suitable means of transfer shall be provided to prevent the inadvertent interconnection of normal and temporary power sources. Where a motor base inlet type of plug is used to receive power from the generator, all circuit conductors, including the grounded conductor, attached to the inlet plug shall be disconnected while normal power is supplied. The generator(s) shall have an adequate capacity and rating for the supply of all equipment to be operated at one time. The installation shall comply with other applicable provisions of this code.

Comment 3-84 received the following Technical Correlating Committee Note:

The Technical Correlating Committee directs that the Panel Action on Comment 3-84 be reported as "Hold" consistent with Section 4-4.6.2.2 of the NFPA Regulations Governing Committee Projects. This Comment will become a Proposal for Code-Making Panel 18 during the next code cycle.

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Recommendation:

Place the energized flanged inlet restriction in the new receptacle article, as a new 406.6(C), and then reletter existing (C) as (D), as follows:

(C) Flanged Inlets. Flanged or motor-base inlet plugs shall be installed so their prongs, blades, or pins are not energized unless inserted into an energized receptacle cord body.

Substantiation:

The hazard identified in the proposal is real regardless of whether the wiring is a temporary connection. This material belongs with its companion material under Code-Making Panel 18's jurisdiction.

Panel Meeting Action: Accept in Principle

Add a new 406.6(d) as to read:

(d) Flanged Surface Inlet. A flanged surface inlet shall be installed so that the prongs, blades, or pins are not energized unless an energized cord connector is inserted into it.

Panel Statement:

The panel agrees with the submitter and has revised the recommendation to require that a flanged surface inlet not be energized until a cord cap is inserted into it.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-31 Log #52 NEC-P18 **Final Action: Accept in Principle**
(406-6(C) (New))

NOTE: The following proposal consists of Comment 15-9 on Proposal 3-119 in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 3-119 was:
Add:
(c) GENERATORS. Where temporary power is provided by a portable or vehicle-mounted generator(s) and is connected to the permanent wiring system, a suitable means of transfer shall be provided to prevent the inadvertent interconnection of normal and temporary power sources. Where a motor base inlet type of plug is used to receive power from the generator, all circuit conductors, including the grounded conductor, attached to the inlet plug shall be disconnected while normal power is supplied. The generator(s) shall have an adequate capacity and rating for the supply of all equipment to be operated at one time. The installation shall comply with other applicable provisions of this code.
Comment 15-9 received the following Technical Correlating Committee Note:
Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.

Recommendation:

Place the energized flanged inlet restriction in the new receptacle article, as a new 406.6(C), and then reletter existing (C) as (D), as follows:
(C) Flanged Inlets. Flanged or motor-base inlet plugs shall be installed so their prongs, blades, or pins are not energized unless inserted into an energized receptacle cord body.

Substantiation:

The hazard identified in the proposal is real regardless of whether the wiring is a temporary connection. This material belongs with its companion material under Code-Making Panel 18's jurisdiction.

Panel Meeting Action: Accept in Principle

Panel Statement:

See panel action and statement on Proposal 18-30.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-32 Log #770 NEC-P18 **Final Action: Reject**
(406-7)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise last sentence:
Nongrounding type receptacles and cord connectors shall not accept grounding-type attachment plugs except those described in 406.9(A) for plug-in ground-fault circuit interruptors.

Substantiation:

Code users may perceive a conflict. Proposal provides correlation.

Panel Meeting Action: Reject

Panel Statement:

The submitter indicates that the present wording may be perceived as a conflict. The submitter has provided no substantiation that this is really the case and has proved to be problematic in field application.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-33 Log #753 NEC-P18 **Final Action: Reject**
(406-8(B))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text as follows:
(B) Wet Locations (1) ~~15- and 20- Ampere Outdoor Receptacles. 15- and 20-ampere receptacles, 125-volt receptacles~~ Receptacles installed ~~outdoors~~ in a wet location shall have an enclosure that is weatherproof whether or not an attachment plug is inserted except that
~~(2) Other Receptacles: All other receptacles installed in a wet location shall comply with (a) or (b);~~
~~(a) A receptacle installed in a wet location where the product intended to be plugged into it is not attended while in use (e.g. sprinkler system controller, landscape lighting, holiday lights, and so forth) shall have an enclosure that is weatherproof with the attachment plug inserted or removed.~~
~~(b) A~~ a receptacle installed in a wet location ~~where the product intended to be plugged into it~~ authority having jurisdiction determines the utilization equipment which may be supplied will not be likely to be unattended while in use (e.g. portable tools, and so forth), shall have an enclosure that is weatherproof when the attachment plug is removed.

Substantiation:

The requirement of (B)(1) is limited to only outdoor wet locations, and since (B)(2) other receptacles does not cover 15- and 20-ampere 125- and 250-volt receptacles there is no specific requirement for those receptacles installed indoors in wet locations.
Code requirements should be based on safety; the more stringent requirement of (B)(1) for specific receptacles seems to be based on the relative greater number of those ratings installed.
If the rule (B)(2) is safe for receptacles with higher ampere and voltage ratings and multiphase ratings in wet locations indoors or outdoors, it should be safe for receptacles specified in (B)(1).
If safety warrants the requirements of (B)(1) for certain receptacle ratings, it is warranted for higher voltage and ampere rated receptacles.
The panel statement for proposal 18-43 in the 2000 ROP indicated the reason for not employing the rule of (B)(1) for all receptacles was that receptacles inside premises where walls are hosed down with the plug cap removed are more weatherproof with an enclosure (cover) that is weatherproof only when the plug cap is removed (other than "bubble" type). The rule also applies to such receptacles installed outdoors in wet locations where not hosed down.
The requirements are arbitrary and inconsistent; the panel seems to have determined that one type enclosure (cover) may be used for certain receptacles covered in (B)(2)(b) since it is more weatherproof, even though a testing laboratory lists either type as suitable for wet locations.

Panel Meeting Action: Reject

Panel Statement:

The 1st sentence in the substantiation is incorrect. Section 406.8(B)(1) applies only to "15- and 20-ampere, 125- and 250-volt receptacles installed outdoors in a wet location". Section 406.8(B)(2) covers all other receptacles including 15- and 20-ampere, 125- and 250-volt receptacles installed indoors. CMP 18 disagrees with the substantiation that it has been arbitrary and inconsistent.
The panel does not agree that all wet location receptacle covers need to be of the weatherproof type when a cord is connected. There are numerous instances where it is safer to have a cover that is weatherproof without a cord attached especially in the hose down areas of food processing plants and biomedical research facilities. The panel has not seen any justification to dismiss the concerns expressed in the panel statement to 2002 NEC proposal 18-43.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-34 Log #454 NEC-P18 **Final Action: Reject**
(406-8(B)(2))

Submitter: Alex Janicijevic, RACO

Recommendation:

Delete 406.8(B)(2) in its entirety.

Substantiation:

Clarity of purpose. 406.8(B)(2) is no longer necessary

Panel Meeting Action: Reject

Panel Statement:

The submitter provided no substantiation or rationale supporting the statement that 406.8(B)(2) is not necessary. Deleting it would remove any provisions for protecting a large number of receptacles installed in wet locations.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-35 Log #1276 NEC-P18 **Final Action: Reject**
(406-8(B)(1))

Submitter: David H. Kendall, Carlon, Lamson & Sessions

Recommendation:

Revise text to read as follows:
406.8 Receptacles in Damp or Wet Locations.
(A) Damp Locations. A receptacle installed outdoors in a location protected from the weather or in other damp locations shall have an enclosure for the receptacle that is weatherproof when the receptacle is covered (attachment plug cap not inserted and receptacle covers closed).
An installation suitable for wet locations shall also be considered suitable for damp locations.
A receptacle shall be considered to be in a location protected from the weather where located under roofed open porches, canopies, marquees, and the like, and will not be subjected to a beating rain or water runoff.
(B) Wet Locations.
(1) 15- and 20-Ampere ~~Outdoor~~ Receptacles in a Wet Location. 15- and 20-ampere, 125- and 250-volt receptacles installed outdoors or in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted.

Substantiation:

Delete the word "outdoor" in the title of this section and add "in a Wet Location" will provide a title for the section. In the text of the section, adding the phrase "or in a wet location" will require the enclosure to be weatherproof, whether or not the attachment plug is inserted, in any wet location, rather than just in an outdoor application. Indoor locations, such as food processing areas in supermarkets, vehicle washing areas inside car washes and other similar areas, often require hose down or water exposure for the walls in these areas with electrical appliances still plugged into the receptacle.

Panel Meeting Action: Reject

Panel Statement:

The panel does not agree that all wet location receptacle covers need to be of the weatherproof type when a cord is connected. There are numerous instances where it is safer to have a cover that is weatherproof without a cord attached especially in the hose down areas of food processing plants and biomedical research facilities. The panel has not seen any justification to dismiss the concerns expressed in the panel statement to 2002 NEC proposal 18-43.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-36 Log #1668 NEC-P18 **Final Action: Reject**
(406-8(B)(1))

Submitter: Richard W. Likes, L & F Electric

Recommendation:

Revise text as follows:
(1) 15- and 20-Ampere Outdoor Receptacles. 15- and 20-ampere, 125- and 250-volt receptacles installed outdoors in a wet location, with permanent cords plugged into, shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted.

Substantiation:

I have been an electrician for 28 years. 1) We had a problem with outside outlets getting water in them and tripping the GFIs. The siding industry solved the problem with a master mount for outlets that inset the outlet and cover, allowing water to run off the outside. With bubble covers, we have had to use the old master mounts. 2) A cover sticking out 3 inches can be broken, causing a worse problem.

Panel Meeting Action: Reject

Panel Statement:

Section 406.8(B)(1) anticipates that cords will be left unattended at one time or another. There is no way for the installer or AHJ to contemplate whether a cord will be plugged in permanently.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-37 Log #1830 NEC-P18 **Final Action: Reject**
(406-8(B)(1))

Submitter: David Zinck, NewburyPort Wiring Inspector

Recommendation:

Revise as follows:
(B) Wet Locations
(1) 15- and 20-ampere Outdoor Receptacles. 15- and 20-ampere, 125- and 250-volt Ground Fault Circuit Interrupter receptacles installed outdoors in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug cap is inserted. Where the GFCI device protecting the receptacle is in a dry location the enclosure shall be permitted to comply with 406.8(B)(2).

Substantiation:

The original proposal creating 406.8(B)(1) cited the fact that water was getting into the GFCI receptacles compromising the electronics and compromising the GFCI protection. I don't dispute this as fact having seen it myself many times on outlets that weren't that old, many times within a year. However, this rule doesn't take into consideration the electrician who religiously puts his GFCI device in the garage or next to the panel and "loads out" to his required GFCI outdoor outlets for the purpose of keeping his GFCI dry and protected. Nor does it allow an option for the homeowner who doesn't want to see that large ugly "in-use" cover on the front of his house. While I am not aware of a 250 Volt 15 or 20 ampere GFCI receptacle being available on the market today, it is a device that might hit the market and become popular for swimming pools, etc. so I didn't propose eliminating the "250 volt" rating from 406-8(B)(1).

Panel Meeting Action: Reject

Panel Statement:

Whether or not a GFCI receptacle is installed, the receptacle needs to be properly protected from moisture. Indeed, the submitter's substantiation states that this happens many times water gets into GFCI receptacles. Presumably the water gets in whether or not the receptacle is a GFCI type and thus merits the same protection.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-38 Log #2814 NEC-P18 **Final Action: Reject**
(406-8(B)(1))

Submitter: Henry A. Jenkins, Wake County

Recommendation:

Delete the word "outdoor" in the title of Section 406.8(B) and replace with the phrase "in a Wet Location." Delete the word "outdoor" between the word installed and in
(B) Wet Locations
(1) 15 and 20 Ampere ~~Outdoor~~ Receptacles in a Wet Location 15 and 20 ampere 125-volt receptacles installed ~~outdoors~~ in a wet location shall have an enclosure that is weatherproof whether or not the attachment plug is inserted (The remainder will remain unchanged.)

Substantiation:

Deleting the word "outdoor" in the title of this section and adding "in a Wet Location" will provide the title for the section. In the text deleting the word "outdoor" will require the enclosure to be weatherproof, whether or not the attachment plug is inserted, in any wet location, rather than just in an outdoor location. Indoor locations, such as food processing areas in supermarkets, vehicle washing areas inside car washes and other similar areas, often require hose down or water exposure for the walls in these areas with electrical appliances still plugged into the receptacle.

Panel Meeting Action: Reject

Panel Statement:

Section 406.8(B)(2) requires 15 and 20-ampere receptacles installed indoors, as well as all other types such as 30 or 50-ampere receptacles installed in either indoor or outdoor wet locations, to be protected based on whether the receptacle is likely to be attended when in use. The submitters statement that "indoor locations, such as food processing areas in supermarkets, vehicle washing areas inside carwashes and other similar areas, often require hose down or water exposure for the walls in these areas with electrical appliances still plugged into the receptacle" and (B)(2) would require a "while-in-use" cover. However, the panel concludes that where high-pressure sprayers are used the other type of cover may provide superior protection and should be permitted. See panel action and statement on Proposal 18-35.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-39 Log #1829 NEC-P18 **Final Action: Accept in Part**
(406-8(B)(2))

Submitter: David Zinck, NewburyPort Wiring Inspector

Recommendation:

Revise as follows:
(B) Wet Locations.
(2) Other Receptacles. All other receptacles installed in a wet location shall comply with (a) or (b):
(a) A receptacle installed in a wet location where the product intended to be plugged into it is not attended while in use (~~e.g. , sprinkler system controller, landscape lighting, holiday lights, and so forth~~) shall have an enclosure that is weatherproof with the attachment plug inserted or removed.
(b) A receptacle installed in a wet location where the product intended to be plugged into it will be attended while in use (~~e.g., portable tools, and so forth~~) shall have an enclosure that is weatherproof when the attachment plug is removed.

Substantiation:

According to the proposal that created this article, the reason for 406-8(B)(2) is to recognize that there are many wet locations that are not "outdoor." Parts of restaurants, factories, breweries, dairy industries, etc., are examples of these. The biggest problem adding the most confusion about this article is the fact that the items listed as examples in ( ) are items typically plugged into outdoor receptacles. The above changes would correct this.

Panel Meeting Action: Accept in Part

Revise 406.8(B)(2)(a) as follows:
(a) A receptacle installed in a wet location, where the product intended to be plugged into it is not attended while in use, shall have an enclosure that is weatherproof with the attachment plug cap inserted or removed.

Panel Statement:

The panel agrees that the parenthetical wording in 406.8(B)(2)(a) may lead to confusion. The panel does not agree that the parenthetical wording in 406.8(B)(2)(b) is confusing.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-40 Log #3304 NEC-P18 **Final Action: Reject**
(406-8(B)(2)(b))

Submitter: Nicholas T. Abbatiello

Recommendation:

Revise as follows:
A receptacle installed in a wet location <u>in or on a residential dwelling unit</u> where the product intended to be plugged into it will be attended while in use (e.g., portable tools, and so forth, <u>but not temporary seasonal lighting</u>) shall have an enclosure that is weatherproof when the attachment plug is removed.

Substantiation:

In many commercial and industrial locations, "attended" type covers are frequently used and equipment is often times plugged into them for extended periods. The "attended" covers should only be used in residential applications and excluded from use in commercial, including guest lodging and industrial applications. Further, on residences, there is a great likelihood that the receptacle will be used for seasonal type temporary lighting displays, which are left in place for a month or two. The displays are usually located outside the dwelling unit proper and generally in the front of the edifice. These covers should be the "unattended" type. Also, decorative type of lighting is being more commonly employed for landscaping effects, which are usually plugged in indefinitely. The above gives some remedy to this potentially dangerous situation where water and subsequent corrosion can create a hazard.

Panel Meeting Action: Reject

Panel Statement:

The panel does not agree that 406.8(B)(2)(b) applies only to residential occupancies. There are many non-residential occupancies such as food preparation areas of restaurants, where attended type weatherproof covers are suitable to be used when equipment is permanently connected.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-41 Log #1514 NEC-P18 (406-8(C)) **Final Action: Accept in Principle**

Submitter: Harold F. Willman, City of Aurora

Recommendation:

Revise text to read as follows:
(C) Bathtub and Shower ~~Space~~ Area. A receptacle shall not be installed within a bathtub or shower ~~space~~ area.
FPN: See 410.4(D) for tub or shower area definition.

Substantiation:

Because all Code Panels intend exact wording, words with the same meaning are used to avoid the redundancy of a specific word. Space, area and zone are examples of using words synonymously in Chapters 1 through 4. An example is NEC 110.26(F)(1) and 110.26(F)(2) where all three words are used synonymously. By changing "space" to "area" and using the FPN to refer to the definition, it makes the intent clear as to the space the receptacle is not to be installed. This will also void the argument that "area" and "space" are not the same word and therefore do not mean the same thing. This wording and definition references clarifies the hazard of electric devices within a wet space, area or zone.

Panel Meeting Action: Accept in Principle

Revise 406.8(C) to read:
(C) Bathtub and Shower Space. Receptacles shall not be installed within or directly over the bathtub or shower stall.

Panel Statement:

The panel does not agree that receptacles need to be installed 3 feet away from the outer edge of a tub or shower. In many instances, especially in the smaller apartment sized bathrooms, it would be impossible to install a receptacle beyond 3 feet from the edge of the tub. The panel does agree that receptacles shall not be installed within the footprint of a tub or shower. The panel action adequately conveys the location restriction without the use of a fine print note. The panel does not concur with the submitter's statement regarding the use of words with the same meaning to avoid redundancy.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-42 Log #1817 NEC-P18 (406-8(C)) **Final Action: Reject**

TCC Action:

It was the action of the Technical Correlating Committee that this proposal be sent to Code-Making Panel 19 for information.

Submitter: Gilbert L. Thompson, MEIA Codes and Standards

Recommendation:

Change the wording to read as follows:
Receptacle outlets shall not be installed in or within reach [750 mm (30 in.)] of a shower or bathtub space.

Substantiation:

Mobile homes and manufactured homes have this wording in Section 550.13(F)(1). Since many manufactured homes are installed in today's society, it would only seem that the same rule be required for on-site constructed homes. This would make code requirements for the installation of receptacles in bathtubs and shower spaces more uniform.

Panel Meeting Action: Reject

Panel Statement:

The panel does not agree that receptacles need to be installed 30 inches away from the outer edge of a tub or shower. In many instances, especially in the smaller apartment sized bathrooms, it would be impossible to install a receptacle beyond 30 inches from the edge of the tub. The panel does agree that receptacles shall not be installed within the footprint of a tub or shower. The submitter is referred to the action taken by CMP 19 in 19-46a (Log #CP1919) that correlates the requirements of 550.13(F)(1) with this section.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-43 Log #1087 NEC-P18 **Final Action: Reject**
(406-8(C) Exception (New))

Submitter: Russell LeBlanc, Peterson School of Engineering

Recommendation:

Add this Exception:
Exception: Internal receptacles that are part of listed utilization equipment, and used for supplying power to internal components of the utilization equipment.

Substantiation:

Listed bathroom exhaust fans or fan/light combo units often have receptacles inside them for the connection of the motor or lampholder socket. These presently would need to be modified by removing the receptacles and cord caps and hard wiring the components, unless we could use this Exception. No receptacles of any kind are currently allowed in bathtub or shower spaces!
Supporting material is available for review at NFPA headquarters.

Panel Meeting Action: Reject

Panel Statement:

The panel does not agree that a receptacle internal to a listed appliance or a listed luminaire is subject to the provisions of 406.8(C). These receptacles are necessary for the appliance or luminaire and are not readily accessible to the user.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-44 Log #775 NEC-P18 **Final Action: Accept in Part**
(406-8(E))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
Flush Mounding with Faceplate. The enclosure for a receptacle installed in an outlet box that is flush mounted ~~on a wall surface~~ or set back of the finished surface as covered in 314.20 shall be made weatherproof by means of a weatherproof faceplate assembly that provides a watertight connection between the plate and the finished ~~wall~~ surface.

Substantiation:

Edit. The requirement should apply to set back outlet boxes and surfaces other than walls. Present wording does not cover set back boxes or ceiling surfaces. The Style Manual requires text to be as explicit as possible.

Panel Meeting Action: Accept in Part

Revise 406.8(E) to read:
(E) Flush Mounting with Faceplate. The enclosure for a receptacle installed in an outlet box flush-mounted in a finished surface shall be made weatherproof by means of a weatherproof faceplate assembly that provides a watertight connection between the plate and the finished surface.

Panel Statement:

The panel accepts this proposal in part and agrees with the submitter that not all flush mounted boxes are installed in walls. The panel does not agree and rejects the portion of the recommendation that it is necessary to add wording about a flush box. The box is flush where it is installed immediately at the surface or back fl inch.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-45 Log #1593 NEC-P18 **Final Action: Reject**
(406-9)

Submitter: Frank Martucci Fort Lee, NJ

Recommendation:

Add after first sentence. "Each grounding pole for cord connectors, and attachment plugs, shall have two wiring sites. Cord connectors, and attachment plugs, shall be designed so that only the grounding pole can be wired with two conductors."

Substantiation:

[Text of Proposal 18-45 substantiation is shown on page 2672]

Panel Meeting Action: Reject

Panel Statement:

The submitter has made identical recommendations for past code cycles. These recommedations were rejected with adequate explanation for the rejection. The submitter has offered no new substantiation that has not been reviewed before.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-46 Log #2219 NEC-P18 (406-9) **Final Action: Reject**

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:

406.9 Grounding-Type Receptacles, Adapters, Cord Connectors, and Attachment Plugs.

(A) Grounding Poles. Grounding-type receptacles, cord connectors, and attachment plugs shall be provided with one fixed grounding pole in addition to the circuit poles. The grounding contacting pole of grounding-type plug-in ground-fault circuit interrupters shall be permitted to be of the movable, self restoring type on circuits operating at not over 150 volts between any two conductors or any conductor and ground.

(B) Grounding-Pole Identification. Grounding-type receptacles, adapters, cord connections, and attachment plugs shall have a means for connection of a grounding conductor to the grounding pole. A terminal for connection to the grounding pole shall be designated by one of the following:

(1) A green-colored hexagonal-headed or -shaped terminal screw or nut, not readily removable.

(2) A green-colored pressure wire connector body (a wire barrel).

(3) A similar green-colored connection device, in the case of adapters. The grounding terminal of a grounding adapter shall be a green-colored rigid ear, lug, or similar device. The grounding connection shall be designed so that it cannot make contact with current-carrying parts of the receptacle, adapter, or attachment plug. The adapter shall be polarized.

(4) If the terminal for the equipment grounding conductor is not visible, the conductor entrance hole shall be marked with the word green or ground, the letters G or GR, or the grounding symbol, as shown in Figure 406.9(B)(4), or otherwise identified by a distinctive green color. If the terminal for the equipment grounding conductor is readily removable, the area adjacent to the terminal shall be similarly marked.

(C) Grounding Terminal Use. A grounding terminal or grounding-type device shall not be used for purposes other than grounding.

(D) Groundiing-Pole Requirements. Grounding-type attachment plugs and mating cord connectors and receptacles shall be designed so that the grounding connection is made before the current-carrying connections. Grounding-type devices shall be designed so grounding poles of attachment plugs cannot be brought into contact with current-carrying parts of receptacles or cord connectors.

(E) Use. Grounding-type attachment plugs shall be used only with a cord having an equipment grounding conductor.

FPN: See 200.10(B) for identification of ~~grounded~~ earth conductor terminals.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided any definitive technical substantiation that the present term "grounded" has caused any technical problems, confusion or misunderstanding. The substantiation reference to "many countries currently refer to the grounded conductor or neutral as the "earth" conductor is unsubstantiated as to what context or other use "earth" can signify. The grounded conductor is a ground-fault return path conductor and its only connection to earth is through the grounding electrode conductor. A change in terminology from grounded to earth would best be submitted to CMP-5 for disposition and CMP 1 for definition.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-47 Log #1924 NEC-P18 **Final Action: Reject**
(406-9(B)(4))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(4) If the terminal for the equipment ~~grounding~~ bonding conductor is not visible, the conductor entrance hole shall be marked with the word green or ground, the letters G or GR, or the grounding symbol, as shown in Figure 406.9(B)(4), or otherwise identified by a distinctive green color. If the terminal for the equipment ~~grounding~~ bonding conductor is readily removable, the area adjacent to the terminal shall be similarly marked.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects this proposal for the following reasons:
1. The proposal creates confusion because it only changes some of the terms from "grounding" to "bonding" and no explanation why only some of the terms were changed.
2. The proposal contained no substantiation regarding the proposal on Article 250.
3. See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 7 Negative: 3

Explanation of Negative:

COSTELLO: See my Explanation of Negative Vote on Proposal 18-1.
OWENS: See my Explanation of Negative Vote on Proposal 18-1.
WALL: See my Explanation of Negative Vote on Proposal 18-1.

Comment on Affirmative:

FETZER: UL recognizes that this proposal extends beyond the scope of this panel, and therefore understands that the ultimate resolution will reside with the TCC and Panels 5 and/or 1, which have jurisdiction over the basic requirements for grounding and the definition of terms involving such.

18-48 Log #605 NEC-P18 **Final Action: Accept**
(Figure 406-9(B)(4))

TCC Action:

The Technical Correlating Committee notes that Code-Making Panel 5 took a different action on Proposal 5-233 which is similar to this proposal. The Technical Correlating Committee has directed the chairman of Code-Making Panel 5 to establish a task group of appropriate experts including members from Code-Making Panel 18 to reconsider the proposal and develop comments for both Code-Making Panel 5 and Code-Making Panel 18 on the issue. Also, see theTechnical Correlating Committee Note on Proposal 5-233.

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

Recommendation:

Revise: "Figure 406.9(B)(4) grounding symbol (with or without circle)."

Insert Artwork here
Figure 406.9(B)(4)

Substantiation:

The "inverted Christmas tree" grounding symbol is widely used on products of various types, with and without the circle. The current code, illustrating the symbol in a circle causes some confusion in the market and may raise questions as to the meaning of the mark if there is no circle. The requirement is unnecessarily restrictive for wiring device terminals. There is no relative safety issue with either form as it is universally recognized as the ground identification with or without a surrounding circle.

Panel Meeting Action: Accept

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-49 Log #1925 NEC-P18 **Final Action: Reject**
(406-9(E))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(E) Use. Grounding-type attachment plugs shall be used only with a cord having an equipment ~~grounding~~ bonding conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects this proposal for the following reasons:
1. The proposal creates confusion because it only changes some of the terms from "grounding" to "bonding" and no explanation why only some of the terms were changed.
2. The proposal contained no substantiation regarding the proposal on Article 250.
3.See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 7 Negative: 3

Explanation of Negative:

COSTELLO: See my Explanation of Negative Vote on Proposal 18-1.
OWENS: See my Explanation of Negative Vote on Proposal 18-1.
WALL: See my Explanation of Negative Vote on Proposal 18-1.

Comment on Affirmative:

FETZER: UL recognizes that this proposal extends beyond the scope of this panel, and therefore understands that the ultimate resolution will reside with the TCC and Panels 5 and/or 1, which have jurisdiction over the basic requirements for grounding and the definition of terms involving such.

9-99 Log #2835a NEC-P09 **Final Action: Reject**
(408 (New))

Submitter: Stergios Kalogeris, JKELO Inc.

Recommendation:

Add new text as follows:
3 phase, 3-wire, ungrounded phase loss indicators should always be used on switchboards.

Substantiation:

Protection of all 3 phase motors. (example, elevators, HVAC equipment) against single-phasing.

Panel Meeting Action: Reject

Panel Statement:

The submitter did not provide adequate technical substantiation to justify the change. This is a design issue. In addition, the proposal does not use mandatory language as covered in 1.3 of the NEC Style Manual.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-101 Log #3219 NEC-P09 **Final Action: Accept in Principle in Part**
(408-2–Lighting and Appliance Branch Circuit)

Submitter: Steven M. James Mt. Morris, MI

Recommendation:

Move the definition of lighting and appliance branch circuit from the last sentence of 408.14 to a new 408.2 and renumber the article as follows:
Change present 408.2 to 408.3, present 408.3 to 408.4, and present 408.4 to 408.5.
Renumber Part II starting with 408.20.
Renumber Part III starting with 408.40.
Renumber Part IV starting with 408.100
The new 408.2 will read as follows:
408.2 Definitions.
Lighting and Appliance Branch Circuit. ~~A lighting and appliance branch circuit is a~~ branch circuit that has a connection to the neutral of the panelboard and that has overcurrent protection of 30 amperes or less in one or more conductors.

Substantiation:

In 408.14(A) reference is made to a lighting and appliance branch circuit and the definition is located as a part of a paragraph that is a rule. I realize the definition is in close proximity to (A), but it is necessary to always read the previous paragraph to know the location of the definition. Definitions should not be placed into sentences with rules, they should be placed in section 2 of the article.

Panel Meeting Action: Accept in Principle in Part

Reject the definition relocation because these definitions only apply to Part III of the article, and should be defined there. Accept in principle the article renumbering, as follows:
Renumber Article 408 to meet the objectives of 2.4.2.1 of the NEC Style Manual, as follows:
In Part II, increase each existing number by 10 (408.5 would become 408.15, etc.).
In Part III, renumber existing 408.13 to 408.30, and increase all other section numbers by 20 (408.14 would become 408.34, etc.)
In Part IV, increase each existing number by 20 (408.30 would become 408.50, etc.)

Panel Statement:

The present arrangement does not allow for the insertion of new material into either Part I or Part II. This renumbering retains the units digit, preserving to the extent feasible user familiarity with section locations. This procedure was done very successfully in a similar fashion in the then Article 370 (1993 NEC), and should be done here as well. The exception is 408.13; if possible sections titled "General" and placed at the beginning of an article part should adhere to the decade numbering rule.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-100 Log #2660 NEC-P09 **Final Action: Reject**
(408-2 Definitions (New))

Submitter: Phil Simmons, Simmons Electrical Services

Recommendation:

Create a new Section 408.2 Definitions as follows:
408.2 Definitions.
Lighting <u>or</u> ~~**and**~~ **Appliance Branch Circuit.** A branch circuit that has a connection to the neutral of the panelboard and that has overcurrent protection of 30 amperes or less in one or more conductors.
Lighting and Appliance Branch-Circuit Panelboard. A panelboard having more than 10 percent of its overcurrent devices protecting lighting <u>or</u> ~~and~~ appliance branch circuits.
Power Panelboard. A panelboard having 10 percent or fewer of its overcurrent devices protecting lighting <u>or</u> ~~and~~ appliance branch circuits.
Renumber the remaining sections.

Substantiation:

These definitions are extracted from existing Section 408.14 and have minor modifications as shown. These terms are used in several sections of Article 408 and are important to understanding and applying the requirements of this Article.
Locating the definitions in new Section 408.2 will also comply with the requirements of the NEC Style Manual.

Panel Meeting Action: Reject

Panel Statement:

These definitions only apply to Part III of the article, and should be defined there. In addition, CMP-9 rejects changing "and" to "or" because its current usage is inclusive, that is, these panels contain lighting circuits, or appliance circuits, or both.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-102 Log #2221 NEC-P09 **Final Action: Reject**
(408-3)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:

408.3 Support and Arrangement of Busbars and Conductors.

(A) Conductors and Busbars on a Switchboard or Panelboard. Conductors and busbars on a switchboard or panelboard shall comply with 408.3(A)(1), (2), and (3) as applicable.

(1) Location. Conductors and busbars shall be located so as to be free from physical damage and shall be held firmly in place.

(2) Service Switchboards. Barriers shall be placed in all service switchboards such that no uninsulated, ungrounded service busbar or service terminal is exposed to inadvertent contact by persons or maintenance equipment while servicing load termination.

(3) Same Vertical Section. Other than the required interconnections and control wiring, only those conductors that are intended for termination in a vertical section of a switchboard shall be located in that section.

Exception: Conductors shall be permitted to travel horizontally through vertical sections of switchboards where such conductors are isolated from busbars by a barrier.

(B) Overheating and Inductive Effects. the arrangement of busbars and conductors shall be such as to avoid overheating due to inductive effects.

(C) Used as Service Equipment. Each switchboard or panelboard, if used as service equipment, shall be provided with a main bonding jumper sized in accordance with 250.28(D) or the equivalent placed within the panelboard or one of the sections of the switchboard for connecting the ~~grounded~~ earth service conductor on its supply side to the switchboard or panelborad frame. All sections of a switchboard shall be bonded together using an equipment grounding conductor sized in accordance with Table 250.122.

Exception: Switchboards and panelboards used as service equipment on high-impedance ~~grounded~~ earthed neutral systems in accordance with 250.36 shall not be required to be provided with a main bonding jumper.

(D) Terminals. In switchboards and panelboards, load terminals for field wiring, including ~~grounded~~ earth circuit conductor load terminals and connections to the ground bus for load equipment grounding conductors, shall be located so that it is not necessary to reach across or beyond an uninsulated ungrounded line bus in order to make connections.

(E) Phase Arrangement. The phase arrangement on 3-phase buses shall be A, B, C from from to back, top to bottom, or left to right, as viewed from the front of the switchboard or panelboard. The B phase shall be that phase having thee higher voltage to ground on 3-phase, 4-wire, delta-connected systems. Other busbar arrangements shall be permitted for additions to existing installations and shall be marked.

Exception: Equipment within the same single section or multisection switchboard or panelboard as the meter on 3-phase, 4-wire, delta-connected systems shall be permitted to have the same phase configuration as the metering equipment.

FPN: See 110.15 for requirements on marking the busbar or phase conductor having the higher voltage to ground where supplied for a 4-wire, delta-connected system.

(F) Minimum Wire-Bending Space. The minimum wirebending space at terminals and minimum gutter space provided in panelboards and switchboards shall be as required in 312.6

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

See the panel statement on Proposal 9-1 (Log #2453i).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-103 Log #1927 NEC-P09 **Final Action: Accept in Principle**
(408-3(C))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(C) Used as Service Equipment. Each switchboard or panelboard, if used as service equipment, shall be provided with a main bonding jumper sized in accordance with 250.28(D) or the equivalent placed within the panelboard or one of the sections of the switchboard for connecting the grounded service conductor on its supply side to the switchboard or panelboard frame. All sections of a switchboard shall be bonded together using an equipment ~~grounding~~ bonding conductor sized in accordance with Table 250.122.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Accept in Principle

Revise the last sentence of the proposal recommendation to read as follows: ...using an equipment bonding jumper sized in accordance with Table 250.122 or Table 250.66 as appropriate.

Panel Statement:

This action correlates with the terms used in Section 250.102(C) and 250.102(D). The panel notes the provisions of the exception to 250.30(A)(4) paragraphs (1),(2) and (3) and has corrected the text in the existing code language.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-104 Log #1519 NEC-P09 **Final Action: Reject**
(408-4)

Submitter: David Shapiro, Safety First Electrical Contracting, Consulting, and Safety Education

Recommendation:

Add at end,
"The identifications shall be unique, so as to enable users to differentiate between disconnecting means serving similar loads quickly and unmistakably".

Substantiation:

The NFPA Inspection Manual says that this is the intent. Intent, however, is not enforceable, and this will be even more true in 2005.

Panel Meeting Action: Reject

Panel Statement:

The current language allows the AHJ to enforce specific information in circuit directories. The new language " quickly and unmistakably" is subjective and unenforceable. There is no stated hazard that substantiates the need for this change.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 9 Negative: 2

Explanation of Negative:

HARTWELL: I have considerable sympathy for this proposal, having gone through a difficult history of getting installers in my former jurisdiction to first, even provide circuit directories, and then, having those directories convey useful information. I have seen far too many panels with directories showing, for example, ten 15A circuits saying "lights and plugs", six circuits labeled "heat" and two or three marked "kitchen outlets".

The panel statement is partially correct, and the phrase "quickly and unmistakably" could be removed from the proposal very easily. The rest should stand. The key is the word "unique". Although the Code does allow the enforcement community to insist on what the proposal requests, express language would produce more consistent enforcement. When I began enforcing useful circuit directories all I had to work with was 110.22. The 1990 NEC brought the express circuit directory requirement to then 384.13, and compliance improved. Relocation of the requirement to 408.4 in the 2002 NEC as a stand-alone requirement improved visibility and compliance even more. This proposal will result in a further improvement in compliance, with a commensurate improvement in safety.

OFFERDAHL: This proposal should be "accepted in principle." The submitter concern about properly marking the circuit directory could be improved by adding the words to the sentence to read as follows:

"All circuits and circuit modifications shall be legibly identifies as to its clear, evident and specific purpose or use on a circuit directory."

These additional words will emphasize the importance of circuit directory for the safe operation of an electrical system.

9-105 Log #1845 NEC-P09 **Final Action: Reject**
(408-5)

Submitter: Wayne Sargent, City of Salem, Oregon

Recommendation:

Add text to read as follows:
For protection against fastener penetrations where panelboards are located on the interior of exterior wood framed walls that could receive siding, a space behind the panelboard of 50 mm (2 in.) shall be provided or a steel plate equivalent in size to the panelboard at least 1.6 mm (1/16 in.) thick shall be installed behind the building finish is applied.

Substantiation:

The problem occurs in exterior 2x4 walls wherever siding nails are penetrating 30-40 mm into the back of interior mounted residential load generally when horizontal lap siding is installed. The nails can damage conductors, bus bars, and overcurrent protection devices. This damage easily goes unnoticed if the load center is not checked at the final inspection. The biggest concern is damage that may occur behind the busbars and main breaker that will now be visible by removing the cover at final inspection. If the siding nail hits the backpan, a busbar, or main breaker where it is not visible with the cover removed, and then the installer simply removes the bent nail, damage can be done without any visible defect. In most cases 2 x 6 in. walls are used, so the 50 mm suggested spacing behind the load center is provided. For limited space where 2 x 6 in. walls cannot be used, the 1.6 mm steel plate option behind the entire loadcenters should suffice. The photos I have provided document these penetrations.
Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement:

The substantiation points to a workmanship issue on the part of other trades. The panel recognizes that with the introduction of the tools available today, such as electric screw drivers and air nailers, that appropriate workmanship and materials are necessary to ensure a safe installation. Air space and additional steel barriers can also be defeated with these tools and do not resolve the safety concern. Coordination with other trades is necessary.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-106 Log #2408 NEC-P09 **Final Action: Reject**
(408-5)

Submitter: Wayne Sargent, City of Salem, Oregon

Recommendation:

Add the following to 408.5:
For protection against fastener penetrations where panelboards are located on the interior of exterior wood framed walls that could receive siding, a space behind the panelboard of 50 mm [2 in.] shall be provided, or a steel plate equivalent in size to the panelboard at least 1.6 mm (1/16 in.) thick shall be installed before the building finish is applied.

Substantiation:

The problem occurs in exterior 2x4 in. walls where siding nails are penetrating 30-40 mm into the back of interior mounted residential loadcenters, generally when horizontal lap siding is installed. The nails can damage the conductors, bus bars, and overcurrent protection devices. This damage easily goes unnoticed if the loadcenter is not checked at the final inspection. The biggest concern is damage that may occur behind the busbars and main breaker that will not be visible by removing the cover at final inspection. If the siding nail hits the backpan, busbar, or main breaker where it is not visible with the cover removed, and then the installer simply removes the bent nail, damage can be done without any visible defect. In most cases 2x6 in. walls are used so the 50 mm suggested spacing behind the loadcenter is provided. For limited space where 2x6 in. wall construction cannot be used, an option is to provide protection with a 1.6 mm steel plate behind the entire loadcenter.
[I also hope to submit photos with a similar faxed proposal to document this proposal, if I have time. All of these photos of penetrations are available in JPEG format.]

Panel Meeting Action: Reject

Panel Statement:

See the panel statement on Proposal 9-105 (Log #1845).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-107 Log #2862 NEC-P09 (408-10) **Final Action: Accept in Principle**

Submitter: Alan Manche, Square D Company

Recommendation:

Move 408.10 from Part II-Switchboards to Part I - General. Renumber 408.10 as 408.5 and renumber 408.5 as 408.10.

Substantiation:

The requirements in 408.10 specifically include "floor-standing panelboards" and should be applied to both Part II - Switchboards and Part III - Panelboards and not be restricted to just the Switchboard Part. move 408.10 to 408.5 and include 408.5 in Part I. Renumber 408.5 as 408.10 where it can remain in Part II.

Panel Meeting Action: Accept in Principle

Accept the move of Section 408.10 from Part II-Switchboards to Part I-General. Renumber existing 408.10 as 408.5. Renumber existing 408.5 as 408.20 to correlate with the renumbering made under Proposal 9-101 (Log #3219).

Panel Statement:

It is understood that this requirement is applicable to enclosures containing busing and normally not having a bottom, thereby permitting conduits free entry into the enclosure. It is not intended to apply to an enclosed wallmounted panelboard mounted at or near floor level.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-108 Log #1320 NEC-P09 (408-13) **Final Action: Accept**

Submitter: National Electrical Code Technical Correlating Committee

Recommendation:

Replace the term "computed" with the term "calculated" in the following sections:
408.13

Substantiation:

This proposal is the result of an effort by the NEC Usability Task Group to standardize the language throughout the NEC relative to the use of the terms computed and calculated. After analyzing the usage, the group agreed that the term "calculated" was the best term for use throughout the NEC. This is one in a series of proposals to standardize on the term calculated.

The term "calculate" and its derivatives is presently used in the article title, section titles, and throughout portions of the existing article. Other Articles of the NEC such as for calculating conductor ampacties (under engineering supervision), calculating the size of enclosures, and in Annex D use the term calculate. Additionally, the term "calculate" is more commonly used in other NFPA codes and standards e.g. NFPA 70E, arc flash calculation. Adversely, the term "computation" has a connotation of using a computer, although "load calculations" are frequently determined using a calculator. It appears that the term "computation" was used more frequently beginning with the 1975 NEC based on an editorial revision project.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-109 Log #2662 NEC-P09 (408-14) **Final Action: Reject**

Submitter: Phil Simmons, Simmons Electrical Services

Recommendation:

Revise existing Section 408.14 as follows:

408.14 Classification of Panelboards.

Panelboards shall be classified for the purposes of this article as either lighting and appliance branch-circuit panelboards or power panelboards, based on their content. ~~A lighting and appliance branch circuit is a branch circuit that has a connection to the neutral of the panelboard and that has overcurrent protection of 30 amperes or less in one or more conductors.~~

~~**(A) Lighting and Appliance Branch Circuit Panelboard.** A lighting and appliance branch circuit panelboard is one having more than 10 percent of its overcurrent devices protecting lighting and appliance branch circuits.~~

~~**(B) Power Panelboard.** A power panelboard is one having 10 percent or fewer of its overcurrent devices protecting lighting and appliance branch circuits.~~

Substantiation:

This is a companion proposal to the proposal to move the deleted text to create a new Section 408.2 Definitions. This text will not be needed here if the proposal is approved to create the new section on definitions of important terms used in Article 408.

Panel Meeting Action: Reject

Panel Statement:

See the panel statement on Proposal 9-100 (Log #2660).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-110 Log #3519 NEC-P09 **Final Action: Reject**
(408-15)

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 12 for action in Article 645. This action will be considered by Code-Making Panel 12 as a public comment.

Submitter: Stephen W. McCluer, American Power Conversion Corp

Recommendation:

Add new Exception:
Exception No. 1: Power distribution units that are used for information Technology Equipment may have multiple panelboards within a single cabinet provided that each panelboard has no more than 42 overcurrent devices and the Power Distribution Unit is utilization equipment listed for information technology application by a nationally-recognized testing laboratory.

Substantiation:

Information Technology (IT) equipment today typically consists of multiple bays of rack-mounted electronic modules. Each electronic module is protected ay an overcurrent device located in a centralized power distribution unit that distributes power to all the bays within the IT system. Because of the large number of devices that might be located in a single system, the number of circuit breakers can exceed 42 poles.

Article 408.15 states that "Not more than 42 overcurrent devices... shall be installed in any one cabinet." This proposed exception recognizes that products have existed for many years in which multiple panelboards are compartmentalized within a single cabinet. It clarifies that Article 408 applies to switchboards and panelboards that are part of the premise electrical system and does not apply to approved utilization equipment. The proposed exception requires that two criteria must be met:

1) no more than 42 protective devices shall be mounted on any single panelboard
2) the entire power distribution unit must be a device listed for the application as information technology equipment by a NRTL.

Panel Meeting Action: Reject

Panel Statement:

This type of exception does not belong in Chapter 4, although it might be justified for special equipment applications. CMP 9 recommends that this proposal be referred to CMP 12 for action in Article 645.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-111 Log #557 NEC-P09 **Final Action: Reject**
(408-16(A), Exception No. 2)

Submitter: J. Kevin Vogel, Crescent Electrical Supply

Recommendation:

Delete Exception No. 2 from Section 408.16(A).

Substantiation:

Since the Code applies to new installations and not to existing installations, the exception is not necessary.

Panel Meeting Action: Reject

Panel Statement:

There are very large numbers of these installations still in place. CMP 9 does not want to unfairly burden them by removing all recognition of their distribution arrangements. The NEC does this in other comparable situations, as in the case of existing 3-wire range connections recognized in 250.140.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-112 Log #1400 NEC-P09 **Final Action: Accept in Principle**
(408-16(B))

Submitter: Raj Awesti, Belco Electric

Recommendation:

Add text to read as follows:
The individual overcurrent protective device shall be located within or at any point on the supply side of the panel board.

Substantiation:

The exception states "This individual protection" but does not refer it to any particular article of 408.16A, and B. My assumption is the above proposal is what the exception means, if this is incorrect then the exception should be worded clearly.

Panel Meeting Action: Accept in Principle

At the beginning of the referenced sentence, change the word "The" to "This" so as to read: "This overcurrent protective device shall be located …"

Panel Statement:

The panel action responds to the proposal intent, but uses a simpler sentence construction.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-113 Log #2661 NEC-P09 **Final Action: Reject**
(408-16(B))

Submitter: Phil Simmons, Simmons Electrical Services

Recommendation:

Revise existing Section 408.16(B) as follows:

(B) Power Panelboard Protection. A power panelboard shall comply with ~~In addition to~~ the requirements of 408.13. A power panelboard installed as or modified so as to be a lighting and appliance branch circuit panelboard shall comply with (A). ~~with supply conductors that include a neutral and having more than 10 percent of its overcurrent devices protecting branch circuits rated 30 amperes or less shall be protected by an overcurrent protective device having a rating not greater than that of the panelboard. The overcurrent protective device shall be located within or at any point on the supply side of the panelboard.~~

~~*Exception: This individual protection shall not be required for a power panelboard used as service equipment with multiple disconnecting means in accordance with 230.71.*~~

Substantiation:

This proposal is intended to primarily be an editorial improvement of the existing requirements for overcurrent protection of power panelboards. In doing training on the revision to this section for the 2002 NEC, we have found the present wording to be cumbersome. In addition, it seems the exception is not necessary as the rules in 408.13 and 408.16(B) does not require an individual overcurrent protective device on the line side of the panelboard such as is required for lighting and appliance branch circuit panelboards.

Panel Meeting Action: Reject

Panel Statement:

This section does not address a power panelboard that has been modified or installed as a lighting and appliance panelboard. It addresses power panelboards that are and will remain power panelboards, but which originate branch circuits in sizes and numbers that are comparable to lighting and appliance panelboards. This can happen, for example, on ungrounded systems. In such cases, CMP 9 wants to assure comparable protection. The exception addresses the trade-off that exists with service panelboards, where modifications are usually subject to inspection and therefore not as likely to be abused.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-114 Log #1483 NEC-P09 **Final Action: Accept**
(408-16(C))

Submitter: Michael Helsley, Encompass Electrical Technologies-Rocky

Recommendation:

Snap switches rated at 30 amperes or less. Panelboards with snap switches rated at 30 amperes or less shall have overcurrent protection ~~not in excess~~ of 200 amperes or less.

Substantiation:

Proposal to change negative language to affirmative language. For ease of comprehension. Accordance to NEC Style Manual, Section 3.3.1, example 4 of General Guidelines states: Use positive language, rather than negative, wherever possible.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-115 Log #2292 NEC-P09 **Final Action: Reject**
(408-16(F) Exception (New))

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 13 for action in 690. This action will be considered by Code-Making Panel 13 as a public comment.

Submitter: Norman Smith, I.B.E.W. Local 291 / Rep. Labor

Recommendation:

Add new text as follows:

Exception: Solar Photovoltaic System Anti-Islanding Circuits.

Substantiation:

Anti-islanding circuits - used with solar voltaic systems immediately de-energize unplugged breaker.

Panel Meeting Action: Reject

Panel Statement:

This type of exception does not belong in Chapter 4. CMP 9 recommends that this proposal be referred to CMP 13 for action in Article 690.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-116 Log #430 NEC-P09 **Final Action: Reject**
(408-16(G))

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 19 for action in Article 550. This action will be considered by Code-Making Panel 19 as a public comment.

Submitter: Barry F. Tower

Recommendation:

Please add the following new text: (g) Overcurrent protection of branch circuit grounded conductors and branch circuit equipment grounding conductors. Overcurrent protection of branch circuit grounded conductors and branch circuit equipment grounding conductors shall be provided for mobile home installations. Overcurrent shall be detected and interrupted by use of one of the following means:

1. A single open-neutral fault interrupting device installed as the main disconnecting means within the panelboard.
2. A single open-neutral fault interrupting device installed within the branch circuit on another panelboard that feeds this panelboard.
3. A neutral-switching GFI type overcurrent device shall be required on each branch circuit of the panelboard where a grounded conductor is used in that circuit.

Where a single open-neutral fault interrupting device is used as permitted in 1 and 2 above, it shall be designed so that the open-neutral fault setting does not exceed 1 ampere, and it shall open all ungrounded conductors. It shall not be required to open the grounded feeder conductor. It shall not be permitted to open any equipment grounding conductor.

Where a neutral-switching GFI type overcurrent device is used as permitted in 3 above, all ungrounded branch circuit conductors and the branch circuit grounded conductor shall be opened when a fault is detected. The neutral-switching GFI type overcurrent device shall not be permitted to open any branch circuit equipment grounding conductor.

The requirements specified in this article shall become effective only after the Authority Having Jurisdiction has determined that manufacturers are able to supply at least one of the two permitted interrupting devices described above.

Substantiation:

The purpose of this new proposal is to prevent overcurrent fires caused by "open neutrals in the feeder" of mobile homes and buildings with sub-panels where they are fed with a neutral and a separate grounding conductor such as a four-wire 240/120 V feeder. An open neutral in the feeder anywhere between the service and the distribution panel can start a fire if there is an interconnection between a branch circuit grounded neutral conductor and the branch circuit equipment grounding conductor. If there is an interconnection on just one of the branch circuits of the panelboard (any branch circuit), a fire is almost certain if the large neutral in the feeder is opened for any reason. These interconnections are very, very common. Master Electricians such as myself discover them all the time. Only a professional would even know how to check for an interconnection in a branch circuit between the grounded conductor and the branch circuit equipment grounding conductor (parallel conductors). The equipment grounding conductor may be in contact with the grounded conductor inside a device box. Any defective appliance in which the neutral conductor is grounded to the case can burn down a building if the neutral becomes open at the feeder (only on the 4-wire systems addressed in this proposal). Someone could have an appliance with a grounded neutral plugged in for many years and not know that they have a problem. Then one day their neutral opens up (on their feeder) and a fire starts. They had no warning, and they had no way of knowing that the appliance was defective. A very common appliance that ends up having a grounded neutral is a 240/120 V dryer (or range). The pigtail is often installed by the appliance delivery person. They have no concept of why the bonding jumper must be removed. That bonding jumper may be burning down a home while you are reading this. The requirements have recently changed for ranges and dryers to require a 4-wire system. I agree that this is the proper wiring method. Unfortunately, we have increased the fire hazard while decreasing the electrocution hazard. The facts would show that more people die from house fires (electrically caused) than from electrocution. This proposal provides the only two ways to protect branch circuit neutrals from overcurrent on the 4-wire systems. This problem has been ignored by engineers for years. The public thinks that their wiring is safe because they have circuit breakers. The circuit breakers protect the ungrounded conductor and as a result also protect the grounded neutral conductor (except on a 4-wire system addressed here). With a 4-wire system, a fire can and does start as follows: The neutral feeder conductor (may be rated at 100 amperes) becomes open, but instead of disconnecting the power, there is an alternate path for the circuit because one of the branch circuit equipment grounding conductors is accidentally connected in parallel with a branch circuit neutral conductor. The neutral bus for the entire panelboard will be backfed through that alternate path (perhaps through a no. 14 conductor). There is no overcurrent protection on the grounded conductor or equipment grounding conductor in any branch circuit. I have provided 2 drawings showing how an open neutral can and does cause severe overloads. The first drawing shows that the neutral is already accidentally grounded, but there are no signs of any problem. The second drawing shows the fault path after the main neutral (in the feeder) opens up. The example shows a severe overload (40 amps) on a no. 14 branch circuit equipment grounding conductor and backfeeding the same 40 amps from the branch circuit neutral. It should be noted that the circuit with the problem (interconnection between the neutral and equipment grounding conductor) does not have to be in use - in fact the circuit breaker for that circuit can be turned off and a fire will still result. With this proposal, protecting the neutral will also protect the equipment grounding conductor - no further protection would be required. This proposal is only advisory as presented because no suitable product is currently manufactured that could protect branch circuit neutrals or branch circuit equipment grounding conductors. Even neutral switching breakers provide no overcurrent protection on the grounded neutral conductor - they just open both (ungrounded and grounded) if an overload is detected on the ungrounded conductor. GFIs are available with 2-pole design, but they are not currently made in ratings above 60 amps. Also they have a fault trip setting of only 5 milliamps - much too sensitive for a main breaker. I have suggested that it have a fault trip setting of 1 ampere (a modified GFI). That would satisfy numbers 1 and 2 in the proposal above. It seems that it would be very easy for large manufacturers to produce a product that is needed so much. Two-pole GFIs currently work as follows: If leg one is carrying 60 amperes, and leg two is carrying 40 amperes, then the neutral should be carrying 20 amperes. If so, then everything is fine. If the neutral is only carrying 19 amperes or zero amperes - then trip the breaker because the neutral must be open or there is another alternate path in parallel with the neutral that is carrying the remainder of the current. There is another side benefit of having a device that will shut down a panel with an open neutral, and it would help make it much more cost effective. Whenever a neutral opens up in any panel, appliances connected to circuits on opposite legs become in series with each other. When that happens, Ohms law will determine the voltage that each one will drop. Electronic appliances usually burn out because they might end up getting 180 volts while the opposite appliance might only get 60 volts. Serious property damage can result from an open neutral (especially when it is the large feeder neutral). The second method would also be very easy to make. They currently make GFIs, and they make neutral switching breakers - just make both features into one circuit breaker. That would satisfy number 3 in the proposal above. We now have GFIs, and finally AFIs; it is time for ONFIs (Open Neutral Fault Interrupters) - or whatever the manufacturers might

end up calling them.
NOTE: Supporting Material is Available for Review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement:

These requirements do not belong in Chapter 4. CMP 9 recommends that this proposal be referred to CMP 19 for action in Article 550. CMP-9 disagrees with the submitters substantiation.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-117 Log #2835 NEC-P09 **Final Action: Reject**
(408-16(G) (New))

Submitter: Stergios Kalogeris, JKELO Inc.

Recommendation:

Add new text as follows:
3 phase, 3-wire, ungrounded phase loss indicators should always be used on switchboards.

Substantiation:

Protection of all 3 phase motors. (example, elevators, HVAC equipment) against single-phasing.

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 9-99 (Log #2835a).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-118 Log #320 NEC-P09 **Final Action: Reject**
(408-17)

Submitter: R. K. Varma, State of PA, DCED

Recommendation:

Revise text to read as follows:
"Panelboards in damp or wet locations <u>like laundry or bathrooms or similar areas subject to moisture</u> shall be installed to comply with 312.2(A)."

Substantiation:

Anywhere where there is moisture like laundry/bathroom etc., it needs to comply with 312.2(A). Sinks are common in laundries and hence this should be considered damp or wet locations.

Panel Meeting Action: Reject

Panel Statement:

Current definitions address the submitter's concern. The submitter is attempting to redefine "damp or wet locations." These defintions are adequately defined in Article 100.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

HARTWELL: The presence of a sink almost never results in the adjacent walls of the room becoming classified as a damp or wet location. Classification of adjacent areas must be done by the AHJ on a case-by-case basis following an inspection. The majority of damp location bathrooms are likely to be residential in character due to shower activity. Overcurrent devices are excluded from such locations by 240.24(E). This proposal is unnecessary.

9-119 Log #323 NEC-P09 **Final Action: Reject**
(408-18)

TCC Action:

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

Submitter: Alan H. Nadon, City of Elkhart, IN

Recommendation:

Revise text to read as follows:
408.18 Enclosure. Panelboards shall be mounted in cabinets, cutout boxes, or enclosures designed for the purpose and shall be dead front. Unused openings for circuit breakers and switches shall be adequately closed.

Substantiation:

The change to Section 110.12 in the 2002 Code that specified unused openings as applying only to raceways and cables does not address unused breaker and switch openings in panelboards.

Panel Meeting Action: Reject

Panel Statement:

CMP-9 agrees with the intent of the proposal. The change should be made in 110.12(A). CMP-9 requests that the Technical Correlating Committee forward Proposal 9-119 (Log #323) to Panel 1 for action as a public comment with respect to closing unused openings. CMP-9 suggests broadening the language in 110.12(A) to include vacant device openings.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

HARTWELL: Although I voted with the panel at the meeting, I have reconsidered my position. I am now persuaded that this issue is intimately connected with the requirements for panelboard dead fronts and switchboard enclosures. It does not really belong with the generic requirements in 110.12(A). However, the language proposed violates 3.2.1 of the NEC Style Manual. I suggest the following new sentence for consideration in the comment period: "Unused openings for circuit breakers and switches shall be closed using listed closures, or other approved means that provide protection substantially equivalent to the wall of the enclosure." Since this concept also applies to vacant openings in switchboards, it should appear as a stand-alone section in Part I with the title "Unused Openings."

9-120 Log #1399 NEC-P09 **Final Action: Reject**
(408-18)

Submitter: Arlen Gustafson Mahtomedi, MN

Recommendation:

Add text to read as follows:
408.18 Enclosure. Panelboards shall be mounted in cabinets, cutout boxes, or enclosures designed for the purpose and shall be dead-front. All panelboards rated over 100 amps shall have hinged enclosure covers.
Exception: Panelboards other than of the dead-front, externally operable type shall be permitted where accessible only to qualified persons.

Substantiation:

Due to the weight of the larger covers, which are hard to remove for inspections, service and maintenance, and because they can cause injury to personnel. They also can cause inadvertent tripping of circuit breakers.

Panel Meeting Action: Reject

Panel Statement:

Insufficient technical substantiation has been presented that the weight of large covers presents a safety hazard. The proposed requirements are unduly restrictive. Many other methods in addition to hinging are utilized to ensure proper alignment and support of covers during installation. All panelboards are not entered on a regular basis. Hinged fronts should remain as an option and may be requested as required by the particular facility.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-121 Log #2220 NEC-P09 **Final Action: Reject**
(408-20 and 408.21)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:

408.20 Grounding of Panelboards. Panelboard cabinets and panelboard frames, if of metal, shall be in physical contact with each other and shall be grounded. Where the panelboard is used with nonmetallic raceway or cable or where separate grounding conductors are provided, a terminal bar for the grounding conductors shall be secured inside the cabinet. The terminal bar shall be bonded to the cabinet and panelboard frame, if of metal; otherwise it shall be connected to the grounding conductor that is run with the conductors feeding the panelboard.

Exception: Where an isolated equipment grounding conductor is provided as permitted by 250-146(D), the insulated equipment grounding conductor that is run with the circuit conductors shall be permitted to pass through the panelboard without being connected to the panelboard's equipment grounding terminal bar.

Grounding conductors shall not be connected to a terminal bar provided for ~~grounded~~ earth conductors (may be a neutral) unless the bar is identified for the purpose and is located where interconnection between equipment grounding conductors and ~~grounded~~ earth circuit conductors is permitted or required by Article 250.

408.21 ~~Grounded~~ Earth Conductor Terminations. Each ~~grounded~~ earth conductor shall terminate within the panelboard in an individual terminal that is not also used for another conductor.

Exception: ~~Grounded~~ Earth conductor of circuits with parallel conductors shall be permitted to terminate in a single terminal if the terminal is identified for connection of more than one conductor.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

See the panel statement on Proposal 9-1 (Log #2453i).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-122 Log #1926 NEC-P09 **Final Action: Reject**
(408-20 Exception)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:

Exception: Where an isolated equipment ~~grounding~~ bonding conductor is provided as permitted by 250.146(D), the insulated equipment ~~grounding~~ bonding conductor that is run with the circuit conductors shall be permitted to pass through the panelboard without being connected to the panelboard's equipment grounding terminal bar.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See the panel statement on Proposal 9-1 (Log #2453i).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-123 Log #3434 NEC-P09 **Final Action: Reject**
(408-20 Exception)

Submitter: Robert Schuerger, EYP Mission Critical Facilities, Inc.

Recommendation:

Revise as follows:
Exception: Where ~~an isolated~~ dedicated equipment grounding conductor is provided as permitted by 250.146(D), the insulated equipment grounding conductor that is run with the circuit conductors shall be permitted to pass through the panelboard without connection to the panelboard's equipment grounding terminal bar.

Substantiation:

The use of the term "isolated" has caused confusion which has led to improper and unsafe installations in which a separate grounding electrode and grounding system is installed isolated from the rest of the building's grounding system. Since the separate grounding system is not properly bonded to the building's grounding system, a significant voltage can be developed between the two grounding systems in the case of lightning or an electrical fault. This creates a significant hazard for both personal injury and fire. There have been many cases of this type of installation in the past, particularly with machine tools, data processing equipment and other sensitive electronic equipment installations.
Changing "isolated" to "dedicated" also brings this section in alignment with the proposed definition and change to 250.146(D).
This text is also being proposed for the revision of IEEE Std 1100, Powering and Grounding Electronic Equipment.

Panel Meeting Action: Reject

Panel Statement:

This action is contingent upon the activity of CMP-5 with respect to the companion proposal from the same submitter.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

HARTWELL: My current information is that CMP 5 has apparently rejected the companion Proposal 5-243, partly because the existing terminology is thoroughly embedded in product standards. However, there is considerable technical sympathy on CMP 5 in favor of this change. We will probably need to revisit this issue in December.
YOUNG: This proposal should be reconsidered if Panel 5 votes to accept a parallel proposal.

9-124 Log #3337 NEC-P09 **Final Action: Reject**
(408-21)

Submitter: Sean Warrington, Delcollo Electric

Recommendation:

Delete text as follows:
Ground Conductor Terminations.
Each grounded conductor shall terminate within the panelboard ~~(in an individual terminal that is not also used for another conductor)~~.

Substantiation:

To separate a ground and neutral in its own hole, its a waste of space.

Panel Meeting Action: Reject

Panel Statement:

Separation of the grounding and grounded conductors is essential for a safe installation. If for maintenance or troubleshooting reasons the grounded conductor is loose or disconnected, it is imperative that the circuit maintain a solid connection for personnel safety. If the conductors are in a common terminal both will be separated at the same time.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

HARTWELL: There is another issue unaddressed in the panel statement. Grounded conductors are current carrying whereas grounding conductors are not. Terminations for current-carrying conductors are tested differently than those used for equipment grounding conductors. This is why many panelboards have termination restrictions that allow multiple equipment grounding conductors, as many as three in some cases, in a single terminal. On the other hand, such an arrangement for grounded conductors, as a practical matter, will not pass certain heat cycling and other safety tests. These rules have good physics behind them, and they do not cause "a waste of space."

9-125 Log #2222 NEC-P09 **Final Action: Reject**
(408-35)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:

408.35 Wire-Bending Space in Panelboards. The enclosure for a panelboard shall have the top and bottom wire bending space sized in accordance with Table 312.6(B) for the largest conductor entering or leaving the enclosure. Side wire-bending space shall be in accordance with Table 312.6(A) for the largest conductor to be terminated in that space.

Exception No. 1: either the top or bottom wire-bending space shall be permitted to be sized in accordance with Table 312.6(A) for a lighting and appliance branch-circuit panelboard rated 225 amperes or less.

Exception No. 2: Either the top or bottom wire-bending space for any panelboard shall be permitted to be sized in accordance with Table 312.6(A) where at least one side wire-bending space is sized in accordance with Table 312.6(B) for the largest conductor to be terminated in any side wire-bending space.

Exception No. 3: the top and bottom wire-bending space shall be permitted to be sized in accordance with Table 312.6(A) spacings if the panelboard is designed and constructed for wiring using only one single 90 degree bend for each conductor, including the ~~grounded~~ earth circuit conductor, and the wiring diagram shows and specifies the method of wiring that shall be used.

Exception No. 4: either the top or the bottom wire-bending space, but not both, shall be permitted to be sized in accordance with Table 312.6(A) where there are no conductors terminated in that space.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

See the panel statement on Proposal 9-1 (Log #2453i).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-126 Log #1847 NEC-P09 **Final Action: Reject**
(408-37)

Submitter: Fred Robison, Mission Electric

Recommendation:

Add new text as follows:
Panels shall be required to have a spacing device, or constructed in such a manner, as to prevent the faceplate fasteners from piercing the insulation of the circuit carrying conductors within the panel.

Substantiation:

Virtually every house or building that has electricity has a fuse panel contained within a fuse box. The fuse box surrounds the fuse panel and protects it from the environment, as well as preventing persons from inadvertently contacting the fuse panel. The fuse panel may typically include a plurality of circuit breakers that may be toggled as needed to turn on and off electrical circuits. In a typical building, ten, twelve, and fourteen gauge wire (AWG) may be used to connect the fuse panel to the branch circuits, such as outlets, overhead lights and fans, switches, water heaters, furnaces, and air conditioning units. These branch circuit wires carry the electricity from the fuse panel to the branch circuit load. A one hundred Amp fuse panel can have as many as twenty-four circuit breakers, or branch circuits. A two hundred Amp fuse panel may have as many as forty-two circuit breakers. Each 120V branch circuit, controlled by these circuit breakers, usually requires three wires: the ungrounded conductor (hot), the grounded conductor (neutral), and the grounding conductor (ground). Therefore, a forty-two circuit, two hundred Amp panel could have as many as 126 branch circuit wires.

Electricity is supplied to the fuse panel from an external transformer or power line using much heavier wire. By national code, one hundred Amps require number one aluminum or number three copper (AWG) wire. By the code, two hundred Amps require 4/0 aluminum or 3/0 copper (AWG) wire. Even larger wires are used in larger homes and commercial buildings. As a general rule, the heavier the wire, the more electricity flowing through it.

These heavier wires, because of their diameters, are remarkably inflexible. In many installations, the heavy main feeder wires are brought in the bottom and loop around the inside of the fuse box to connect to the fuse panel. An electrician installing the fuse box attempts to bend the wires into a desired position against the back of the box. However, many times these wires will bow out of position and contact the internal lip that extends along the front edge of the fuse box.

On most fuse panels, the front cover of the box is screwed on. These screws usually have a sharp tip that extends through a hole in the front cover and a matching hole in the front internal lip of the fuse box. On larger commercial and/or industrial panels, the fuse boxes have clamps that hold the front cover onto the body of the panel. Either the screw or the clamp can (and frequently do) pierce insulation on the out of position main feeder wires or branch circuit wires. Because the fasteners are metal, it is possible that the fastener shorts the wire to the fuse box, such that a person touching the fuse box may receive a shock, or in extreme situations, be electrocuted. This problem is compounded by the fact that, until the faceplate is removed, visual inspection will not reveal this hazard.

Information on the frequency of this problem is difficult to find because of the lack of detail in most of the reports, which are taken from newspaper articles. Most only state the cause was a fuse or breaker box. The U.S. Consumer Product Safety Commission has cited a few, which I have included. I am sure many incidents are not even reported because no one was hurt or property was damaged. But considering the large number of panel fires and their potential for catastrophic loss of property or life, this amendment needs to be included in the code and retroactive to existing panels.

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

Panel Meeting Action: Reject

Panel Statement:

CMP-9 disagrees with the concepts as submitted in the substantiation. The issues described by the submitter may exist in many types of electrical equipment and are not limited to panelboards. Care should be taken in placing the conductors so as not to expose the conductors to damage within electrical equipment.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

BERNSON: Faceplace fasteners coming in contact with conductors within the panel is a concern. No matter how careful the electrician is, there is always the possibility of the fastener damaging the conductors inside the panel.

11-5 Log #2536 NEC-P11Meeting Action: Accept **Final Action: Reject**
(409 (New))

TCC Action: Reject

It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

Submitter: Alan Manche, Schneider Electric/Square D

Recommendation:

Add new Article 409 for Industrial Control Panels.

Article 409 – Industrial Control Panels

I. General

409.1 Scope. This article covers industrial control panels intended for general use and operating from a voltage of 600 volts or less.

409.2 Definitions.

Control Panel. An assembly of a systematic and standard arrangement of two or more components such as motor controllers, overload relays, fused disconnect switches, and circuit breakers and related control devices such as pushbutton stations, selector switches, timers, switches, control relays and the like with associated wiring, terminal blocks, pilot lights and similar components.

II. Installation

409.20 Conductor – Minimum Size and Ampacity. The size of the control panel supply conductor shall have an ampacity not less than 125 percent of the full-load current rating of all resistance heating loads plus 125 percent of the full-load current rating of the highest rated motor plus the sum of the full-load current ratings of all other connected motors and apparatus based on their duty cycle that may be in operation at the same time.

409.21 Overcurrent Protection.

(A) General. Control Panels shall be provided with overcurrent protection in accordance with Parts I, II, and IX of Article 240. Overcurrent protection for the control panel shall be provided by either fuses or circuit breakers.

(B) Location. This protection shall be provided by either,

(1) an overcurrent protective device located ahead of the control panel or

(2) a main overcurrent protective device located within the control panel. Where overcurrent protection is provided for the control panel as part of the control panel, overcurrent protection shall consist of a single circuit breaker or set of fuses and the supply conductors shall be considered either as feeders or taps as covered by 240.21.

(C) Rating. The rating or setting of the overcurrent protective device for the circuit supplying the control panel shall not be greater than the sum of the largest rating or setting of the branch-circuit short-circuit and ground-fault protective device provided with the control panel, plus 125 percent of the full-load current rating of all resistance heating loads, plus the sum of the full-load currents of all other motors and apparatus that could be in operation at the same time.

Exception: Where one or more instantaneous trip circuit breakers or motor short-circuit protectors are used for motor branch-circuit short-circuit and ground-fault protection as permitted by 430.52(C), the procedure specified above for determining the maximum rating of the protective device for the circuit supplying the control panel shall apply with the following provision: For the purpose of the calculation, each instantaneous trip circuit breaker or motor short-circuit protector shall be assumed to have a rating not exceeding the maximum percentage of motor full-load current permitted by Table 430.52 for the type of control panel supply circuit protective device employed.

Where no branch-circuit short-circuit and ground-fault protective device is provided with the control panel, the rating or setting of the overcurrent protective device shall be based on 430.52 and 430.53, as applicable.

409.30 Disconnecting Means. Disconnecting means that supply motor loads shall comply with Part IX of Article 430.

409.60 Grounding.

Multi-section control panels shall be bonded together with an equipment grounding conductor or an equivalent grounding bus sized in accordance with Table 250.122. Equipment grounding conductors shall terminate on this grounding bus or to a grounding termination point provided in a single-section control panel.

I. Construction Specifications

409.100 Enclosures. Enclosures shall be made of moisture-resistant, noncombustible material. Table 430.91 shall be used as the basis for selecting control panel enclosures for use in specific locations other than hazardous (classified) locations. The enclosures are not intended to protect against conditions such as condensation, icing, corrosion, or contamination that may occur within the enclosure or enter via the conduit or unsealed openings. These internal conditions shall require special consideration by the installer and user. An enclosure type number shall be marked on the control panel enclosure.

409.102 Busbars and Conductors. Control panels utilizing busbars shall comply with the following:

(A) Support and Arrangement. Busbars shall be protected from physical damage and be held firmly in place.

(B) Phase Arrangement. The phase arrangement on 3-phase horizontal common power and vertical buses shall be A, B, C from front to back, top to bottom, or left to right, as viewed from the front of the motor control center. The B phase shall be that phase having the higher voltage to ground on 3-phase, 4-wire, delta-connected systems. Other busbar arrangements shall be permitted for additions to existing installations and shall be marked.

409.104 Wiring Space in Control Panels.

(A) General. Control panel enclosures shall not be used as junction boxes, auxiliary gutters, or raceways for conductors feeding through or tapping off to other switches or overcurrent devices, unless adequate space for this purpose is provided. The conductors shall not fill the wiring space at any cross section to more than 40 percent of the cross-sectional area of the space, and the conductors, splices, and taps shall not fill the wiring space at any cross section to more than 75 percent of the cross-sectional area of that space.

(B) Wire Bending Space. Wire bending space shall be in accordance with the requirements in 430.10(B).

409.106 Spacings. Spacings between terminals and other bare metal parts shall not be less than specified in Table 430.97.

409.108 Service-Entrance Equipment. Where used as service equipment, each control panel shall be provided with a single main disconnecting means to disconnect all ungrounded service conductors. The disconnecting means shall be of the type that is suitable for service applications.

Where a grounded conductor is provided, the control panel shall be provided with a main bonding jumper, sized in accordance with 250.28(D), for connecting the grounded conductor, on its supply side, to the control panel equipment ground bus or terminal.

409.110 Marking. A control panel shall be marked with the following information that is plainly visible after installation:

1) Manufacturers name, trademark or other descriptive marking by which the organization responsible for the product can be identified
2) Supply voltage, phase, frequency, and full-load current
3) Short-circuit current rating of the industrial control panel based on one of the following:

a. short circuit current rating of a listed and labeled assembly
b. short circuit current rating established utilizing an approved method
FPN: UL508A-2001 Supplement SB is an example of an approved method
4) Electrical wiring diagram or the number of the index to the electrical drawings showing the electrical wiring diagram.
5) If the control panel is intended as service equipment it shall be marked to identify it as being suitable for use as service equipment.

Substantiation:

The need for rules governing the installation of control panels is long overdue. There has been a significant increase in the use of control panels in various locations. That increased usage has led to many misapplications of control products and related equipment. The addition of this new article will provide the installer and the enforcing authority the basic rules needed for a safe installation.

The article has been titled "Industrial Control Panels" to be consistent with the standards and industry terminology. However, the article scope is not limited to "industrial" locations only. This is a key because these control panels can be installed in a wide variety of locations.

The following provides the specific substantiation for the individual sections:

Part I – General

409.1 Scope. – This scope is limited to industrial control panels (common industry term) for general use. There are a number of specialized control panels that may be governed by other standards. For instance, if the industrial control panel is on a machine built to NFPA 79, there are rules in NFPA 79 that would apply. Additionally, the scope is limited to 600V and less since there is minimal application for a panel of this type in over 600 V applications.

409.2 Definitions. – A definition of control panel is provided. There is not a "standardized" term in the industry, so the definition provided is based on how UL typically describes control panels in their listing files. Although the article does not specifically require a "listed" control panel, the definition is suitable for general application.

Part II – Installation

409.20 Conductor – Minimum Size and Ampacity Grounding – this section is consistent with the requirements found in 670.4 for sizing the supply conductors to NFPA 79 Industrial Machinery control panels.

409.21 Overcurrent Protection (A) and (B) – this section is consistent with the requirements found in 430.94 for sizing and location requirements for overcurrent protection. The requirements for overcurrent protection within the control panel in 409.21(B)(2) are consistent with the overcurrent protection requirements in 670.4(B).

409.21 Overcurrent Protection (C) – this section is consistent with the overcurrent protection requirements in 670.4(B).

409.30 Disconnecting Means. – This section was added to clarify the confusion that often arises over the disconnect performance requirements for disconnects found within a control panel serving motor loads. The disconnecting means requirement in this section is consistent with Part IX of Article 430.

409.60 Grounding – this section is consistent with the requirement found in 430.96 for motor control centers. Large multi-section control panels are not uncommon.

Part III – Construction

409.100 Enclosures – Since control panels are used in a wide variety of environments, it is important to have a basis for selecting the proper enclosure type. Since Table 430.91 provides that basis, this language requires that Table 430.91 be used. In addition the governing language from 430.91 is repeated here to describe the purpose of the enclosure. The requirement to mark the enclosure type number comes from Note 1 to Table 430.91.

409.102 Busbars – This language is derived from the requirements in 430.97.

409.104 Wiring Space – The general requirement is consistent with 312.8 and provides the basic rules needed for gutter space that will be used for thru conductors and splices/taps. For wire bending space rules, the reference is made to 430.10(B) that covers controllers.

409.106 Spacings – This is an often overlooked item in constructing a control panel. Terminals and other devices are placed with live parts too close to grounded parts and results in faults within the control panel. This rule will establish the minimum spacing requirements consistent with Table 430.97 for motor control centers.

409.108 Service Entrance Equipment – Although the use of a control panel as service equipment is not common, it is important to establish some basic rules if an installation in this manner is made. The requirement for a single main disconnect is consistent with the requirement for motor control centers in 430.95.

A sentence has been added to make it clear that any disconnecting means used in the service equipment has to be suitable for service application. This is important so that devices such as manual motor controllers are not improperly applied in service applications.

Additionally, there is a requirement for a main bonding jumper if a grounded conductors is supplied. This is consistent with the second paragraph of 430.95.

430.110 Marking – This section assembles some information from various code sections as well as adds key requirement for short-circuit current ratings to be marked.

Item 1 is derived from NEC 110.21, this is repeated here because that is often a missing marking on control panels.

Items 2 and 4 are consistent with the requirements in 670.3(A).

Item 3 is new and is critical. Control panels are being misapplied in a large number of applications because they have an inadequate short circuit current rating. This rule establishes that the SCCR must be marked and states that it is determined by the listing process (item a) or by an approved method (item b). The present UL 508A Supplement SB is an example of an approved method that is in use today. The most common misapplication is for the user to assume that the first overcurrent device is the only item needing an appropriate rating. The devices used in the control panel must have individual protection as specified by their own labeling (such as a motor starter) or the entire panel has to be short circuit tested. This is a much needed addition to the NEC to aid in getting proper application of control panels.

Item 5 is consistent with the Service Equipment markings required by Article 230.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 9 Negative: 5

Explanation of Negative:

BUNCH: The principle reason for voting negative is that this is a product requirement issue which cannot be covered in the Code. Creating this special section for Industrial Control Panels would allow the Authority Having Jurisdiction to accept this without knowing if it was really proper for the intended use. Most of these products have their own product safety standards and listing categories. These standards, such as UL 1995, consider more safety issues than can be addressed in the Code such as pressures, pressure reliefs, pipe strength, mechanical protection which are all met before the product is listed. Creating Article 409 could allow bypassing the complete product listing process and thereby result in less safe applications than now exist. This doesn't address any problems in safety today and may create new ones.

CLOSSON: The substantiation provided by the submitter calls for, "The need for rules governing the installation of control panels is long over due". The submitter has not provided any text to solve the alleged problem. No instructions have been provided for the installation of an industrial control panel.

What Mr. Manche has provided is an incomplete set of requirements for control panels. Many details for the design, marking and construction of a control panel have not been addressed. As end product standards (UL 508A, NFPA 79, etc.) already exist for control panels, I see no need for the addition of this proposal to the NEC.

Control panels are available that have been listed to current nationally recognized standards. To attempt to rewrite the current standards for control panels for insertion into the NEC is not feasible. The design and construction of a control panel exceeds the scope of electricians in the field and places an unnecessary burden on the Authority Having Jurisdiction to inspect each nonlisted control panel. Leave the responsibility with the manufacturers of control panels to provide listed products that comply with nationally recognized standards.

COX: This panel should have rejected this proposal for the following reasons:

- Submitter has not provided sufficient technical substantiation that a problem exist.
- The Scope states that the article covers panels intended for "general use". No definition exists for "general use" so it will be a judgment call determining whether or not a particular panel is covered.
- Definition of "control panel" is too broad and vague; nearly all control panels are included. A panel with two pushbuttons or a panel with two timers would be included. Such a panel should not have to meet all the rules listed, especially those concerned with marking for "short circuit current" and "full load current".
- Rules listed in proposed 409.20, 409.21, 409.30 and 409.60 already exist in other articles. No need to repeat them.
- 409.102 deals with a motor control center with wording identical to that in 430.97 (without the exception). The NEC does not need two sections dealing with the same equipment.
- 409.110 deals with marking. In industry, empty control panels are purchased and then equipment is added. A marking to indicate manufacturer or trademark or other "descriptive marking" for the responsible organization is impractical and not needed.

HAAS: The submitter stated there have been many misapplications of control products and failed to identify any. The construction of such panels requires the use of provisions in many sections of the Code. The proposal does not include all those provisions while duplicating several others. The omission of any of the Chapter 5 and 7 rules (725 for example) is particularly troublesome. To condense the applicable portions of Article 250 into two sentences is also inappropriate. The rules as proposed hit only the high points of several Code sections and omit details (for example Parts III, IV and VIII of Article 240) and exceptions (e.g. 300.4(F) Exception). This material should have been forwarded to CMP-9 for action, which is more appropriate to their scope.

SAUNDERS: The substantiation for the proposed change indicates "...The need for rules governing the installation of control panels is long overdue. The addition of this new article will provide the installer and the enforcing authority the basic rules needed for a safe installation."

The added Article address the issues of "installation" of control enclosures in Part II of the proposal, but the remainder of the Article attempts to provide a very limited description of the issues regarding the construction of a control enclosure which is already covered in an industry standard (i.e., UL 508A). The addition of a "minimum level" of requirements in this Article will add confusion to the submitter's issue especially when there are differences between the minimum requirements of the code and the applicable product standard.

Comment on Affirmative:

WRIGHT: NEMA agrees with the addition of the article to the NEC and notes that some additional changes would improve the usability. Those changes are outlined below.

A FPN should be added to the scope of 409.1 in order to provide further product safety guidance on the assembly of a control panel:

409.1 Scope

FPN: UL 508A is a safety standard for Industrial Control Panels.

Panel members raised concerns about how this article ties to the other equipment and articles in the NEC such as NFPA 79 and Fire Pump Control panels. In order to address this concern, a new section similar to that found in many other Sections such as 240.3, would benefit the usability of this new article.

409.3 Other Articles. Control Panels for specific type of equipment addressed in other articles of this Code shall be constructed and installed in accordance with those specific articles.

Delete the second sentence of 409.21(A). Proper overcurrent protection is already addressed in the first sentence by referencing the appropriate parts in Article 240. The second sentence also places an inappropriate restriction on a panel that only contains a single motor application and where the self-protected combination controller is permitted in 430.52.

409.21(A) General. Control Panels shall be provided with overcurrent protection in accordance with Parts I, II, IX of Article 240. ~~Overcurrent protection for the control panel shall be provided by either fuses or circuit breakers.~~

Add the word "single" in front of the word "main" in the first sentence and delete the second sentence of 409.21(B)(2). 409.21(B) is a location requirement and the overcurrent protection is already covered in 409.21(A). Adding the word "single" resolves the number of overcurrent devices permitted to be installed in the panel in order to protect the panel:

409.21(B)(2) A single main overcurrent protective device located within the control panel. ~~Where overcurrent protection is provided for the control panel as part of the control panel, overcurrent protection shall consist of a single circuit breaker or set of fuses and the supply conductors shall be considered either as feeders or taps as covered by 240.21.~~

The section on spacing requirements for the construction of a control panel is not consistent with present industry standards. The present reference was extracted from the spacing requirements of panelboards and motor control center connection points to the bus. It does not appropriately address the spacing requirements as found within a control panel as outlined in industry standards such as UL 508A. The revision below aligns the proposed spacing requirements with the UL industry product standards for industrial control panels.

panels.

409.106 Spacings. Spacings between ~~terminals and other~~ live bare metal parts in feeder circuits shall not be less than specified in Table 430.97.

18-50 Log #1737 NEC-P18Meeting Action: Accept in Principle (410-1) **Final Action: Reject**

TCC Action: Reject

The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee "Rejects" the Panel Action. The recommended FPN contains a requirement and interpretation of the definition of "luminaire" which is not appropriate in an FPN. The Technical Correlating Committee directs the panel to reconsider the proposal and either modify the scope statement to include coverage of the contemplated material or develop a specific comment to Code-Making Panel 1 to modify the definition of "luminaire" to reflect the desire of the panel. This action will be considered by the panel as a public comment.

Submitter: Marcelo M. Hirschler, GBH International / Rep. Fire Retardant Chemicals Association

Recommendation:

Revise text to read as follows;

410.1 Scope. This article covers luminaires (lighting fixtures), lampholders, pendants, incandescent filament lamps, arc lamps, electric-discharge lamps, the wiring and equipment forming part of such lamps, luminaires (fixtures), and lighting installations.

FPN No. 1: Decorative-lighting products and accessories for temporary seasonal and holiday use with a maximum input voltage rating of 120 V are covered by this article. Such products include the following:

(a) factory-assembled seasonal lighting strings with push-in, midget-screw, or miniature-screw lampholders connected in series for across-the-line use or with candelabra- or intermediate-screw lampholders connected in parallel for direct-connection use.

(b) factory-assembled seasonal decorative outfits such as wreaths, stars, light sculptures, crosses, candles or candle sets without lamp shades, products in the shape of, or in resemblance to, a Christmas tree provided with simulated branches and needles not exceeding 30 inches in height, blow-molded figures or objects, animated figures, tree tops, controllers, tree stands, and motorized decorative displays.

(c) lighting products which are portable and not permanently connected to a power source.

(d) ornaments which are provided with an adapter for connection to a push-in lampholder and are intended to replace a push-in lamp in a series-connected decorative-lighting string or decorative outfit.

FPN No. 2: Portable flexible lighting products provided with a power supply cord with a fused attachment plug and intended for outline and decorative lighting use, with a maximum input voltage rating of 120 volts, are covered by this article. Such products include the following:

(a) lighting products provided with a power supply cord with a fused attachment plug incorporating non-replaceable series and series/parallel connected lamps enclosed within a flexible polymeric tube or extrusion.

(b) flexible lighting products provided with a power supply cord with a fused attachment plug used in light sculptures.

Add to Annex A: Seasonal and Holiday Decorative Products: UL 588

Add to Annex A: Flexible Lighting Products: UL 2388

Substantiation:

* Decorative lighting can be a severe source of fire when placed in contact with, or close proximity to, combustibles, including natural or artificial combustible vegetation. In fact, it has been shown that the vast majority of fire losses associated with Christmas tree fires are actually caused by faulty or inadequate decorative lighting.

* UL has recently developed UL 588 (Standard for Seasonal and Holiday Decorative Products), issued in August 2000, to address this problem (often caused by non-compliant lights).

* Strings of lights (often known as rope lights), provided with a power supply cord with a fused attachment plug and intended for outline and decorative lighting use are being covered by a new UL standard, UL 2388 (Standard for Flexible Lighting Products).

* It is important to point out that the National Electrical Code does not, as yet, require the listing of decorative lighting, to a large extent because UL 588 has not been available in its present form until recently and UL 2388 has only been issued in 2002.

* Thus, it behooves the NEC to ensure that there is a clear home for these products, which appear to be luminaires, and should thus be referenced in Article 410.

* NFPA statistics for 1988 show: (a) that the leading cause of Christmas tree fires and property damage was short circuit or ground fault (21%), (b) that, in this category, electrical failure other than short circuit ranked second in number of fires, injuries and property damage with the exception of the "other known" category, and (c) that cords and plugs were the leading type of equipment involved in the ignition of Christmas trees.

* The NFPA web site contains the following recommendation: "When decorating Christmas trees, always use safe tree lights. (Some lights are designed only for indoor or outdoor use, but not both.) Larger tree lights should also have some type of reflector rather than a bare bulb and all lights should be listed by a testing laboratory."

* There have also been recommendations from a large number of organizations that all tree lights should be listed. A simple web site search brings up, among others: the US Fire Administration (an entity of the Federal Emergency Management Agency, 500 C Street, SW Washington, D.C. 20472), the National Safety Council (A Membership Organization Dedicated to Protecting Life and Promoting Health, 1121 Spring Lake Drive, Itasca, IL), US Department of Agriculture, various universities (including University of Illinois, @ Urbana-Champaign, University of Nebraska, University of California @ Berkeley, and so on), various authorities having jurisdiction and, of course, Underwriters Laboratories.

* Decorative lighting is often used as temporary lighting, as recognized in section 527.3 (B) of the NEC, where time constraints are imposed for such lights.

* Decorative lighting is often used as temporary lighting, as recognized in section 527.3 (B) of the NEC, where time constraints are imposed for such lights.

* The following Table (taken from NFPA data between 1980 and 1988) compares the likelihood of having a fire fatality when a fire starts on a particular product. In other words, how likely is a fire starting on a Christmas tree going to lead to a fatality. We can get that information by comparing the number of fires to the number of fire fatalities, and it shows that every 26 fires starting on a Christmas tree lead to a fatality. This is a poor record, as only two of the other products on the list are worse: clothing that is being worn by a person (at 8 fires per fatality) and upholstered furniture (at 25 fires per fatality). At the other end of the spectrum, with fires from plants and trees, there is a fire fatality every 871 fires, and with other decorations, there is a fatality every 450 fires. It is important to keep pointing out that Christmas tree fires really usually mean decorative light fires.

* Of course, the same NFPA data also shows that several other products are more likely to result in fires. For example, fires are 90 times

more likely to start on mattresses or bedding than on Christmas trees, and 13 times more likely to start on curtains and drapes than on Christmas trees. However, looking at deaths from fires, products such as decorations, toys and games and plants and trees are much less deadly than Christmas trees (which really means decorative lights): a fire starting in any other decoration is 10 times less likely to lead to a fire fatality than one starting on a Christmas tree.

****Insert Table NEC Tb 410.1 L1737 Here****

(Table shown on page 2785)

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

Panel Meeting Action: Accept in Principle

CMP 18 recommends to the Technical Correlating Committee that a fine print note be added to the scope of Article 410. The FPN will read:

FPN: As defined in Article 100, the definition of luminaire includes decorative lighting products and accessories for temporary seasonal and holiday use, and portable flexible lighting products.

Panel Statement:

The panel agrees that seasonal and holiday lighting, and flexible lighting are included within the scope of Article 410 and has recommended that a Fine Print Note be added to reflect this. The panel revised the proposed Fine Print Note to provide nonmandatory language. The panel recommends to CMP 1 that standards, UL 588-Seasonal and Holiday Decorative Products, and UL 2388-Flexible Lighting Products referenced in the recommendation be added to Annex A.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-51 Log #1357 NEC-P18 (410-2) **Final Action: Accept in Principle**

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal along with the following comments:

1) Is the panel implying that Article 410 applies in addition to Article 700 and 701 for unit equipment, or does the panel intend that Article 410 not apply in any manner? If Article 410 applies and is modified by the requirements in 700 and 701, the Technical Correlating Committee questions the need for a reference since 90.3 already conveys that Chapters 1 through 4 apply to all installations.

2) The panel needs to reconsider this proposal in conjunction with Proposal 18-52a because the two actions provide different text for the same section.

3) The NEC Style Manual requires that the "Other Article" information be presented in a table format and the Technical Correlating Committee directs the panel to reformat this material into a table.

4) The panel should consider if a renumbering of Article 410 is required due to the lack of additional usable empty numbers within the Article parts. The Technical Correlating Committee notes that the "Other Articles" section should be 410.3 to be consistent with the NEC Style Manual and other code articles. This action will be considered by the panel as a public comment.

The Technical Correlating Committee directs that this proposal be sent to Code-Making Panel 13 for information relative to the reference to Articles 700 and 701.

Submitter: J. Kevin Vogel, Crescent Electrical Supply

Recommendation:

Add new sentence to section:

Emergency and locally required illumination unit equipment shall be installed as specified in 700.12(E) and 701.11(F).

Substantiation:

The proposed wording in Section 410.2 will, like the other information in that section, alert users of the Code to the very important requirements contained in Articles 700 and 701. The majority of journeymen electricians that are students in Code classes that I teach express surprise, and confess to frequently having violated, the requirements of 700.12(E) and 701.11(F).

Panel Meeting Action: Accept in Principle

Revise 410.2 as follows:

410.2 Application of Other Articles. Equipment for use in hazardous (classified) locations shall conform to Articles 500 through 517. Lighting systems operating at 30 volts or less shall conform to Article 411. Arc lamps used in theaters shall comply with 520.61, and arc lamps used in projection machines shall comply with 540.20. Arc lamps used on constant-current systems shall comply with the general requirements of Article 490. Unit equipment for emergency illumination shall comply with 700.12(E) and unit equipment for legally required standby illumination shall comply with 701.11(F).

Panel Statement:

The panel agrees that a reference to unit equipment for emergency and legally required standby illumination shall be included in 410.2.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-52a Log #CP1806 NEC-P18 (410-2) **Final Action: Accept**

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 18-51. See Technical Correlating Committee action on Proposal 18-51. This action will be considered by the Panel as a Public Comment.

Submitter: Code-Making Panel 18

Recommendation:

Revise 410.2 to read:
"Lighting systems operating at 30 volts or less shall conform to Article 411. Arc lamps used in theaters shall comply with 520.61, and arc lamps used in projection machines shall comply with 540.20. Arc lamps used on constant-current systems shall comply with the general requirements of Article 490."

Substantiation:

In accordance with the arrangement of the Code specified in 90.3, general cross-reference to whole articles is not necessary. The panel has deleted the general reference to Articles 500 through 517 in this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-52 Log #2663 NEC-P18 (410-2–Storage Space) **Final Action: Reject**

Submitter: Phil Simmons, Simmons Electrical Services

Recommendation:

Move the definition of Storage Space and the Fine Print diagram from 410.8 to new Section 410.2. Renumber the following sections.
Definition.
Storage Space. The volume bounded by the sides and back closet walls and planes extending from the closet floor vertically to a height of 1.8 m (6 ft) or the highest clothes-hanging rod and parallel to the walls at a horizontal distance of 600 mm (24 in.) from the sides and back of the closet walls, respectively, and continuing vertically to the closet ceiling parallel to the walls at a horizontal distance of 300 mm (12 in.) or the width of the shelf, whichever is greater.~~;~~ For ~~for~~ a closet that permits access to both sides of a hanging rod, this space includes the volume below the highest rod extending 300 mm (12 in.) on either side of the rod on a plane horizontal to the floor extending the entire length of the rod.
FPN: See Figure 410.8.
Figure 410.8 Closet storage space.

Substantiation:

This proposal intends to move the definition from Section 410.8 to Section 410.2 Definitions. This will comply with the NEC Style Manual.
In addition, it is proposed to break up the really long single sentence into to two sentences. This should make the term easier to read and understand.

Panel Meeting Action: Reject

Panel Statement:

The definition of clothes closet is applicable only to 410.8, and separating it from this section diminishes usability.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-53 Log #229 NEC-P18 **Final Action: Reject**
(410-4(D))

Submitter: Vergil Phillips, City of Kansas City, MO Codes Administration

Recommendation:

Add the words "sconce lights" after the word "pendants".

Substantiation:

Current language allows the installation of a sconce light on the wall at the flood-rim level of the bathtub. This fixture will endanger the person (taking a bath) in the following ways:

Splashing, or placing wet toys in contact with the energized and thus heated light bulb will cause the glass bulb to break and broken pieces of glass to enter the tub.

The fixture invites someone who slips and is falling to grasp the glass, which will not support the person. It will break away and propose a razor-sharp cutting edge endangerment.

The energized fixture, if touched by a person poses an electrocution hazard. This is the most important concern.

The fixture, when installed in the area adjacent to the tub is almost certain to cause death to a child or anyone in the tub who touches this energized device. The photo I have provided illustrates a reviewed and approved installation of a sconce light 4 ft above the bathtub rim due to the fact that the NEC does not specifically prohibit such installation. Authority Having Jurisdiction sometimes only means verbatim what is specifically within the text of the code.

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

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement on 18-55. the term "sconce lights" is not a recognized luminaire type. These are surface-mounted luminaires and may be suitable for use in this location.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

LARSON: I believe that Panel 18 erred in rejecting this proposal. The term "Sconce Light" describes a well-known generic style of luminaire, whether it is a "recognized" type or not. In general, this type of surface mounted luminaire is not suitable for installation in a bathtub and shower area, for the specific reasons cited in the submitter's substantiation. The luminaire shown in the submitter's photo depicts an obvious hazard. If the general perception among installers and inspectors is that 410-4(D) does not prohibit the installation of this type of luminaire above a bathtub, then that situation should be fixed by editing the code language. I believe the panel action should have been to "Accept in Principle." The limited panel action on Proposal 18-55 (Log #1572) did nothing to address this situation.

18-54 Log #353 NEC-P18 **Final Action: Reject**
(410-4(D))

Submitter: Carl L. McKarain, R.F. Fisher Electric / Rep. IAEI

Recommendation:

Need to add GFCI protection for wall mounted light fixtures over tubs (wall mounted fixtures are not covered.)

Substantiation:

It could keep someone from being killed or injured.

Panel Meeting Action: Reject

Panel Statement:

This proposal does not contain any substantiation other than the submitter's supposition. The submitter did not provide technical substantiation to support the recommendation as is required by 4-3.3(d) of the NFPA Regulations Governing Committee Projects.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-55 Log #1572 NEC-P18 **Final Action: Accept in Principle**
(410-4(D))

Submitter: Michael J. Johnston, Int'l Assn. of Electrical Inspectors

Recommendation:

Revise Section 410.4(D) as follows:

(D) Bathtub and Shower Areas. No parts of cord-connected luminaires (fixtures), wall or ceiling hung ~~hanging~~ luminaires (fixtures), lighting track, pendants, or ceiling-suspended (paddle) fans shall be located within a zone measured 900 mm (3 ft) horizontally and 2.5 m (8 ft) vertically from the top of the bathtub rim or shower stall threshold. This zone is all encompassing and includes the zone directly over the tub or shower stall.

Substantiation:

There appears to be some confusion in the field regarding consistent application of the requirement to meet the intent of section 410.4(D). If it is intended to restrict wall mounted or wall hung, surface mounted luminaries (fixtures), the language has created a difference in application of the rule. The revision would clarify the requirement and intentions of the technical committee regarding electrical equipment permitted in that specified restricted zone. The revision would not restrict the use of suitable recessed fixtures in the restricted area, but would restrict surface mounted (wall mounted) luminaries (wet location rated) from being installed in those areas. This is not clear currently in the rule. The definition of "hanging" in many dictionaries includes a description of the term as being hung on the wall or ceiling, as one would hang a picture on the wall. Many AHJs use this as a means to prohibit it the surface mounted wall luminaries (fixtures) from being installed in this area. The revision would provide clarification and contribute to increased safety.

Some jurisdictions that allow surface wall mounted, wet location fixtures in these areas because of the present wording, also then require the fixture to be GFCI protected. I agree with this, but there are not words in the NEC to require this protection if the fixure is allowed in these locations.

My concerns are for those who may slip in the tub or shower. The natural reaction on the way down is to grab onto anything to stop the fall. This could be a situation where the energized lighting luminaire (fixture) which is permitted to be mounted in accordance with 314.27(A) Exception would be subject to damage other than it would be capable of withstanding. This is a shock hazard. It also is a shock hazard for bathing, curious children.

The clarification is needed to assist the consumer in the interest of safety in the bathtub and shower areas, and also to assist code enforcement officials with a rule that results in more consistent and safe installations. The intent of this proposal was not directed at limiting all lighting luminaries (fixtures) in these areas, such as totally enclosed types suitable for wet locations that are flush mounted and recessed), but to try to address the situations associated with wall (surface) mounted fixtures indicated in the substantiation. GFCI protection should be provided for all electrical equipment in these zones.

Panel Meeting Action: Accept in Principle

Revise 410.4(D) to read:

(D) Bathtub and Shower Areas. No parts of cord-connected luminaires (fixtures), chain-, cable-, or cord-suspended luminaires (fixtures), lighting track, pendants, or ceiling-suspended (paddle) fans shall be located within a zone measured 900 mm (3 ft) horizontally and 2.5 m (8 ft) vertically from the top of the bathtub rim or shower stall threshold. This zone is all encompassing and includes the zone directly over the tub or shower stall.

Panel Statement:

This section addresses luminaires and fans that hang from the ceiling into the shower/bath space. The wording is not intended to exclude suitable luminaires. Wall and ceiling mounted luminaires, suitable for the environment, are acceptable. Properly installed listed luminaires would not have energized exterior surfaces. The substantiation does not provide data or documentation that indicates suitable surface mounted luminaires present a hazard.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

LARSON: While I agree that the proposed revision to 410.4(D) is a positive step, I believe that the Panel misinterpreted the main thrust of the proposal. The submitter has pointed out that 410.4(D) is unclear as to whether the device restrictions in a bathtub and shower area apply to ceiling-mounted units only, or if the restrictions extend to certain types of wall-mounted devices also. The first sentence of the panel statement adds to this confusion by claiming that this section addresses only ceiling-mounted luminaires and fans. I believe that the intent of 410.4(D) is to apply restrictions to the entire volume within the defined zone, which includes the wall surfaces. The examples given in 410.4(D) are all ceiling-mounted devices. I believe that the panel should widen the list of restricted luminaires, as suggested in the submitter's recommendation, to make clear that certain types of wall-mounted luminaires are also prohibited. Suitability for the environment is only one factor to consider in this prohibition. The other is suitability for the location. Some surface mounted luminaires, such as those discussed in Proposal 18-53 (Log #229), even if listed for damp or wet locations, are clearly not suitable for installation in a bathtub and shower area. Citing such restrictions for wall-mounted luminaires in 410.4(D) seems to be the best place to do that.

18-56 Log #2970 NEC-P18 (410-4(D)) **Final Action: Reject**

Submitter: Ryan Offerdahl, Richard Electric Inc. / Rep. NJATC

Recommendation:

Revise as follows:

No parts of cord connected luminaires-fixtures, hang luminaires, lighting track, pendants, (wall sconce), or ceiling-suspended fans shall be located within a zone measured 3 ft horizontally and 8 ft vertically from the top of the bathtub rim or shower stall threshold. This zone is all encompassing and includes the zone directly over the tub or shower walls.

Substantiation:

I have run into an instance were it was 3 ft by 3 ft away from shower area. Inspector called for it to be moved.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement on 18-55. The term "wall sconce" is not a recognized luminaire type. These are surface mounted luminaires and may be suitable for use in this location. The proposal did not provide technical substantiation as is required by 4-3.3(d) of the NFPA Regulations Governing Committee Projects.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-57 Log #2331 NEC-P18 (410-4(E)) **Final Action: Accept in Principle**

TCC Action:

It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.

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

Recommendation:

Add new text as follows:

(E) Luminaires (Fixtures) in Sports Facilities. Luminaires (fixtures) using a mercury vapor or metal halide lamp in playing and spectator areas of sports facilities (including mixed use or all-purpose facilities found in some schools, churches, and community centers) shall be of the type that completely encloses the lamp. Such luminaires (fixtures) shall be permitted to have an additional guard.

Substantiation:

The industry continues to experience a small, but persistent, level of cases in sports facilities, particularly in schools, where athletic activity may result in the breakage of a mercury or metal halide lamp outer jacket when such lamps are used in open luminaires. When this occurs, the arc tube can continue to operate even though the outer jacket may be cracked or no longer be present. This can lead to reports that describe a burning sensation around the eyes and a sunburn appearance around the cheeks and forhead from spectators and those that continue to play under such a lamp. These reported symptoms of eye inflammation and skin burn are typical of over-exposure to UV radiation, which can occur when the lamp outer jacket is broken and the arc tube continues to operate. A complete lamp enclosure will provide mechanical protection to reduce the possibility of damage to the outer lamp jacket.

Panel Meeting Action: Accept in Principle

Add a new 410.4(E) to read:

"Luminaires (fixtures) subject to physical damage, using a mercury vapor or metal halide lamp, installed in playing and spectator seating areas of indoor sports, mixed-use, or all-purpose facilities shall be of the type that protects the lamp with a glass, or UV attenuating plastic lens. Such luminaires (fixtures) shall be permitted to have an additional guard."

Panel Statement:

The panel has revised the text to specifiy that the requirement applies only to luminaires installed indoors that are subject to physical damage and only to those that are installed above playing and seating areas. In addition, the revised text addresses the characteristics required of the lens.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

BER: What we are dealing with here, a couple of cases of sunburn? Skin cancer? When the submitter states that the "...industry continues to experience a small, but persistent, level of cases." (emphasis added) it begs the question as to whether this is a significant enough of an issue for the panel to be concerned with. It would sure be helpful for the panel to have some additional information as to the number of cases involved and what was the extent of the human damage that occurred.

SMITH: The submitter does not have enough technical data as to what led up to this occurrence or even if there would be a safe distance away from the playing/spectator area that these Luminaires could be installed without the concern of UV radiation. Thus, I vote Negative on the Accept in Principle of this proposal.

WALL: This proposal addresses a product standard and/or maintenance issue. The manufacturer of the lamp should be advising the owners of installations to replace the lamps upon breakage of the outer envelope.

Comment on Affirmative:

O'BOYLE: The substantiation given by the submitter indicates that the lens is needed to provide mechanical protection to reduce the possibility of damage to the outer lamp jacket. The panel statement does not provide technical substantiation supporting the need to confirm the UV attenuation properties of a plastic lens. I suggest that the words "UV attenuating" should be removed from the panel action.

ROSENBAUM: The purpose of the enclosure in the original submission was for mechanical protection to prevent lamp breakage, not for UV attentuation. It is recommended to remove the words "UV attenuating" from the Panel Action. All plastic lenses provide UV attenuation, but the inclusion of these words in the article could cause confusion among AHJs regarding the acceptability of plastic lenses.

18-58 Log #1488 NEC-P18 (410-6) **Final Action: Reject**

Submitter: Don Walker Lakewood, CO

Recommendation:

Revise text to read as follows:
410.6 Luminaires (Fixtures) Overcombustible Materials. Lampholders installed over highly combustible materials shall be of the unswitched type~~.~~, ~~Unless~~ unless an individual switch is provided for each luminaire (fixture)~~.~~, ~~Lampholders~~ Luminaires (fixtures) shall be located at least 2.5 m (8 ft) above the floor or shall be located or guarded so that lamps cannot be readily removed or damaged.

Substantiation:

As currently worded and punctuated.

Panel Meeting Action: Reject

Panel Statement:

The submitter has provided no definitive substantiation that there is a problem with the current text.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-59 Log #1427 NEC-P18 (410-8) **Final Action: Reject**

Submitter: David A. Kerr, Jr. Friendsville, PA

Recommendation:

Revise text to read as follows:
410.8 Luminaires (Fixtures) in ~~Clothes~~ Closets
(D) Location. Luminaires (fixtures) in ~~clothes~~ closets...

Substantiation:

The fire hazard is the same in small storage areas. Deleting clothes would simplify the rule. People routinely stack paper towels and cardboard boxes right up to the ceiling.

Panel Meeting Action: Reject

Panel Statement:

The submitter has provided no definitive substantiation to support expanding this requirement to other than clothes closets.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-60 Log #757 NEC-P18 (410-14(B)) **Final Action: Accept in Part**

TCC Action:

The Technical Correlating Committee directs that the panel action be revised to read "...back of the luminaire (fixture) to provide…". This revision will make the text consistent with the use of the term luminaire throughout the article.

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text as follows:
Access to Boxes. Electric-discharge luminaires (lighting fixtures) ~~surface~~ mounted over ~~concealed~~ the opening of outlet, pull, or junction boxes shall be provided with suitable openings in the back of the fixture to provide access to the wiring in the box.

Substantiation:

Boxes are required to be accessible by 370.29. The definition of concealed in Article 100 indicates concealed boxes are not accessible. This section does not cover flush-mounted and suspended fixtures which can be installed to cover the openings in boxes. Depending on the wiring method and the installation, access to the box can present varying degrees of difficulty without openings in the back of such fixtures. The rule should be limited to fixtures mounted over the opening of boxes, which is the intent. Where a fixture is mounted over an accessible box with the opening up and supplied through a nipple from the back of the box an opening in the back of the fixture other than a knockout is not needed.

Panel Meeting Action: Accept in Part

Revise text as follows:
Access to Boxes. Electric-discharge luminaires (lighting fixtures) surface mounted over concealed outlet, pull, or junction boxes shall be provided with suitable openings in the back of the fixture to provide access to the wiring in the box.

Panel Statement:

The panel rejected all of the recommendations except for addition of the words "wiring in the". The installation that is described in the remainder of this proposal does not meet the requirements of this section. An electric-discharge luminaire that is mounted over a box is required to have a box opening over the box.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-61 Log #2873 NEC-P18 **Final Action: Accept**
(410-15(B))

Submitter: Ray Carter, Rocket Permapost

Recommendation:

Revise text to read as follows:

410.15(B) Metal or Nonmetallic Poles Supporting Luminaires (Lighting Fixtures). Metal or Nonmetallic poles shall be permitted to be used to support luminaires (lighting fixtures) and as a raceway to enclose supply conductors, provided the following conditions are met:

(1) A ~~metal~~ pole shall have a handhole not less than 50 mm x 100 mm (2 in. x 4 in.) with a raintight cover to provide access to the supply terminations within the pole or pole base.

Exception No. 1: No handhole shall be required in a pole 2.5 m (8 ft) or less in height above grade where the supply wiring method continues without splice or pull point, and where the interior of the pole and any splices are accessible by removing the luminaire (fixture).

Exception No. 2: No handhole shall be required in a ~~metal~~ pole 6.0 m (20 ft) or less in height above grade that is provided with a hinged base.

(2) where raceway risers or cable is not installed within the pole, a threading fitting or nipple shall be brazed, ~~or~~ welded, or attached to the pole opposite the handhole for the supply connection.

(3) A metal pole shall be provided with a grounding terminal.

a. A pole with a handhole shall have the grounding terminal accessible from the handhole.

b. a pole with a hinged base shall have the grounding terminal accessible within the base.

Exception: No grounding terminal shall be in a pole 2.5 m (8 ft) or less in height above grade where the supply wiring method continues without splice or pull, and where the interior of the pole and any splices are accessible by removing the luminaire (fixture).

(4) A metal pole with a hinged base shall have the hinged base and pole bonded together.

(5) Metal raceways or other equipment grounding conductors shall be bonded to the metal pole with an equipment grounding conductor recognized by 250.118 and sized in accordance with 250.122.

(6) Conductors in vertical ~~metal~~ poles used as raceway shall be supported as provided in 300.19.

Substantiation:

As present worded in the 2002 NEC, this section only addresses metal poles used for supporting luminaires (lighting fixtures) but many lighting poles are now constructed of either concrete or fiberglass. There are also short nonmetallic raceway sleeves being used for support of weatherproof par holders or flood that should be included in this section.

Since these poles are not included in this section, the NEC does not permit these poles to be used as a raceway, as it presently does for metal poles. Section 300.3(A) requires single conductors specified in Section 310.13 to be enclosed in a Chapter 3 wiring method so Section 300.3(A) would not permit THHN/THWN conductors to be installed inside either a concrete, fiberglass, or PVC pole even though these poles would provide as much physical protection as a metal pole. The possibility of damage from the interior of the concrete, fiberglass, or PVC would not be any different than that same possibility in a metal pole.

By not permitting these nonmetallic poles to be used as a raceway, the raceway enclosing the conductors in the underground raceway must be extended to the top of the pole or a cord or cable from Article 400 must be used. Since this use is not specifically addressed in Section 400.7 and 400.8, some inspectors are not permitting even extra hard usage cable to be used inside these poles.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-62 Log #3248 NEC-P18 **Final Action: Reject**
(410-15(B)410-22(A))

Submitter: Alfred A. Fiorello, Fiorello Electric Inc.

Recommendation:

Add text to read as follows:

Metal poles supporting luminaries (lighting fixtures). Metal poles shall be permitted to be used as a raceway and comply with Article 300.17 and 376.22.

Substantiation:

The problem is in large parking areas, too many conductors are in these poles. As an inspector, I am seeing 40 to 50 conductors in one 4 in. pole. This should be limited as other raceways are.

Panel Meeting Action: Reject

Panel Statement:

Metal poles are presently permitted to be used as raceways and are required to conform with 300.17. Section 376.22 contains requirements for wireways. Metal poles are not wireways.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-63 Log #1928 NEC-P18 **Final Action: Reject**
(410-15(B)(5))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(5) Metal raceways or other equipment ~~grounding~~ bonding conductors shall be bonded to the pole with an equipment grounding conductor recognized by 250.118 and sized in accordance with 250.122.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects this proposal for the following reasons:
1. The proposal creates confusion because it only changes some of the terms from "grounding" to "bonding" and no explanation why only some of the terms were changed.
2. The proposal contained no substantiation regarding the proposal on Article 250.
3.See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

COSTELLO: See my Explanation of Negative Vote on Proposal 18-1.
OWENS: See my Explanation of Negative Vote on Proposal 18-1.
WALL: See my Explanation of Negative Vote on Proposal 18-1.

Comment on Affirmative:

FETZER: UL recognizes that this proposal extends beyond the scope of this panel, and therefore understands that the ultimate resolution will reside with the TCC and Panels 5 and/or 1, which have jurisdiction over the basic requirements for grounding and the definition of terms involving such.

18-64 Log #3157 NEC-P18 **Final Action: Reject**
(410-15(B)(5))

Submitter: Eric Stromberg, The Dow Chemical Company

Recommendation:

Add the following sentence to the existing text: Metal poles must be bonded to an effective grounding system as per 250.2 and 250.4(A)(3).

Substantiation:

It is still unclear to many inspectors that metal light poles must have an equipment grounding conductor bonded back to the source as a low impedance fault path for the clearing of overcurrent protection in the event of a phase to case fault. All too often, poles are still being installed with simply a ground rod at the pole and no equipment grounding conductor. The death of the young girl in the California car wash this past year would most likely have been prevented had the light pole she touched been bonded. I know that the code already calls this out, but the message is still not getting out.

Panel Meeting Action: Reject

Panel Statement:

The panel accepts the submitter's statement that current Code wording is clear. The panel concludes that the issue is better training of installers rather than adding more code language.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-65 Log #604 NEC-P18 (410-16(A)) **Final Action: Accept in Principle in Part**

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

Recommendation:

Revise text to read as follows:
Means of Support.
(A) Outlet Boxes. Outlet Boxes or fittings installed in accordance with ~~as required by Section 314.23~~ 314.27(B) shall be permitted to support a luminaire~~s~~ (fixture~~s~~).

Substantiation:

This requirement is redundant to the requirements in 314.27(B) and should not be repeated. The reference to 314.27(B) is important and remains.

Panel Meeting Action: Accept in Principle in Part

Revise 410.16(A) to read:
(A) Outlet Boxes. Outlet boxes or fittings installed as required by 314.23 and complying with the provisions of 314.27(A) and 314.27(B) shall be permitted to support luminaires (fixtures).

Panel Statement:

The panel does not agree that the reference to 314.23 is redundant and has retained it. The reference gives the means of attachment for the box. The panel agrees that reference should also be made to 314.27 (A) and (B) giving specific requirements for boxes supporting luminaires.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-66 Log #1424 NEC-P18 (410-16(A)) **Final Action: Accept in Principle in Part**

Submitter: Stephen W. Drayton, Eastern Idaho Electrical JATC / Rep. 2nd Year Apprentice Class

Recommendation:

Revise text to read as follows:
(A) Outlet Boxes. Outlet boxes or fittings installed as required by ~~314.23~~ 314.27(A) and 314.27(B) shall be permitted to support luminaires (fixtures).

Substantiation:

We believe that the intent of NEC 1999 410-16(a) was lost by referring to the NEC Article 314.23 in 2002. Article 314.27(B) requires installation as required by 314.23.

Panel Meeting Action: Accept in Principle in Part

Panel Statement:

See panel action and statement on Proposal 18-65.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-67 Log #3341 NEC-P18 (410-16(C)) **Final Action: Reject**

Submitter: Vincent A. Mickle, Hatzel & Bueller / Rep. Electricians Local Union 98

Recommendation:

According to 410.16(C), there is no requirement for independently supporting the fixtures (luminaires) to the building structure.

Substantiation:

Make an addendum to the current, (410.16(C)) and place an exception to this article, stating that the luminaire (fixtures) shall be supported by the building structure.

Panel Meeting Action: Reject

Panel Statement:

Section 410.16(C) requires the suspended ceiling to be "securely attached to the building structure at appropriate intervals". It further requires that the "framing members of suspended ceiling systems used to support luminaires (fixtures) shall be securely fastened to each other". Finally, it requires the "luminaires (fixtures) shall be securely fastened to the ceiling framing member." Having complied with these three requirements, it is not the intent to also require the luminaires to be independently supported by the building structure. The substantiation offered no information to demonstrate that such additional support is necessary.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-68 Log #2846 NEC-P18 **Final Action: Reject**
(410-16(H))

Submitter: Richard Dawkins, JKELO Electric

Recommendation:

Delete text:
410.16(H) Outdoor luminaires (lighting fixtures) and associated equipment shall be supported by trees.

Substantiation:

225.26 Vegetation as Support. Vegetation such as trees shall not be used for support of overhead conductor spans.

Panel Meeting Action: Reject

Panel Statement:

The substantiation seems to imply that 225.26 prohibits supporting luminaires by trees. It does not. It prohibits using trees to "support overhead conductor spans". 410.16(H) recognizes this by referring to 225.26 in the first Fine Print Note.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-69 Log #1083 NEC-P18 **Final Action: Accept in Principle**
(410-18 Exception No. 2 (New))

TCC Action:

The Technical Correlating Committee understands that the panel action should include the term "(fixtures)" following the word "luminaires".

Submitter: Russell LeBlanc, Peterson School of Engineering

Recommendation:

Add Exception No. 2 as follows:
Exception No. 2: Replacement luminaires that are GFCI protected shall not be required to be grounded, if the wiring method does not provide a ready means for grounding.

Substantiation:

To allow another safe option for luminaire replacements. This would be similar to receptacle replacements where no grounding means exists.

Panel Meeting Action: Accept in Principle

Add a new Exception No. 2 to 410.18(B) and renumber the existing exception to 410.18(B) as Exception No. 1. New exception to read:
Exception 2: Replacement luminaires that are GFCI protected shall not be required to be connected to an equipment grounding conductor.

Panel Statement:

The panel agrees that providing GFCI protection for luminaires supplied by a circuit that does not provide an equipment grounding means provides the same level of protection as that afforded receptacles in 210.7(D)(3)(e). The panel's revised text provides the type of protection recommended by the submitter. recommendation

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-70 Log #37 NEC-P18 **Final Action: Accept in Principle**
(410-18(B))

NOTE: The following proposal consists of Comment 18-14 on Proposal 18-28 in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 18-28 was:

Revise as follows:

(b) Made of Insulating Material. Fixtures directly wired or attached to outlets supplied by a wiring method that does not provide a ready means for grounding shall be made of insulating material and shall have no exposed conductive parts.

Exception: Where the wiring method does not provide a ready means for grounding the lighting fixture at the lighting outlet, it shall be permitted to connect an equipment grounding conductor from the outlet in compliance with Section 250-130(c). The lighting fixture shall then be grounded in accordance with (a).

Submitter: Eric Stromberg, The Dow Chemical Company

Recommendation:

410-18(b)(1) Where this circuit is supplied by a GFCI, fixtures with exposed metal parts shall be allowed.

Substantiation:

Currently, the code (410-18(b)) only allows nonmetallic (no exposed conductive parts) lighting fixtures to be used when supplied by an ungrounded two-wire circuit. 210-7(d)(3)(e), however, allows the use of a grounded receptacle on an ungrounded two-wire circuit when the receptacle is fed by a GFCI and is labeled accordingly. It is the opinion of the author that the spirit of Article 210 should be applied to article 410-18 and thereby allow the use of metallic light fixtures on a two-wire system when the circuit is protected by a GFCI.

Panel Meeting Action: Accept in Principle

Panel Statement:

See panel action and statement on Proposal 18-69.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-71 Log #1930 NEC-P18 **Final Action: Reject**
(410-18(B) Exception)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:

Exception: Replacement luminaires (fixtures) shall be permitted to connect an equipment grounding ~~grounding~~ bonding conductor from the outlet in compliance with 250.130(C). The luminaire (fixture) shall then be grounded in accordance with 410.18(A).

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects this proposal for the following reasons:

1. The proposal contained no substantiation regarding the proposal on Article 250.
2. See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

COSTELLO: See my Explanation of Negative Vote on Proposal 18-1.
OWENS: See my Explanation of Negative Vote on Proposal 18-1.
WALL: See my Explanation of Negative Vote on Proposal 18-1.

Comment on Affirmative:

FETZER: UL recognizes that this proposal extends beyond the scope of this panel, and therefore understands that the ultimate resolution will reside with the TCC and Panels 5 and/or 1, which have jurisdiction over the basic requirements for grounding and the definition of terms involving such.

18-72 Log #2784 NEC-P18 **Final Action: Accept in Principle**
(410-18(B) Exception No. 2 (New))

Submitter: Dale Rooney, Municipality of Anchorage

Recommendation:

Add text as follows:
Add exception No. 2 to read: "Replacement luminaries (fixtures) shall be permitted to be supplied through a ground-fault circuit interrupter."

Substantiation:

This brings the permitted practices for replacement luminaries in line with those for replacement receptacles. If a light is on the same circuit with receptacles that are already protected by a GFCI, there should be no need for additional grounding.

Panel Meeting Action: Accept in Principle

Panel Statement:

See panel action and statement on Proposal 18-69.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-73 Log #1931 NEC-P18 **Final Action: Reject**
(410-20)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
410.20 Equipment ~~Grounding~~ Bonding Conductor Attachment. Luminaires (fixtures) with exposed metal parts shall be provided with a means for connecting an equipment ~~grounding~~ bonding conductor for such luminaires (fixtures).

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects this proposal for the following reasons:
1. The proposal contained no substantiation regarding the proposal on Article 250.
2.See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

COSTELLO: See my Explanation of Negative Vote on Proposal 18-1.
OWENS: See my Explanation of Negative Vote on Proposal 18-1.
WALL: See my Explanation of Negative Vote on Proposal 18-1.

Comment on Affirmative:

FETZER: UL recognizes that this proposal extends beyond the scope of this panel, and therefore understands that the ultimate resolution will reside with the TCC and Panels 5 and/or 1, which have jurisdiction over the basic requirements for grounding and the definition of terms involving such.

18-74 Log #2294 NEC-P18 **Final Action: Reject**
(410-20 Exception (New))

Submitter: Jerry Cleveland, Cleveland Electric

Recommendation:

Add text as follows:
Exception: Where no equipment grounding conductor is readily accessible, and the likelihood fault at luminaire from other than circuit feeding luminaire is small. By installing ground fault circuit interruption protection (5ma trip) on luminaire branch circuit, the luminaire's ground wire shall be eliminated.

Substantiation:

In older homes without equipment ground for outside luminaires, to run an equipment ground back to locations specified in 250.130(C) you are opening up porch ceilings, and walls to fish ground wire. The GFCI will protect against shock hazard to personnel, and trip out a fault before any damage to equipment can occur (5ma X 120V = 0.6 watts not enough power to damage). Other power not in area. This ideal occurred as an extension to the code allowing grounded receptacles on load side of GFCI on branch circuit with no equipment ground.

Panel Meeting Action: Reject

Panel Statement:

The submitter's recommendation does not specify a section to which this recommended text applies. However, the submitter is referred to the panel action and statement on Proposal 18-69.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-75 Log #1932 NEC-P18 **Final Action: Reject**
(410-21)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
410.21 Methods of Grounding. Luminaires (fixtures) and equipment shall be considered grounded where mechanically connected to an equipment ~~grounding~~ bonding conductor as specified in 250.118 and sized in accordance with 250.122.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects this proposal for the following reasons:
1. The proposal creates confusion because it only changes some of the terms from "grounding" to "bonding" and no explanation why only some of the terms were changed.
2. The proposal contained no substantiation regarding the proposal on Article 250.
3.See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

COSTELLO: See my Explanation of Negative Vote on Proposal 18-1.
OWENS: See my Explanation of Negative Vote on Proposal 18-1.
WALL: See my Explanation of Negative Vote on Proposal 18-1.

Comment on Affirmative:

FETZER: UL recognizes that this proposal extends beyond the scope of this panel, and therefore understands that the ultimate resolution will reside with the TCC and Panels 5 and/or 1, which have jurisdiction over the basic requirements for grounding and the definition of terms involving such.

18-76 Log #2223 NEC-P18 (410-23) **Final Action: Reject**

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
410.23 Polarization of Luminaires (Fixtures). Luminaires (fixtures) shall be wired so that the screw shells of lampholders are connected to the same luminaire (fixture) or circuit conductor or terminal. The ~~grounded~~ earth conductor, where connected to a screw-shell lampholder, shall be connected to the screw shell.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided any definitive technical substantiation that the present term "grounded" has caused any technical problems, confusion, or misunderstanding. The substantiation reference to "many countries currently refer to the grounded conductor or neutral as the "earth" conductor is unsubstantiated as to what context or other use "earth" can signify. The grounded conductor is a ground-fault return path conductor and its only connection to earth is through the grounding electrode conductor. A change in terminology from "grounded" to "earth" would best be submitted to CMP 5 for disposition and CMP 1 for definition.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-77 Log #1933 NEC-P18 (410-29(A)) **Final Action: Reject**

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(A) Cord Requirements. Flexible cord shall be of the hard-service type, having conductors not smaller than the branch-circuit conductors, having ampacity at least equal to the branch-circuit overcurrent device, and having an equipment ~~grounding~~ bonding conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects this proposal for the following reasons:
1. The proposal contained no substantiation regarding the proposal on Article 250.
2.See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

COSTELLO: See my Explanation of Negative Vote on Proposal 18-1.
OWENS: See my Explanation of Negative Vote on Proposal 18-1.
WALL: See my Explanation of Negative Vote on Proposal 18-1.

Comment on Affirmative:

FETZER: UL recognizes that this proposal extends beyond the scope of this panel, and therefore understands that the ultimate resolution will reside with the TCC and Panels 5 and/or 1, which have jurisdiction over the basic requirements for grounding and the definition of terms involving such.

18-78 Log #756 NEC-P18 **Final Action: Reject**
(410-30(C))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text as follows:
(1) "~~A~~ An individual listed luminaire (fixture) or ~~a~~ an individual listed assembly shall be permitted to be cord connected if..."(remainder unchanged). Or alternatively add: For the purpose of this section fixtures covered in 410.31 and 410.32 are not considered as a listed assembly.

Substantiation:

I have observed installations of end-to-end installed suspended fluorescent fixtures of various total lengths and configurations in supermarkets and the like supplied by a single cord. If the intent is not to consider end-to-end fixtures as covered in 410.31 and 410.32 as a suitable assembly for cord connection, the proposal would provide clarification.

Panel Meeting Action: Reject

Panel Statement:

The submitter has seen non-compliant installations. The fact that there are non-compliant installations is not sufficient justification for a revision to the Code.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-79 Log #2332 NEC-P18 **Final Action: Accept**
(410-30(C)(1))

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 19 for information.

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

Recommendation:

Revise text as follows:
410.30 Cord-Connected Lampholders and Luminaries (Fixtures).
(C) Electric-Discharge Luminaires (Fixtures).
(1) A listed luminaire (fixture) or a listed assembly shall be permitted to be cord connected if the following conditions apply:
(1) The luminaire (fixture) is located directly below the outlet ~~box~~ or busway.
(2) The flexible cord meets all the following:
(a) Is visible for its entire length outside the luminaire (fixture).
(b) Is not subject to strain or physical damage.
(c) Is terminated in a grounding-type attachment plug cap, ~~or~~ busway plug or is part of a listed assembly incorporating a manufactured wiring system connector in accordance with 604.6(C), or has a luminaire (fixture) assembly with a strain relief and canopy.

Substantiation:

This proposal is a companion proposal to that submitted for 604.6(F) [New].
These proposals are intended to clarify the confusion and perceived inconsistencies in the application of 604.6(A)(3) and 410.30(C) to manufactured wiring system connectors involving electric-discharge luminaires. Since the addition of the content of 604.6(A)(3) to the Code in 1999, local authorities having jurisdiction have questioned the applicability of these products in three different known cases and have received differing opinions.
Prior to 1999, the use of flexible cords with conductors smaller than 12 AWG with manufactured wiring system connectors was allowed for installation of electric-discharge luminaires, and these products were listed in accordance with 410.30(C). The intent of 604.6(A)(3) as originally submitted was to allow the use of flexible cord in the transition between manufactured wiring systems and non-lighting utilization equipment. In these applications, unlike electric discharge luminaires, the load is unknown, so the conductors must be sized to carry the full capacity of the circuit. The addition of 604.6(A)(3) in 1999 disallowed the use of any conductors smaller than 12 AWG in flexible cord making a transition between the components of a manufactured wiring system and utilization equipment. The unintended effect was to create confusion and, on the part of some local authorities having jurisdiction, to question the acceptability of conductors smaller than 12 AWG in wiring electric-discharge luminaires.
As part of the listing process, manufactured wiring system connectors have been evaluated to UL 183 that has been derived from UL 498. Thus, they are evaluated to the same requirements as grounding-type attachment plugs referred to in 410.30 and should be considered equivalent.
Finally, there have been no reported safety issues involving electric-discharge luminaires connected using flexible cord and manufactured wiring connectors since their introduction in 1984. Since their introduction, over 6 million electric-discharge luminaires have been installed using flexible cord with 16 AWG conductors and manufactured wiring system connectors.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-80 Log #724 NEC-P18 (410-33) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
~~Branch~~ Circuit Conductors and Ballasts. ~~Branch circuit~~ Circuit conductors within 75 mm (3 in.) of a ballast shall have an insulation temperature rating not less than 90 degrees C. (194) unless ~~supplying a~~ the luminaire (fixture) is listed and marked ~~identified~~ as suitable for a different insulation temperature.

Substantiation:

This requirement should also apply to fixture wires, some of which have a temperature rating less than 90 degrees C and which can be used to connect a fixture to the branch circuit outlet or connect end-to-end fixtures. Fixtures listed for use as a raceway may also contain feeder conductors or branch circuit conductors which do not supply the fixtures; these are not presently included. While "identified" may be accomplished by marking, by definition it does not require it. The proposal correlates with the normal standard method (marking) for identifying temperature ratings.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided documentation that the current requirement has been problematic in the field. The product standards address other wiring within the ballast compartment and the product markings instruct the installer on the proper temperature conductor that can be installed in that luminaire.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-81 Log #726 NEC-P18 (410-33) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete: "~~Branch~~" in heading and text.

Substantiation:

The requirement should apply to fixture wire and feeder conductors where these are permitted to be installed.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided documentation that the current requirement has been problematic in the field. The product standards address other wiring within the ballast compartment and the product markings instruct the installer on the proper temperature conductor that can be installed in that luminaire.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-81a Log #CP1800 NEC-P18 (410.36) **Final Action: Accept**

Submitter: Code-Making Panel 18

Recommendation:

Revise the second sentence of 410.36 to read:
"Wiring compartments, including their entrances shall be designed and constructed to permit conductors to be drawn in and withdrawn without physical damage."

Substantiation:

The panel has acted to remove the words "such that" and "may" that are designated in the NEC Style Manual as being possibly vague and problematic. The additional words "designed and constructed" are already in use in the Code, for example in 110.31, and match the heading of 410.36 which is "Design and Material".

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-82 Log #2224 NEC-P18 **Final Action: Reject**
(410-42)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
410.42 Portable Lamps.
(A) General. Portable lamps shall be wired with flexible cord recognized by 400.4 and an attachment plug of the polarized or grounding type. Where used with Edison-base lampholders, the ~~grounded~~ earth conductor shall be identified and attached to the screw shell and the identified blade of the attachment plug.
(B) Portable Handlamps. In addition to the provisions of 410.42(A), portable handlamps shall comply with the following.
(1) Metal shell, paper-lined lampholders shall not be used.
(2) Handlamps shall be equipped with a handle of molded composition or other insulating material.
(3) Handlamps shall be equipped with a substantial guard attached to the lampholder or handle.
(4) Metallic guards shall be grounded by means of an equipment grounding conductor run with circuit conductors within the power-supply cord.
(5) Portable handlamps shall not be required to be grounded where supplied through an isolating transformer with an ungrounded secondary of not over 50 volts.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided any definitive technical substantiation that the present term "grounded" has caused any technical problems, confusion, or misunderstanding. The substantiation reference to "many countries currently refer to the grounded conductor or neutral as the "earth" conductor is unsubstantiated as to what context or other use "earth" can signify. The grounded conductor is a ground-fault return path conductor and its only connection to earth is through the grounding electrode conductor. A change in terminology from "grounded" to "earth" would best be submitted to CMP 5 for disposition and CMP 1 for definition.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-83 Log #1934 NEC-P18 **Final Action: Reject**
(410-42(B)(4))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(4) Metallic guards shall be grounded by means of an equipment ~~grounding~~ bonding conductor run with circuit conductors within the power-supply cord.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects this proposal for the following reasons:
1. The proposal creates confusion because it only changes some of the terms from "grounding" to "bonding" and no explanation why only some of the terms were changed.
2. The proposal contained no substantiation regarding the proposal on Article 250.
3.See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

COSTELLO: See my Explanation of Negative Vote on Proposal 18-1.
OWENS: See my Explanation of Negative Vote on Proposal 18-1.
WALL: See my Explanation of Negative Vote on Proposal 18-1.

Comment on Affirmative:

FETZER: UL recognizes that this proposal extends beyond the scope of this panel, and therefore understands that the ultimate resolution will reside with the TCC and Panels 5 and/or 1, which have jurisdiction over the basic requirements for grounding and the definition of terms involving such.

18-84 Log #710 NEC-P18 **Final Action: Reject**
(410-46)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
Live Parts. Exposed live parts within porcelain or plastic ~~luminaires (fixtures)~~ lampholders shall be suitable recessed... (remainder unchanged)

Substantiation:

This rule appears primarily to address lampholders, which are a different category from fixtures (see article title). Plastic lampholders are also available.

Panel Meeting Action: Reject

Panel Statement:

This section applies to porcelain luminaires and does not apply to lampholders. The substantiation offers no rationale to change the existing requirement.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-85 Log #2225 NEC-P18 **Final Action: Reject**
(410-47)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
410.47 Screw-Shell Type. Lampholders of the screw-shell type shall be installed for use as lampholders only. Where supplied by a circuit having a ~~grounded~~ earth conductor shall be connected to the screw shell.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided any definitive technical substantiation that the present term "grounded" has caused any technical problems, confusion, or misunderstanding. The substantiation reference to "many countries currently refer to the grounded conductor or neutral as the "earth" conductor is unsubstantiated as to what context or other use "earth" can signify. The grounded conductor is a ground-fault return path conductor and its only connection to earth is through the grounding electrode conductor. A change in terminology from "grounded" to "earth" would best be submitted to CMP 5 for disposition and CMP 1 for definition.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-86 Log #2511 NEC-P18 **Final Action: Reject**
(410-50 (New))

Submitter: Russell LeBlanc, Peterson School of Engineering

Recommendation:

Renumber existing 410.50 to 410.51.
Add new 410.50:
Grounding. Lampholders directly wired or attached to outlets shall be grounded in accordance with 410.18.

Substantiation:

I can find no requirements in 410 for the grounding of metal lampholders. Metal lampholders should be grounded the same as metal luminaires. Presently, 410.18 does not apply to lampholders, because a lampholder by definition is not a luminaire.
Note: Supporting Material available for review at NFPA headquarters.

Panel Meeting Action: Reject

Panel Statement:

The equipment shown in the photo provided in the substantiation is mislabeled as a lampholder. This type of equipment is listed as a luminaire and is required to be grounded.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

WELLS: The panel statement that the product shown in the photo accompanying the proposal is correct. The luminaire shown is incorrectly labeled a "lampholder" on the label shown.

18-87 Log #134 NEC-P18 **Final Action: Reject**
(410-65(C))

Submitter: Richard I. Underwood, Applied Technical Services

Recommendation:

Add new text to read as follows:
(C) Recessed Incandescent Luminaires (Fixtures). Incandescent luminaires (fixtures) shall have thermal protection, designed to directly detect lamp heat, and shall so be identified as thermally protected.

Substantiation:

There exist allegedly "thermally protected" fixtures that technically meet the requirement of the current code, but cause fires nonetheless, due to the foreseeable misapplication of thermal insulation. Such fixtures are potentially more dangerous than fixtures with no thermal protection, as they can provide the installer of either the fixture or the insulation with a false sense of security.

Panel Meeting Action: Reject

Panel Statement:

The test protocol in UL 1598 requires testing of recessed incandescent luminaires for heat rise and verifies that the thermal protector will trip if the luminaire is improperly installed. The test takes into account the anticipated abnormal conditions found in typical installations. The submitter did not provide sufficient technical data to indicate that the current requirement is inadequate.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Abstain: 1

Explanation of Abstention:

O'BOYLE: The submitter is a contracted witness in active litigation involving my employer.

18-88 Log #459 NEC-P18 **Final Action: Reject**
(410-66(A)(2), 410.66 (B))

Submitter: Xen George Anchales, San Bernardino County, CA

Recommendation:

Where type IC luminaires are mentioned in these two sections, also include inherently protected luminaires.

Substantiation:

Type IC fixtures are not the only type of luminaires that can have insulation placed over them, inherently protected luminaires are also listed for direct contact with insulation. See UL luminaire marking guide and report on discussion during UL's meeting with inspectors at the 2001 IAEI Section Meetings.
NOTE: Supporting Material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement:

Inherently protected Type IC luminaires are a subset of Type IC. Therefore, Type IC luminaires are the only recessed luminaires that can have the insulation placed over them. These luminaires are marked "Type IC" as well as "Inherently Protected". No revision is needed.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-89 Log #135 NEC-P18 **Final Action: Accept in Principle**
(410-66(B))

Submitter: Richard I. Underwood, Applied Technical Services

Recommendation:

Replace the current paragraph with the following:
(B) Installation: Recessed fixtures shall not be installed in spaces that may be insulated.
Exception: Recessed fixtures identified as suitable for insulation to be in direct contact with the fixture (Type IC).

Substantiation:

The code's current focus is on the installation of thermal insulation, rather than on the installation of the fixture. Unfortunately, insulation installers may not be familiar with the code. Additionally, some types of insulation can change position after installation.
Significant fires and property damage have resulted from allegedly "thermally protected" fixtures that have come into contact with insulation. These fixtures contain thermal switches that do not sense enclosure temperature. Such fixtures are only suitable for locations where there is no possibility that they will be insulated, such as between floors.

Panel Meeting Action: Accept in Principle

Revise 410.66(B) to read:
(B) Installation. Where the installation of insulation is required or planned, recessed luminaries not identified for contact with insulation shall be provided with a field installed means to prevent insulation from being installed above or within 75 mm (3 in.) of the recessed luminaire's (fixture's) enclosure, wiring compartment, or ballast.

Panel Statement:

The panel recognizes that the potential for field installation of insulation can present a problem with non-IC luminaires. The panel has removed the word "thermal" as there are other uses of insulation, such as sound attenuation. The revised recommendation addresses this problem. The panel points out that the incidents cited in the fire investigation reports referred to in the substantiation, were installations not in compliance with the current requirements of this Code. On their own merit, these reports did not warrant the proposed revision. See the panel action and statement on Proposal 18-87.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Abstain: 1

Explanation of Abstention:

O'BOYLE: The submitter is a contracted witness in active litigation involving my employer.

18-90 Log #737 NEC-P18 **Final Action: Accept in Principle**
(410-73(E)(4))

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 13 for information.

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
A ballast in a fluorescent luminare (fixture) that is used for egress lighting and energized only ~~during~~ from an emergency or legally required standby system shall not have thermal protection.

Substantiation:

Edit. "Emergency" is not defined. Literal wording would permit thermal protection if the fixture is energized during testing of the emergency system (no emergency). Safety should warrant the rule to apply to legally required standby systems.

Panel Meeting Action: Accept in Principle

Revise 410-73(E)(4) to read:
(4) Egress Luminaires (Fixtures). A ballast in a fluorescent luminaire (fixture) that is used for egress lighting and energized only during a failure of the normal supply shall not have thermal protection.

Panel Statement:

The panel agrees that emergency is not defined within the Code and has used terminology from Article 700 in the revision of the requirement.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-91 Log #3006 NEC-P18 **Final Action: Accept in Principle**
(410-73(F)(5) (New))

TCC Action:

It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting with respect to the substantiation of the listing requirement. This action will be considered by the panel as a public comment.

Submitter: Fred Carpenter, Lithonia Lighting

Recommendation:

Add new 410.73(F)(5) to read as follows:
(5) Metal Halide Lamp Containment. Luminaires (fixtures) that use a metal halide lamp other than a PAR lamp shall be of the type that encloses the lamp, or shall be provided with a lampholder that only allows the insertion of a lamp that is rated for use in an open luminaire.

Substantiation:

Metal halide lamps have been identified as presenting a risk of a hazardous end-of-life failure. This risk is described in papers published by the NFPA, OSHA, FM Global, Industrial Risk Insurers (GE Global Asset Protection Services), and NEMA. An article written by Ronald Stein entitled, "HID Lighting Advisory", was published in the Section News insert of the April/May 2001 NFPA Update. In this article, Mr. Stein states, "A persistent loss history involving High Intensity Discharge (HID) lighting, particularly for indoor industrial and warehousing applications, has led to increased scrutiny from property underwriters and an escalated assessment by industry of HID lamps as potential ignition sources." He also states, "Of the three types of HID lighting, metal halide lamps evidently display the highest potential for violent arc tube failure". In their March 2, 1998, IRI information bulletin number IM.5.11.2, Industrial Risk Insurers states, "... metal halide HID lamps have been identified as the likely cause of ignition in recent major fires. The number of losses attributed to metal halide HID lighting fixtures continues to grow". FM Global's Property Loss Prevention Data Sheets #5-21, revised May, 2001 states, "High Intensity Discharge (HID) lights can create an ignition source if they shatter. Over the last decade, FM Global customers are reporting about 3 such incidents a year, with the loss experience largely involving only metal halide lights".

Metal halide luminaires that utilize lamp enclosures (lenses) can be evaluated and Listed for their ability to contain a lamp rupture regardless of the lamp type used; however, metal halide luminaires that do not have lenses can also be Listed if the luminaire is labeled as not being suitable for use with certain lamp types. The lamp types that are acceptable for use in open luminaires (i.e., those that do not require lamp enclosures) are classified by the lamp manufacturers as being either "O-type" or "S-type". O-type lamps are provided with a shroud around the arc tube and are containment tested in accordance with ANSI standard C78.387 so they are rated for use in open luminaires. These lamps are frequently designed so that they fit into medium or mogul base lampholders that have specifically been designed for O-type lamps. S-type lamps have not been containment tested but are allowed in open luminaires provided they are oriented within 15 degrees of vertical and all of the lamp manufacturers' cautions, warnings, and instructions are followed. Depending on the specific lamp and manufacturer, this includes:

1. turning the lamp off for at least 15 minutes per week.
2. group relamping at specified intervals
3. not installing the lamp over combustible material, and
4. not using the lamp in an area that is not occupied for extended periods of time.

S-type lamps do not fit into the lampholders that are designed for O-type lamps.

Adhering to the lamp manufacturers' recommendations and the guidelines published in the NEMA Lighting Systems Division document #LSD 25-2002, "Best Practices for Metal Halide Lighting Systems, Plus Questions and Answers about Lamp Ruptures in Metal Halide Lighting Systems" will minimize the risks associated with these S-type lamps. However, there is no assurance that the end user will adhere to these recommendations and guidelines. The potential for the end user to ignore the guidelines is a risk that can be avoided by requiring the application of the latest technology. By requiring the use of containment tested O-type lamps and lampholders that will only accept O-type lamps, the need to rely on the maintenance practices of the end user to assure safety can be minimized.

Metal Halide PAR lamps have not demonstrated a rupture risk because they have thick glass envelopes that contain arc tube particles; therefore, they should be exempt from this requirement.

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

Panel Meeting Action: Accept in Principle

Add a new 410.73(F)(5) to read:
(5) Metal Halide Lamp Containment. Luminaires (fixtures) that use a metal halide lamp, other than a thick-glass parabolic reflector lamp (PAR), shall be provided with a containment barrier that encloses the lamp, or shall be provided with a means that only allows the use of a lamp that is listed for operation in an open luminaire fixture.

Panel Statement:

The panel has revised the recommendation to require that the lamps be listed where they are not contained by the luminaire construction. In accordance with the definition of listed, listed products are subject to independent third-party evaluation in accordance with recognized product standards and subject to periodic inspection of the manufacturing process. Self-certification does not meet the defintion of listed. The panel has provided more specific direction on the type of containment that is necessary.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

ROSENBAUM: The requirement for "listing" of the lamps is not justified. NEMA is unaware of any lamp rupture incidents in open luminaires attributed to metal halide lamps that are containment rated for this application. Such lamps meet ANSI containment test requirements developed specifically for this metal halide type and are marked with the ANSI luminaire code, "O". Lamp manufacturers are already equipped and currently perform the necessary forced lamp rupture tests. Self-certification should be maintained since the proposed requirement for third party certification has not been justified.

The proposal should state specifically that the only lamp allowed in an open luminaire will be one that is containment rated by the lamp manufacturer for use in an open luminaire (fixture) and that such lamps are marked with the ANSI luminaire code, "O".

The following wording is recommended:

"Metal Halide Lamp Containment. Luminaires (fixtures) that use a metal halide lamp, other than a thick-glass parabolic reflector lamp (PAR), shall be provided with a containment barrier that encloses the lamp, or shall be provided with a physical means that only allows the use of a lamp that is containment rated by the lamp manufacturer for operation in an open luminaire (fixture). Lamps that are containment rated for use in an open luminaire shall be marked with the ANSI luminaire code, "O".

WALL: This proposal addresses a product standards/product safety issue and should not be addressed by the Code. This requirement is not enforceable by the Authority Having Jurisdiction. The lamp that presents a hazard of ejecting hot parts should be removed from the market.

WELLS: The requirement for "listing" of the lamps was not proposed and is not justified. These lamps meet ANSI containment test requirements developed specifically for this metal halide type and are marked with the ANSI luminaire code, "O". Lamp manufacturers are already equipped and currently perform the necessary forced lamp rupture tests.

Comment on Affirmative:

BER: Although this proposal did not originally contain a requirement for the listing of lamps, it has been included by the panel. This necessity for listing has some long range and long term results that need to be fully explored during the comment stage.

O'BOYLE: The submitter provided compelling technical substantiation to support the need to require O-Type lamps in open metal halide luminaires. Such lamps are presently available and are tested to ANSI standards. Presently, the O-Type lamps are not listed; the lamp manufacturer performs the tests and designs the lamp base in a way to not allow interchangeability with non O-Type lamps. The panel statement does not provide technical substantiation to indicate that non-listed O-Type lamps are not safe. Accordingly, I recommend replacing the word "listed" with "identified".

18-92 Log #1780 NEC-P18Meeting Action: Accept in Principle in Part (410-79) **Final Action: Reject**

TCC Action: Reject

It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" to correlate with the action of the Technical Correlating Committee on Proposal 18-93.

Submitter: Craig M. Wellman , Newark, DE

Recommendation:

Revise Section 410.79 as marked:
410.79 Switches.
(A) Snap switches. Snap switches shall comply with 404.14.
(B) Maintenance disconnect switches. In unclassified, indoor locations in other than dwelling and related outbuilding occupancies, luminaires containing ballasts that are not an integral part of a lamp shall be supplied with integral disconnect switches capable of opening all ungrounded conductors supplying the ballasts. The disconnect switch shall be accessible from the space whether maintenance is performed and the switch's line side terminals shall be guarded. Where the ballasts are mounted separately from the luminaires, a local disconnect switch shall be installed.

Substantiation:

In commercial, industrial, institutional and governmental facilities, it is often unsafe or impractical to turn off power to luminaires at the panelboard. Turning off the power may leave a room in the dark or may reduce illumination, which in some cases can/could create work related hazards for facility occupants. Trying circuits to find the correct one may entail a trial and error process that can be very disruptive for occupants, so workers frequently don't try.

When an energized ballast must be replaced the worker is exposed to the line voltage and shocks are common. The shock may be fatal or it may knock the worker off a ladder leading to injuries.

Here is a recognized problem with an easily implemented solution that will improve safety. The purpose of the code is the practical safeguarding of persons and property from hazards arising from the use of electricity, so the code is the right place for the solution.

Integral luminaire disconnect switches are common in Europe and are offered by some manufacturers in North America.

The identification on circuits in the panelboard is often inadequate to allow identifying specific luminaires in a large facility and improving this identification is impractical. Therefore, it is not realistic to depend on identification of circuits as a solution.

Panel Meeting Action: Accept in Principle in Part

Panel Statement:

The action taken by the panel on Proposal 18-93 has addressed the concerns expressed in the recommendation regarding the installation of a maintenance disconnecting means. Based on that action, it is not necessary to revise 410.79, therefore; that part of the recommendation is rejected.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

LARSON: The practical effect of this proposal would be to force a costly revision to luminaire product standards, and possibly expensive upgrades of existing facilities if the requirement is interpreted by code users as retroactive. These changes would be based primarily on anecdotal and sketchy information. The substantiation does not provide evidence that ballasted luminaires installed in accordance with existing Code provisions are unsafe, and does not include documented evidence of death or injury or fire damage. The substantiation seems to be based primarily on the fact that electricians and customers are sometimes inconvenienced by maintenance activities. In my opinion, the NEC should not be revised simply because electricians or users are inconvenienced by safe maintenance activity (Ref. NEC 90.1(B)). A local disconnect mounted within or near each individual luminaire would add a layer of complexity to lighting system hardware that could introduce unknown safety and fire hazards. A properly designed lighting system that is installed in accordance with existing Code requirements, and having branch circuit disconnect devices that are accurately identified can be safely maintained through application of appropriate work practices. The panel action does not indicate whether this new requirement would be retroactive. If not made retroactive, this change in code language would have no effect on the maintenance safety of existing commercial and industrial installations. A better solution, for new or retrofitted facilities, would be for designers and installers to do a proper job of planning in advance for their customer's needs, by providing multiple lighting branch circuits for individual rooms or areas, so that luminaires can then be isolated at the branch circuit breaker without having to darken an entire work area.

O'BOYLE: The addition of a disconnect switch on every electric discharge luminaire is a far too extreme way of addressing unsafe work practice. There are no clear classifications that distinguish commercial from noncommercial luminaires. Accordingly, there is no way to predetermine if a luminaire will be used in a dwelling or in a commercial space. This proposal will, therefore, require disconnects on a large number of luminaires that will be installed in locations where turning off power before service is not an issue. If commercial site conditions require replacing ballasts without first de-energizing the branch circuit, appropriate protective equipment is available to reduce the risks involved. Alternatively, disconnect means could be considered in the design of the installation to preclude dark rooms. Disconnects are typically separate from the equipment they control.

ROSENBAUM: Requiring the addition of a disconnect means to the vast majority of electric discharge luminaires to accommodate unsafe working practices is not justified. The proposal does not address the unsafe working practice of opening the grounded conductor while the circuit is energized. Qualified persons should turn off power at the panelboard or wear the appropriate personal equipment when servicing ballasts.

Comment on Affirmative:

COSTELLO: See my Comment on Affirmative on Proposal 18-93.

18-93 Log #3421 NEC-P18Meeting Action: Accept in Principle (410-79) **Final Action: Reject**

TCC Action: Reject

It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

Submitter: Danny Liggett Newark, DE

Recommendation:

Add the following to 410.79:
"In other than dwellings and associated outbuildings, luminaires containing ballasts shall have a disconnect switch to open all ungrounded ballast supply conductors.

Substantiation:

Changing the ballast out in a luminaire while the circuit feeding the luminaire is energized has become a regular practice. There are several reasons for this. The circuit may not be identified correctly or at all. When the circuit is de-energized the room becomes dark. The circuit may feed a large area and would create interruptions of the work in the area. In a case brought before a labor board of a terminated electrician, the labor board reversed the termination based upon changing a ballast out on a luminaire while energized as being a standard industry practice. This brings this issue to a new level. As long as this is perceived as an acceptable practice, then progress in electrical safety will be slowed. Work practices alone will not change the electrical safety culture. Standards Making Organizations such as the NEC must provide equipment requirements that safeguard individuals who are exposed to the hazards of electricity while maintaining that equipment.

Panel Meeting Action: Accept in Principle

Add a new 410.73(G) to read:

410.73 (G) Disconnecting Means. In other than dwellings and associated accessory structures, luminaires containing ballast(s) shall have a disconnecting means that will open all ungrounded ballast(s) supply conductors. The line side terminals of the disconnecting means shall be guarded. The disconnecting means shall be located so as to be accessible to qualified persons before servicing or maintaining the ballast. This requirement shall become effective January 1, 2008

Exception No. 1: A disconnecting means shall not be required for luminaries fixtures installed in hazardous (classified) location(s) as defined in Article 500.

Exception No. 2: A disconnecting means shall not be required for fluorescent exit luminaires (fixtures).

Exception No. 3: For cord-and-plug connected luminaires, an accessible separable connector or an accessible plug and receptacle shall be permitted to serve as the disconnecting means.

Panel Statement:

The panel agrees with the concept presented by the submitter for a local disconnecting means at the luminaire for maintenance and servicing of the ballast. The panel has made several revisions to the proposal as follows:

1. The panel has revised the first sentence of the proposal that made the requirement applicable to " unclassified. indoor locations in other than dwelling and related outbuilding occupancies." The revised wording removes the reference to "unclassified locations" and replaces the reference with a new Exception No. 1. The panel understands that there may be hazardous classified location in which the operation of a disconnecting means could create a greater hazard and the use of the exception adds clarity to the requirement.
2. The panel has also removed the reference to "indoor locations" because the location of the luminaire should not impact the application of the provision.
3. The panel replaced the term "disconnect switch" with "disconnecting means" because "disconnecting means" is a defined term in Article 100 and will not limit the device to a switch only. The required disconnecting means can be a device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply. This will permit the utilization of many different types of components to accomplish the requirement.
4. The last sentence was revised to clarify that the location of the disconnecting means must be so located so that it is accessible to qualified persons before examination, adjustment, servicing, or maintenance of the luminaire. This should permit a wide range of locations based on the specific design of the luminaire.
5. The panel has added a new exception No. 2 to clarify that a disconnecting means is not required for fluorescent exit luminaire (fixture).
6. The panel has added a new exception No. 3 to clarify that a disconnecting means is not required where the luminaire is cord and plug connected as permitted in 410.30(C).
7. The panel has relocated the provision to a new Section 410.73(G) because the proposed section (410.79) is limited to switches and was not in Part I, General.
8. An effective date was added that allows for adequate time for manufacturers and users to prepare for implementation of this requirement.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 6 Negative: 5

Explanation of Negative:

BER: Although this proposal could provide some desirable results from the standpoint of maintenance convenience, the extensive ramifications from an installation and manufactured concern require additional investigation. Can manufacturers provide a disconnect feature that would be effective and yet not escalate the cost of these luminaries to the point where every job would feel a dramatic impact? Can this disconnect be accomplished with a simple plug type arrangement?

LARSON: See my Explanation of Negative on Proposal 18-92 (Log #1780).

O'BOYLE: The addition of a disconnect switch on every electric discharge luminaire is a far too extreme way of addressing unsafe work practice. There are no clear classifications that distinguish commercial from noncommercial luminaires. Accordingly, there is no way to predetermine if a luminaire will be used in a dwelling or in a commercial space. This proposal will, therefore, require disconnects on a

large number of luminaires that will be installed in locations were turning off power before service is not an issue. If commercial site conditions require replacing ballasts without first de-energizing the branch circuit, appropriate protective equipment is available to reduce the risks involved. Alternatively, disconnect means could be considered in the design of the installation to preclude dark rooms. Disconnects are typically separate from the equipment they control.

ROSENBAUM: Requiring the addition of a disconnect means to the vast majority of electric discharge luminaires to accommodate unsafe working practices is not justified. The proposal does not address the unsafe working practice of opening the grounded conductor while the circuit is energized. Qualified persons should turn off power at the panelboard or wear the appropriate personal protective equipment when servicing ballasts.

WALL: Wearing PPE prevents most of these accidents and injuries. It is obvious that the electricians are not wearing their PPE as required by OSHA and NFPA 70E in the situation as described by the submitter.

Comment on Affirmative:

COSTELLO: I am in support of Proposal 18-93. This change in the code will add a level of safety to a situation that is costing the safety and lives of electrical workers. Each day electrical workers are placed in a work environment were it has become "common practice" to service a ballast in a luminarie while it is energized. Reasons vary from improperly or unmarked disconnecting devices, having to work in an area that is poorly or not illuminated at all, to complaints of interrupting the workers of an area. Each of these scenarios may create a different hazard to those workers.

By placing a disconnecting means that will open all ungrounded ballast(s) supply conductors of a luminarie, the potential of a hazardous situation from contact with the ungrounded conductor while servicing a luminarie will be eliminated. While this action alone will not address all of the of the hazards presented in servicing luminaries i.e., the opening of grounded conductors in a multiwire branch circuit, it will be a major accomplishment in the safeguarding of persons. Perhaps the Panel should take an even bolder step by taking action to ensure that both the ungrounded conductor and the grounded conductor are disconnected at the luminaire. This will ensure that the grounded conductor on multiwire branch circuits won't pose an additional hazard to the worker servicing the luminaire.

18-94 Log #2884 NEC-P18 (410-81(C)) **Final Action: Reject**

Submitter: Muhammad Khan, Everbrite, Inc.

Recommendation:

Add new wording:

410.81(C) Dimmers and Automatic Controls. Luminaires (fixtures) or lamp installations fitted with externally operable controls, such as dimmers and automatic control system, shall conform to the requirement of 410.83(B).

Substantiation:

The new requirements proposed in the 410.83(B) necessitates that provision is made for Cold-Cathode lighting installations to function properly with transformers and power supplies of secondary-circuit ground-fault protection type when operating with dimmers and automatic controls.

Panel Meeting Action: Reject

Panel Statement:

The submitter failed to provide any technical substantiation for this proposal. The submitter failed to provide any evidence or field reports of safety problems involving Cold-Cathode Lighting Systems, listed, as required by the 2002 National Electric Code, to support this proposal. See also the panel statement on Proposal 18-95.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-95 Log #2883 NEC-P18 (410-83) **Final Action: Reject**

Submitter: Muhammad Khan, Everbrite, Inc.

Recommendation:

Add text to read as follows:
410.81 Control.
(C) Dimmers and Automatic Controls. Luminaries (fixtures) or lamp installation fitted with externally operable controls, such as dimmers and automatic control systems, shall conform to the requirements of 410.83(B).
410.83 Transformers and Electronic Power Supplies.
(A) Type. Transformers and Electronic Power Supplies shall be enclosed, identified for the use, and listed.
(B) Secondary-Circuit Ground-Fault Protection. Transformers and Electronic Power Supplies other than the following shall have secondary-circuit ground-fault protection;
(1) with isolated ungrounded secondaries and with a maximum open-circuit voltage of 7500 volts or less
(2) with integral porcelain or glass secondary housing for the neon tubing and requiring no field wiring of the secondary circuit
(C) Voltage. The secondary-circuit voltage shall not exceed 15,000 volts, nominal, under any load condition. The voltage to ground of any output terminals of the secondary circuit shall not exceed 7500 volts, under any load conditions.
(D) Rating. Transformers and Electronic Power Supplies shall have a secondary short-circuit current rating of not more than 150 mA if the open-circuit voltage is over 7500 volts, and not more than 300 mA if the open-circuit voltage rating is 7500 volts or less.
(E) Secondary Connections. Secondary circuit outputs shall not be connected in parallel or in series.
(F) Externally Operable Controls. Transformers or Electronic Power Supplies shall be provided with necessary means to ensure conformance with 410.81(C).
(G) Marking. A Transformer or Electronic Power Supply shall be marked to indicate that it has secondary-circuit ground-fault protection.

Substantiation:

Problem:
The fire and shock hazards associating with high voltage installations have been known to the industry and the Authorities Having Jurisdiction. The most common cause of fault in these installations is the high voltage arc to ground. The fault could be caused by breakage of lamp (gas-discharge tube) or failure of secondary circuit high voltage cable, including the failure of lamp holder - not precluding the potential of poor workmanship.
Solution:
The fire and shock hazards now existing in these installations could be easily eliminated by requiring the use of transformers and electronic power supplies capable of secondary-circuit ground-fault protection. The technology exists to address this problem for both the transformers and electronic power supplies. A precedent already exists in the NEC Article 600 since 1996 and in UL standards. The proposed changes in the 410.83 easily correct the problem.
This proposal also introduces the use of Electronic Power Supplies for which the requirements already exists in UL2161 standard. The same standard is also applicable to transformers and testing requirements for secondary-circuit ground-fault protection circuitry.
For those installations that are connected to externally operable controls such as the dimmers and automatic control systems the 410.81(C) and 410.83(F) provides option of active interface. This provision will help facilitate the manufacturers of external controls, transformers and electronic power supplies to cooperatively manufacture products that will comply with the new requirements of secondary-circuit ground-fault protection.

Panel Meeting Action: Reject

Panel Statement:

The submitter failed to provide any technical substantiation for this proposal. The submitter failed to provide any evidence or field reports of safety problems involving Cold-Cathode Lighting Systems, listed, as required by the 2002 National Electric Code, to support this proposal. It was reported to the panel that a similar proposal was submitted to the binational standard committee for these products and that proposal was rejected based upon on technical considerations.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-95a Log #CP1801 NEC-P18 (410-100–Lighting Track) **Final Action: Accept**

Submitter: Code-Making Panel 18

Recommendation:

Revise 410.100 definition of lighting track to read:
Lighting Track. A manufactured assembly designed to support and energize luminaires (lighting fixtures) that are capable of being readily repositioned on the track. Its length can be altered by the addition or subtraction of sections of track.

Substantiation:

Section 410.100 was found to contain the word "may." This word is used for a specific purpose in accordance with the NEC Style Manual. The word "can" has been used and in the case of a definition is not vague and unenforceable.
Proposal 18-3 recommended replacing the "may" with "can." Both these words are contained in Table 3.2.1 of the NEC Style Manual as terms that are vague or possibly unenforceable. Section 410.100 was found to contain "may." The panel feels that the proposed wording adds the proper permissive language to this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-96 Log #734 NEC-P18 **Final Action: Accept**
(410-101(C)(9))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
(9) ~~Within the zone measured 900 mm (3 ft) horizontally and 2.5 m (8 ft) vertically from the top of the bathtub rim.~~ Where prohibited by 410.4(D).

Substantiation:

This subsection does not include areas above a shower stall, which may be confusing to Code users, and does not comply with 3.3.5 of the Style Manual.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-97 Log #38 NEC-P18 **Final Action: Reject**
(410-104)

NOTE: The following proposal consists of Comment 18-33 on Proposal 18-4 in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 18-4 was:
Revise Article 410 for receptacles, cord connectors and attachment plugs (cord caps) as proposed below:

[Text of (May 2001) Proposal 18-4 is shown on page 2674]

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Accept in Principle revise last sentence of 410-104:
Unless identified for supports at greater intervals, (1) a single section ~~4 ft (1.22 m) or shorter in length~~ shall have not less than two supports and, (2) a support shall be provided for each 1.22 m (4 ft) of length or major fraction thereof. ~~Where installed in a continuous row, each individual section of not more than 4 ft (1.22 m) in length shall have an additional support.~~

Substantiation:

Present wording is confusing. It only addresses individual sections of track 4 ft or less in length with no specifics for longer lengths. Manufacturers instructions re: mounting holes and clips indicating greater support intervals are covered by the first paragraph of the section.

Panel Meeting Action: Reject

Panel Statement:

As written the proposal would permit two supports for a 10 foot length of lighting track. The submitter's substantiation did not prove that this will provide adequate support.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-97a Log #CP1807 NEC-P18 **Final Action: Accept**
(411-3)

Submitter: Code-Making Panel 18

Recommendation:

Revise 411.3 to read:
Listing Required. Lighting systems operating at 30 volts or less shall be listed.

Substantiation:

Based on the Usability Task Group's request to review all occurences of the phrase "listed for the purpose" to ensure that it provides clear direction, the panel concludes the revised language clarifies its use in this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-98 Log #1277 NEC-P18 (411-4) **Final Action: Accept in Principle**

Submitter: David H. Kendall, Carlon, Lamson & Sessions

Recommendation:

Add new text to read as follows:
411.4 Locations Not Permitted. Lighting systems operating at 30 volts or less shall not be installed (1) where concealed or extended through a building wall, unless using a wiring method specified in Chapter 3, or (2) within 3.0 m (10 ft) of pools, spas, fountains, or similar locations, except as permitted by Article 680.nonmetallic conduit is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (24 in.) of the underground run to emergence or to the point of connection to the aboveground raceway and an equipment grounding conductor shall be included to provide electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.
Exception: Low voltage lighting systems, operating at 30 volts or less fed from a Class 2 power supply, shall not be required to use a wiring method specified in Chapter 3 where concealed or extended through a building wall, ceiling, or floor. The wiring method for these low voltage lighting systems shall be required to comply with Part III of Article 725.

Substantiation:

Low voltage lighting systems using a Class 2 power supply should be able to use the wiring methods provided in Part III of Article 725, similar to the wiring methods permitted for Article 640 for audio system installations, since the voltages and amperages are similar for the lighting systems. Manufacturers cannot list low voltage lighting as a system where using a Class 2 power supply since building wiring methods are too large and thus too difficult to connect to the low voltage lighting equipment.

Panel Meeting Action: Accept in Principle

Revise the wording of 411.4 to read:
411.4 Locations Not Permitted. Lighting systems operating at 30 volts or less shall not be installed in the locations described in 411.4(A) and (B).
(A) Where concealed or extended through a building wall unless permitted in (1) or (2).
(1) Installations performed with any of the wiring methods specified in Chapter 3.
(2) Installations performed with wiring supplied by a listed Class 2 power source and installed in accordance with 725.52.
(B) Where installed within 3.0 m (10 ft) of pools, spas, fountains, or similar locations, unless permitted by Article 680.

Panel Statement:

The panel agrees with the submitter's substantiation to permit the use of concealed wiring where the installation is performed in accordance with Article 725.52 and is supplied from a listed Class 2 power source. The panel has incorporated the proposed exception into the body of the requirement.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-99 Log #2397 NEC-P18 (411-4) **Final Action: Accept in Principle**

TCC Action:

Submitter: Dale Rooney, Municipality of Anchorage

Recommendation:

Add a second sentence to read:
"Wiring supplied by a listed Class 2 source and installed per Article 725 Part III shall be permitted to be concealed."

Substantiation:

Listed products using class 2 power supplies are available. Concealing Class 2 wiring to a light is no more hazardous than the same wiring supplying a doorbell or other small load and should be permitted.

Panel Meeting Action: Accept in Principle

Panel Statement:

See the panel action and statement on Proposal 18-98.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-100 Log #2870 NEC-P18 **Final Action: Reject**
(411-4)

Submitter: Wayne A. Lilly Bridgewater, VA

Recommendation:

Revise Section 411.4 so it read as follows:
411.4 Locations Not Permitted. The power supplies, luminaires (lighting fixtures) and associated equipment of ~~L~~lighting systems operating at 30 volts or less shall not be installed (1) where concealed or extended through a building wall~~, unless using a wiring method specified in Chapter 3,~~ or (2) within 3.0 m (10 ft) of pools, spas, fountains, or similar locations, except as permitted by Article 680.

Substantiation:

As stated in 411.2, the definition of lighting systems operating at 30 volts or less includes "an isolating power supply operating at 30 volts (42.4 volts peak) or less" "with one or more secondary circuits" "supplying luminaires (lighting fixtures) and associated equipment." The current language in 411.4 permits all of the items covered in the definition to be installed where concealed or extended through a wall if a wiring method specified in Chapter 3 is used. I don't believe it is the intent of this section to permit power supplies, luminaires, etc., to be concealed within or extended through walls.
Secondary circuits are covered in 411.5. The language in this section pertaining to wiring methods in Chapter 3 should be relocated to 411.5, Secondary Circuits. I have submitted a companion proposal to relocate that language.

Panel Meeting Action: Reject

Panel Statement:

The current language applies to wiring methods and precludes installation of the power supplies or luminaires in concealed spaces.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-101 Log #2801 NEC-P18 **Final Action: Accept in Principle**
(411-4 Exception (New))

Submitter: Henry A. Jenkins, Wake County

Recommendation:

Add an exception to Section 411.4 as follows:
Exception: Low voltage lighting systems, operating at 30 volts or less fed from a Class 2 power supply shall not be required to use a wiring method specified in Chapter 3 where concealed or extended through a building wall, ceiling, or floor. The wiring method for these low voltage lighting systems are required to comply with Article 725.

Substantiation:

Low voltage lighting systems using a class 2 power supply should be able to use the wiring methods provided in Part III of Article 725, similar to the wiring methods permitted for Article 640 for audio system installation, since the voltages and amperages are similar for lighting systems. Manufacturers cannot list low voltage lighting as a system where using a class 2 power supply since building wiring methods are too large and thus too difficult to connect to the low voltage lighting equipment.

Panel Meeting Action: Accept in Principle

Panel Statement:

See the panel action and statement on Proposal 18-98.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-102 Log #715 NEC-P18 **Final Action: Reject**
(411-5(C))

TCC Action:

The Technical Correlating Committee assumes that there is no change to the section since the panel action on the proposal was "Reject".

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise second sentence:
Bare conductors shall not be installed less than 2.1 m (7 ft) above the finished ~~floor~~ grade (remainder unchanged).

Substantiation:

Edit. These systems may be installed outdoors where there are no floors.

Panel Meeting Action: Reject

Revise wording of 411.5(C) to read: as follows to clarify that bare conductors may only be used indoors.
(C) Bare Conductors. Exposed bare conductors and current-carrying parts shall be permitted for indoor installations only. Bare conductors shall not be installed less than 2.1 m (7 ft) above the finished floor, unless specifically listed for a lower installation height.

Panel Statement:

The NFPA Glossary of Terms defines grade as the reference plane representing the elevation of finished ground level adjoining the building at the main entrance. Regardless of whether the system is installed indoors or outdoors this change would require the mounting height of all installations to be measured from the main entrance ground level.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-103 Log #2871 NEC-P18 **Final Action: Reject**
(411-5(C))

Submitter: Wayne A. Lilly Bridgewater, VA

Recommendation:

Revise Section 411.5(C) so it reads as follows:
(C) Wiring Methods. The secondary circuit wiring methods for lighting systems operating at 30 volts or less shall be permitted to be:
(1) Installed no closer than 3.0 m (10 ft) of pools, spas, fountains, or similar locations, except as permitted by Article 680.
(2) Exposed, concealed, or extended through building walls if any of the wiring methods in Chapter 3 is used.
(3) Exposed bare conductors and current-carrying parts where installed not less than 2.2 m (7 ft) above the finished floor, unless specifically listed for a lower installation height.

Substantiation:

By definition, the phrase "lighting systems operating at 30 volts or less" includes secondary conductors, power supplies, etc. The current language in Section 411.4 addresses wiring methods as well as other items such as power supplies. Secondary circuit conductors are presently covered in 411.5. Therefore, the provisions for secondary circuit conductors should be in 411.5 not 411.4. The provisions for pools, etc., and Chapter 3 wiring methods are being relocated from 411.4 to 411.5 and included with the bare conductor requirements.

Panel Meeting Action: Reject

Panel Statement:

The submitter did not provide technical substantiation or cite incidents where existing installations have created a hazard that supports this change.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-104 Log #3286 NEC-P18 **Final Action: Reject**
(411-5(D))

Submitter: James J. Rogers, Rogers Electric

Recommendation:

Add a new part (D) to section 411.5 to read as follows:
(D) Secondary Overcurrent Protection. All conductors connected to the secondary of a power supply for a lighting system operating at 30 volts or less shall be protected by a secondary overcurrent device rated at not more than the ampacity of the secondary circuit conductors.

Substantiation:

These lighting systems have become very common over the past few years. I have investigated multiple fires that have been caused by overload heating on the secondary conductors of the subject installations. In most instances, this type of overload protection is mandated by the requirements of Article 240 already. This proposal, if accepted would clarify the mandate for this type of protection and place it within the article that governs this type of installation.

Panel Meeting Action: Reject

Panel Statement:

The problem cited by the submitter in his substantiation is addressed by the product listing requirement contained in 411.3.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

17-5 Log #1041 NEC-P17 **Final Action: Reject**
(422)

Submitter: Michael Doyle Prairieville, LA

Recommendation:

Manufacturers of electrical equipment that contain "built-in" disconnecting means to provide physical protection from the energized cables from the line side of the built-in disconnecting means to the equipment enclosure.

Substantiation:

The line side conductors serving the equipment remain energized while the disconnecting means is open. An accidental contact to the energized line side connections remains possible. An inexpensive physical barrier should be installed by the manufacturer to prevent this from occurring.

Panel Meeting Action: Reject

Panel Statement:

No specific section or wording has been provided. See Section 422.4 for requirements relative to live parts and Section 422.34. Safe work procedures including lockout and tagout procedures need to be followed when performing maintenance on appliances.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-6 Log #2451 NEC-P17 **Final Action: Accept in Principle in Part**
(422, XX in Part IV)

Submitter: William H. King, Jr., U.S. Consumer Product Safety Commission

Recommendation:

Add new paragraph to Part IV of Article 422 as follows:
422.XX Vending Machines. Cord-and-plug connected vending machines shall be protected by one of the following:
(1) Ground-fault Circuit-interrupter protection for personnel. The ground-fault circuit interrupter shall be factory-installed on new and remanufactured machines, and be an integral part of the attachment plug or be located in the power supply cord within 300 mm (12 in.) of the attachment plug. As an alternative to factory-installed devices, cord-and-plug connected vending machines with plugs rated 125-volt, single-phase, and 20 amperes or less, manufactured prior to January 1, 2005 and not remanufactured on or after that date, shall be connected to receptacles that provide ground-fault circuit-interrupter protection for personnel.
(2) A system of double insulation, or its equivalent.

Substantiation:

The U.S. Consumer Product Safety Commission (CPSC) has investigated four electrocutions in four separate incidents (CPSC Investigation Nos. 881202CCC1072, 950823CCN2720, 970922CCC2427 & 980402CCC3732), three of which occurred since 1995. Two of the deaths were to children, ages 9 & 10, when they contacted the vending machine. CPSC also investigated three additional incidents with vending machines, cases that involved nonfatal, electric shocks (CPSC Investigation Nos. 940816CEP9009, 950907CWE7273, & 960605CEP9016). In all incidents a vending machine conductor intended to carry current apparently faulted to the exposed frame of the machine, and the ground-fault path was damaged or inadequate.

In addition to the incidents investigated by CPSC, the agency has collected additional reports. One is a death certificate for an individual electrocuted on May 18, 1999 "while working on vending machine." Eight other reports are from a sample of hospital emergency rooms where patients reportedly received an electric shock while in contact with a vending machine.

Recent publications highlight two electric shock events involving electric vending machines. One article, entitled "Case of the Legal Candy Machine", was published in the January 2002 edition of "Electrical Construction and Maintenance Magazine" ("EC&M", published by Intertec, a Primedia Company Overland Park, KS). An electro-forensic engineering consultant, who found that the candy vending machine had a broken grounding pin on the power cord, wrote this article. The other article, "Vending Machine Accident Underscores NEC Grounding Requirements", was published in the January/February 2002 edition of "IAEI News", a publication of the International Association of Electrical Inspectors, Richardson, TX. An attorney, citing evidence that the vending machine caused severe injuries to a consumer because it was not properly grounded, wrote this article.

Some of the incidents of shock and electrocution are the result of product modification that defeated the grounding feature. However, the ground-fault circuit interrupter (GFCI) does not rely on the presence of a grounding conductor to provide electrocution protection. Vending machines with GFCI protection or a system of double insulation will address the increased risk introduced by tampering with the grounding of the machines and make them safer.

Electric vending machines are often located in damp and wet locations, in public places, and used by people standing on the ground. Under these circumstances, reliance on equipment grounding conductors alone for protection against electrocution is insufficient.

An alternative to providing a machine with GFCI protection is included in the proposal. The alternative is a machine designed to be protected by a system of double insulation, such systems being defined by nationally recognized standards. This alternative can address concerns about the loss of perishable food products (milk, yogurt, ice cream, ice, etc.) in the event of a GFCI trip.

An alternative to integral GFCI protection or double insulation may be a program of improved installation guidelines and safety programs for vending machine operators. Such a program should complement, and not replace design improvements for new machines. installation guidelines could, for example, instruct installers of older machines built prior to the requirement and without GFCI protection or a system of double insulation to connect the machines to receptacle outlets protected by GFCIs.

A requirement that GFCIs shall protect receptacles for vending machines, in lieu of the proposed product construction requirement sought herein, is not a satisfactory remedy. It would take an inordinate amount of time, measured in decades, before most receptacles have the fault protection needed to solve a present-day problem, given the general application of the NEC to new installations and wiring added to existing buildings.

The material cost for implementing the proposed requirement should not be an impediment to adopting the GFCI protection. The price of a weather resistant, rugged GFCI plug or GFCI in the cord is approximately $40 (retail). This one time cost when compared with the unit cost of a vending machine and the anticipated service life of the machine (reportedly 10-20 years before obsolescence or remanufacturing) should be viewed in light of the benefit of protecting consumers from electrocution. The estimated number of electrocutions when consumers come in contact with the 3-4 million machines in use is two per year.

This proposal is submitted to the NEC Committee for adoption because the committee membership broadly represents the electrical community that can affect a solution to prevent these deaths in a timely manner on a national scale. The need for improved electrocution protection for consumers from electric vending machines is broader than only upgrading construction requirements applicable to newly manufactured machines. Given the life expectancy of the machines at 10 or more years, and the likelihood that existing machines will be reconditioned or remanufactured to extend their life, the proposal includes providing electrocution protection for machines built prior to incorporating electrocution protection as part of the machine itself. In accordance with the proposal, older machines would be connected to receptacle outlets provided with GFCI protection.

Panel Meeting Action: Accept in Principle in Part

Add new paragraph to Part II of Article 422 as follows:
422.16(B)(4) Cord and Plug Connected Vending Machines. Cord-and-plug connected vending machines shall be one of the following:
(1) For new and remanufactured machines ground-fault circuit-interrupter protection for personnel shall be factory-installed, and shall be an integral part of the attachment plug or be located in the power supply cord within 300 mm (12 in.) of the attachment plug.
(2) Listed vending machines identified as incorporating a system of double insulation.
(3) Vending machines shall be connected to a circuit protected by a ground-fault circuit-interrupter.

Panel Statement:

The second sentence of (1) in the recommendation was eliminated since it established a retroactive requirement.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

Explanation of Negative:

SARDINA: The substantiation provided does not warrant requiring the suppliers to install a GFCI plug and cord combination. This can be handled by incorporating a GFCI receptacle at the location of the vending machine (appliance). Costs incurred to the supplier far exceed the costs of incorporating the GFCI receptacle.

Comment on Affirmative:

HUTCHINGS: I agree with the panel's action to accept in principle in part but feel the wording of the proposed new text could be improved. Alternative wording and the rationale for the changes are as follows:

422.16(B)(4) ~~Cord-and-Plug-Connected~~ Vending Machines. Cord- and-plug connected bending machines shall ~~be one of the following:~~ be protected by one of the means in 422.16(B)(4)(1) through (B)(4)(3).

(1) ~~For new and remanufactured machines g~~Ground-fault circuit-interrupter protection ~~for personnel~~ shall be factory-installed~~,~~ and shall be an integral part of the attachment plug or be located in the power supply cord within 300 mm (12 in.) of the attachment plug.

(2) A Listed vending machines identified as incorporating a system of double insulation.

(3) Vending machines shall be connected to a circuit protected by a ground-fault circuit-interupter.

The redundant term "cord and plug connected" was removed from the first sentence because the heading of Article 422.16 is "Flexible Cords".

The phrase "for new and remanufactured machines" was removed because it is unnecessary. The requirements in 422.16(B)(4) are applicable to vending machines regardless of whether they are new or remanufactured.

The phrase "for personnel" was removed because it is redundant. The definition of "ground-fault circuit interrupter" in Article 100 indicates that a ground-fault circuit interrupter is a Class A device intended for the protection of personnel.

17-7 Log #2837 NEC-P17Meeting Action: Accept in Principle in Part (422-2 and 422.16(B)(4)) **Final Action: Reject**

TCC Action: Reject

It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative. It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 1 for information.

Submitter: Edward A. Schiff, Technology Research Corp.

Recommendation:

Add new text to read as follows:

422.2 Definition Leakage Current Detection and Interruption (LCDI) Protection. A device provided in a power supply cord or cord set that senses leakage current flowing between or from the cord conductors and interrupts the circuit at a predetermined level of leakage current.

422.16(B)(4) Leakage Current Detection and Interruption (LCDI) and Arc Fault Circuit Interrupter (AFCI). Single-phase cord-and-plug-connected room air heaters shall be provided with factory-installed LCDI or AFCI protection. The LCDI or AFCI protection shall be an integral part of the attachment plug or be located in the power supply cord within 300 mm (12 in.) of the attachment plug.

Substantiation:

Portable electric space heaters have accounted for the highest civilian fire death toll of all home heating devices in 10 of the latest 14 years studied (1985-1998) according to the U.S. Home Heating Fire Patterns and Trends published June, 2001 by the NFPA. The risk of fire death for these appliances relative to the number of households using the devices was much higher in 1997 than in 1987. Portable electric space heaters caused an average of 2,800 fires per year from 1994 to 1998 resulting in 95 deaths, 242 injuries and $52.1 million in property damage per year.

Short circuit or ground faults account for 20.7% of the fires and electrical failure other than short circuit account for 10.1% of the fires. Damaged power supply cords account for the majority of these fires.

The space heater's power supply cord can be damaged in a number of ways.

1. Pinched or crimped by furniture or doors
2. Overheated by covering or coiling of the cord
3. Crushed by pedestrian traffic or furniture
4. Improper handling in storage
5. Splicing of the cord
6. Pets or children chewing on the cord
7. Normal aging of the cord

The damage in many of the instances is internal and may not be detectable by inspection. Space heaters, by the nature of the product and application, present a high risk of fire. They are a high current appliance, used around elderly and children (the likely victims of fires), unattended operation, used while people are sleeping, portable, and frequently handled. All of these factors increase the risk of a serious fire. Submitted is a table that highlights approximately 100 recent heater cord fires.

There are two primary types of cord faults. Series faults (the fault is in series with the load) are partially or completely severed conductors within the cord set. A parallel fault, either line to neutral or a ground fault, is typically caused by degraded insulation. Both of these faults will lead to tracking within the cord set, leakage current, arcing and then combustion.

AFCI protected cord sets sense an arcing fault, at a predetermined level and disconnect power. This technology is being employed in circuit breakers for residential load centers.

LCDI protected cord sets sense leakage current flowing from or between conductors. Leakage current is the precursor to an arcing fault. This technology employs a ground fault sensing circuit as the disconnecting means so it also will prevent ground fault fires within the appliance (beyond the power supply cord) and provide shock protection for the appliance. There are 100,000's of LCDI protected cord sets on heaters. In addition, LCDI protected cords have been employed on extension cords, power strips, and other appliance cords for the past six years.

Adopting this proposal will have a positive economic impact on society. The LCDI cord set will add approximately $5.00 to the retail cost of the electric space heater. There are 5 million heaters manufactured each year for a total cost to the consumer of $25 million.

The 2,800 attended portable electric heater fires are responsible for $52.1 million in property damage per year. These fires resulted in 242 serious injuries. The costs associated with the medical treatments, lost work expense, quality of life and pain and suffering, and product liability from these injuries will likely exceed the property damage. The reduction in fire fighting expenses associated with the 2,800 fires per year will also be in the millions. The estimated economic impact of all electric heater fires is well over $100,000,000.00 in annual costs. The cord set is involved in as many as 30 percent of these fires. Reduction in the cord fires should be able to offset the added cost of the heater.

It is difficult to put a price tag on the loss of life. The fact that most of the victims are children, makes this cost to society even greater. Approximately 10 people each year die from heater cord fires. The ground fault protection provided for the complete appliance will prevent additional fires, electrocutions, and the related costs of property damage and injuries.

Precedent exists for the incorporation of this requirement into the NEC. Section 440.65 of the 2002 NEC requires AFCI or LCDI protection for room air conditioner power supply cords. Immersion protection for hair dryers, GFCI protection for cord sets of pools, spas and pressure washers have been Code requirements for some years.

Power supply cords for space heaters continue to cause residential fires. A proven economical solution exists and should be adopted.

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

Panel Meeting Action: Accept in Principle in Part

Editorially revise this section from 422.16(B)(4) to 422.16(B)(5) and change the title to read as follows:

~~422.16(B)(4)~~ 422.16(B)(5) ~~Leakage Current Detection and Interruption (LCDI) and Arc Fault Circuit Interrupter (AFCI)~~ Room Air Heaters.

Panel Statement:

This heading more properly follows the present format for this section. This proposal is referred to CMP 1 for inclusion of the definition in Article 100. This definition is also in Section 440.2.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 7 Negative: 4 Abstain: 1

Explanation of Negative:

CRIPPS: This negative vote on the panel action is based on a number of serious concerns:

1. The proposal is based on questionable fire incident data. Detailed statistical analysis of equivalent official data submitted during the last code cycle to support a similar proposal on room air conditioner fires demonstrated a very different picture to that presented by the proponent. It is anticipated that a similar exercise on room air heater incident data will reveal that the number of fires originating in heaters or their power supply cords is far smaller than claimed, and insignificant in terms of the number of heaters manufactured annually.

Most significantly, the vast majority of ignitions claimed to have originated in room air conditioner supply cords were demonstrated to have occurred in cords that had been spliced or otherwise modified by the user, in unsuitable or abused extension cords, in the receptacle/plug interface or even in the branch circuit. Cord mounted protective devices would have prevented none of these.

2. The claim that the devices specified in the proposals will substantially reduce ignitions due to damage to appliance cords or within the appliances themselves needs examination and study. It has been established that a high proportion of electrical ignitions are the result of resistive heating arising from loose conditions or localized compression of, or damage to, a conductor. Only a small proportion involve arcing, series or parallel. But an AFCI device will by definition react only to an arc and in practice, only a parallel arc, while an LCDI will respond only to a fault that results in a leakage current flow along the monitoring shields.

3. The proposals directly affect fundamental appliance design. The National Electrical Code is not the channel through which safety provisions affecting appliance design should be directed. In the field of electrical appliances, UL has the responsibility to set product-specific requirements on such issues, and its ANSI accredited system of Standards Technical Panels has been established to facilitate standards development through consensus-building processes.

It is these STPs which should be reviewing the evidence, gauging any weakness in existing design or testing provisions, and reaching consensus on remedies. When the NEC mandates requirements, UL is forced to adopt in the interest of harmonization of standards. This circumvents the STP process, disregards the expertise of those who volunteer to participate in it and eliminates the right of manufacturers to participate in the development of standards affecting the products in which they specialize.

In addition, because this is a product design related issue, the NEC and the authorities having jurisdiction (AHJs) would have great difficulty in creating an equal level of safety across the US by passing such a requirement. Some jurisdictions adopt the current code, some adopt parts of it, some lag way behind. The best way of handling the implementation of such requirements is in the ANSI-UL standards for the product.

4. The adoption of the LCDI/AFCI provision for room air conditioner cords has been quoted by the current proponents as establishing a precedent which justifies its unlimited extension to the full range of cord-and-plug connected devices. This does not follow.

Code-Making Panel 11 stated that they took action which should have been within the scope of UL due to lack of progress with changes to UL standards which they saw as desirable. This is not the case with room air heaters. A working group has been set up under the auspices of the UL STP and meetings are actively taking place.

Arrangements are in place to allow examination and analysis of any evidence of deficiencies in room air heater specifications and where appropriate to develop remedies which address any problems at source rather than relying on the addition of proprietary devices which may or may not be effective in practice.

This proposal should not proceed further within the National Electrical Code.

HIRSCH: The integrity of the electrical safety system is anchored in the systematic integration of the NEC, product safety standards, installation inspection and product testing. Any activity to weaken one component will weaken the entire process. If product safety issues were usurped by the Code, the product safety standard process would be weakened resulting in the entire process being weakened.

The EL&P Group's position is that the requirements for listed appliance cords, lamp cords, and extension cords that are not installed as part of the permanent premises wiring system are best covered by the appropriate product standard. It is not the Code's intent or scope to require supplemental overcurrent protection, AFCI, or LCDI, to be provided as part of a listed lamp or appliance cord or listed extension cord sets that would typically be purchased by the after market consumer. EL&P supports the entire electrical safety system that integrates product standards, installation standards, product testing and evaluation, electrical inspection, manufacturer's products, qualified electrical installation, electric supply system characteristics and owner's use and operation. Covering product standards in the installation standard such as the NEC could negate the responsibility of the appropriate product standard and adversely impact the entire process.

SARDINA: See my Explanation of Negative Vote on Proposal 17-6.

KOESSEL: I wish to change my vote from affirmative to a negative vote and the reason is: The proposed requirements for cord-mounted AFCIs or ALCIs on portable electric fans, and portable heaters. These product requirements belong in the product standards not in the installation documents such as the NEC.

Explanation of Abstention:

HUTCHINGS: Since the most recent Code Panel 17 meeting, UL staff has continued to review the field data provided as justification with Proposal 17-7. From this review, UL has determined additional scrutiny of the data is needed to validate the substantiation statements and the fire incident data provided with Proposal 17-7. Also, appropriate research and analysis might be necessary to determine how the reported fault conditions in cords can actually occur in the field, to what extent they are actually occurring and how these conditions can best be mitigated. UL believes it is of utmost importance to delineate product safety standards from code or installation requirements. As such ULs stated position is that Proposal 17-7 is a product issue that should be handled via a consensus product safety standard development process rather than as a NEC code change.

17-7a Log #CP1700 NEC-P17 **Final Action: Accept**
(422-3)

Submitter: Code-Making Panel 17

Recommendation:

Delete the first sentence in 422.3.

Substantiation:

Chapter 5 articles apply where the installation is a classified (hazardous) location.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-8 Log #1079 NEC-P17 **Final Action: Reject**
(422-5)

Submitter: Joseph A. Tedesco Boston, MA

Recommendation:

422.5 AFCI Installation.
Portable electrical appliances shall be connected to a building electrical circuit that is protected with an arc-fault circuit interrupter (AFCI).
Exception: Portable electrical appliances that are provided with thermal and electrical limit controls that will cause the appliance to fail safe if they malfunction.

Substantiation:

See NFPA 909, Code for the Protection of Cultural Resources, 2001 Edition, Section 3.8.1 Electrical Hazards.
This rule would help to coordinate important electrical fire and safety rules that are found throughout the NFC that are related to electrical systems covered by the NEC.

Panel Meeting Action: Reject

Panel Statement:

No evidence submitted to indicate that a hazard exists.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-9 Log #1324 NEC-P17 **Final Action: Accept**
(422-11(B))

Submitter: National Electrical Code Technical Correlating Committee

Recommendation:

Replace the term "computed" with the term "calculated" in the following sections:
422.11(B).

Substantiation:

This proposal is the result of an effort by the NEC Usability Task Group to standardize the language throughout the NEC relative to the use of the terms computed and calculated. After analyzing the usage, the group agreed that the term "calculated" was the best term for use throughout the NEC. This is one in a series of proposals to standardize on the term calculated.
The term "calculate" and its derivatives is presently used in the article title, section titles, and throughout portions of the existing article. Other Articles of the NEC such as for calculating conductor ampacties (under engineering supervision), calculating the size of enclosures, and in Annex D use the term calculate. Additionally, the term "calculate" is more commonly used in other NFPA codes and standards e.g. NFPA 70E, arc flash calculation. Adversely, the term "computation" has a connotation of using a computer, although "load calculations" are frequently determined using a calculator. It appears that the term "computation" was used more frequently beginning with the 1975 NEC based on an editorial revision project.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-10 Log #2833 NEC-P17 **Final Action: Accept**
(422-11(E)(2) and 422.11(E)(3))

Submitter: Steven R. Musial, II, Carl J. Long & Associates, Consulting Elec. Eng.

Recommendation:

Revise text as follows:
422.11(E)(2) "Not exceed 20 amperes if the overcurrent protection rating is not marked and the appliance is rated 13.3 amperes or less; or".
422.11(E)(3) "Not exceed 150 percent of the appliance rated current if the overcurrent protection rating is not marked and the appliance is rated over 13.3 amperes. Where 150 percent...".

Substantiation:

The proposed revised text makes the wording consistent with that of 422.11(E)(1). It is also easier to read and understand.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-11 Log #738 NEC-P17 **Final Action: Reject**
(422-11(E)(3))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise last sentence as follows:
Where 150 percent of the appliance rating does not correspond to a standard overcurrent device rating, a higher size, rating, or possible setting that does not exceed the next higher standard rating shall be permitted.

Substantiation:

Higher intermediate nonstandard ratings should be permitted. Literal wording only permits the next higher standard rating. Similar wording re: higher ratings is used in 430.52(C)(1) Example No. 1.

Panel Meeting Action: Reject

Panel Statement:

The recommendation does not add clarity.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-12 Log #1603 NEC-P17 **Final Action: Reject**
(422-12 Exception (New))

Submitter: David Shapiro, Safety First Electrical Contracting, Consulting, and Safety Education

Recommendation:

Add new text to read as follows:
Exception: One individual outlet for a nonconcurrent load may be supplied by the branch circuit.

Substantiation:

Except in some rare case, there is no harm in using the furnace circuit to supply a single receptacle for an air conditioner. In such a rare case, the AHJ would determine that the loads were not necessarily nonconcurrent. For instance, if the room with the air conditioner were not served by the house's heating system, the AHJ could decide that a portable heater might be employed and forbid the usage.

Panel Meeting Action: Reject

Panel Statement:

Enforcement of this exception (single outlet to be used only for a noncurrent (noncoincident) load) would not be practical since the cooling appliance would not normally be installed when the inspection is made. The only way for the AHJ to assure enforcement would be to require the noncurrent load to be hard wired.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-13 Log #1825 NEC-P17 **Final Action: Reject**
(422-12 Exception No. 2 (New))

Submitter: David Zinck, NewburyPort Wiring Inspector

Recommendation:

Renumber the existing Exception as No. 1 and add Exception No. 2 to read:
Exception No. 2: A receptacle outlet and a light provided for maintenance of the equipment shall be permitted to be connected to the same branch circuit provided it is on the line side of the required disconnect for the equipment.
FPN: See 210.8 for GFCI requirements.

Substantiation:

Often times when installing a new boiler in an old house or building, you would like to provide a light and an outlet for the service technician who will have to maintain the system. But the only good, reliable, properly grounded source you have is the new circuit you just ran for the equipment. Or you may have existing equipment with a decent feed but there isn't a light or an outlet in the area and the "tech" must resort to putting an outlet adapter in the light half way across the basement and running an ungrounded drop light to work with. This change would make it more convenient to provide proper lighting and power for maintenance.

Panel Meeting Action: Reject

Panel Statement:

The Code intent is an individual branch circuit to supply the central heating equipment. Connection to this circuit would violate the main rule. See the definition of Branch Circuit, Individual.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-14 Log #2513 NEC-P17 **Final Action: Reject**
(422-12 Exception No. 2 (New))

Submitter: Russell LeBlanc, Peterson School of Engineering

Recommendation:

Add another exception.
Exception No. 2: The receptacle outlet required by 210.63 shall be permitted to be connected to the same branch circuit.

Substantiation:

It is common practice to install a receptacle outlet at the heating equipment location for supplying cord and plug connected auxiliary equipment such as pumps and valves. This is permitted by code to be the same branch circuit as the heating equipment. This outlet could also meet the intent of 210.63.
However, if a receptacle outlet installed at the heating equipment location is installed, and there is no auxiliary equipment, then the receptacle outlet would not be permitted to be on the same branch circuit as the heating equipment. This does not make any sense! The receptacle outlet required for servicing the equipment should be allowed to be on the same branch circuit. This is a common practice. The outlet for supplying the auxiliary equipment can also be the receptacle outlet to meet the 210.63 requirement. I should have permission to install that receptacle outlet whether or not any auxiliary equipment is being plugged in!

Panel Meeting Action: Reject

Panel Statement:

See panel statement on Proposal 17-13.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-15 Log #709 NEC-P17 **Final Action: Accept**
(422-13)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
Storage Type Water Heaters. ~~A branch circuit supplying~~ A fixed storage-type water heater that has a capacity of 450 L (120 gal) or less shall ~~have a rating not less than 125 percent of the nameplate rating of the water heater~~ be considered a continuous load.

Substantiation:

This section infers but does not specify that such water heaters are continuous loads. If that is the intent it should be specified, for application to feeders and service conductors, where for example in multioccupancy buildings a 25 percent increase for continuous load may be substantial. A continuous load designation allows the application of 100 percent ratings of overcurrent devices and assemblies where listed for continuous load, that is not addressed one way or the other in this section.
Simply applying the 125 percent to the branch circuits may cause confusion, and doesn't comply with 3.3.5 of the Style Manual. For example, the 125 percent rule for motor branch circuit conductors is applicable to feeders and service conductors for the largest motor supplied.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-16 Log #749 NEC-P17 **Final Action: Reject**
(422-14)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text as follows:
"Infrared Lamp ~~Industrial~~ Heating Appliances. Infrared ~~industrial~~ heating appliance shall be permitted..."(remainder unchanged).

Substantiation:

The branch circuits covered in Article 210, whether individual or multiwire, do not limit infrared heating appliances to industrial occupancies. Removal of "industrial" in two places removes the occupancy limitation for the last paragraph.

Panel Meeting Action: Reject

Panel Statement:

See panel Proposal 17-16a (Log #CP1702). The voltage limitation is for industrial locations only in accordance with 210.6(D), Exception No. 1.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-16a Log #CP1702 NEC-P17 **Final Action: Accept**
(422-14)

Submitter: Code-Making Panel 17

Recommendation:

Revise Section 422.14 to read as follows:
422.14 Infrared Lamp Industrial Heating Appliances. In industrial occupancies, infrared ~~industrial~~ heating appliance lampholders ~~shall be permitted to be connected to any of the branch circuits in Article 210 and, in industrial occupancies,~~ shall be permitted to be operated in series on circuits of over 150 volts to ground, provided the voltage rating of the lampholders is not less than the circuit voltage.
Each section, panel, or strip carrying a number of infrared lampholders (including the internal wiring of such section, panel, or strip) shall be considered an appliance. The terminal connection block of each such assembly shall be considered an individual outlet.

Substantiation:

The first part of the first sentence was deleted since Article 210 applies generally.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-18 Log #1935 NEC-P17 **Final Action: Reject**
(422-15(C))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(C) An equipment ~~grounding~~ bonding conductor shall be used where the central vacuum outlet assembly has accessible non–current-carrying metal parts.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel statement on Proposal 17-1.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

CRIVELL: See my Comment on Affirmative for 17-1.

17-19 Log #3327 NEC-P17 **Final Action: Accept in Principle**
(422-16)

Submitter: Kevin Kettner, City of Appleton

Recommendation:

Add a section for hoods. Hoods may be cord and plug connected when an outlet has been installed for a future "over the range" combination microwave hood.

Substantiation:

At present, hoods must be wired direct, which means that when wired for a microwave a cable must be brought out of the receptacle box to feed this hood. When the microwave is installed it may be installed by the owner or an appliance company which may not know what to do with this wire.

Panel Meeting Action: Accept in Principle

Panel Statement:

See panel action and statement on Proposal 17-21.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-20 Log #916 NEC-P17 **Final Action: Reject**
(422-16(B)(2)(2))

Submitter: Stephen Knobel, Summit Electric

Recommendation:

Revise text to read as follows:
The length of the cord shall be 3 ft to ~~(4 ft)~~ (6 ft) measured from the face of the attachment plug to the plane of the rear of the appliance.

Substantiation:

Often times the receptacle can only be put on one side of built in cabinet holding the dishwasher and if the cord is terminated on the opposite side of the dishwasher than a 4 ft cord has a hard time reaching the receptacle.
In Article 210.50(C) you allow appliance receptacle outlets to be installed within 6 ft of the appliance location.

Panel Meeting Action: Reject

Panel Statement:

The four foot portion of the cord extending from the back (rear plane) of the dishwasher should be more than enough to reach any receptacle for the dishwasher.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-21 Log #219 NEC-P17 **Final Action: Accept in Principle in Part**
(422-16(B)(4) (New))

Submitter: Don A. Hursey, Durham County Inspections Department

Recommendation:

Add new text to read as follows:
Permanently installed range hoods shall be permitted to be permanently connected or cord and plug connected.

Substantiation:

Many times range hoods are removed and replaced with a "microwave type" range hood. Allowing cord and plug connection will make the installation much easier for the homeowner because no "electrical change" to the wiring system will be required.

Panel Meeting Action: Accept in Principle in Part

Add a new section to read as follows:
422.16(B)(6) Range Hoods. Range hoods shall be permitted to be cord-and-plug connected with a flexible cord identified as suitable for the use on range hoods in the installation instructions of the appliance manufacturer, where all of the following conditions are met.
(1) The flexible cord shall be terminated with a grounding type attachment plug.
Exception: A listed range hood distinctly marked to identify it as protected by a system of double insulation, or its equivalent, shall not be required to be terminated with a grounding-type attachment plug.
(2) The length of the cord shall not be less than 450 mm (18 in.) and not over 900 mm (36 in.).
(3) Receptacles shall be located to avoid physical damage to the flexible cord.
(4) The receptacle shall be accessible.
(5) The receptacle shall be supplied by an individual branch circuit.

Panel Statement:

The permission to use cord-and-plug connection provides the ability to upgrade to a combined microwave range hood. The panel added the additional requirements to ensure a safe installation of a combined microwave range hood.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-22 Log #3322 NEC-P17Meeting Action: Accept in Principle (422-16(B)(4)) **Final Action: Reject**

TCC Action: Reject

It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

Submitter: Aaron Chase, Leviton Mfg. Co. Inc.

Recommendation:

422.16(B)(4) Cord-and-Plug-Connected Electric Fans. All single-phase cord-and plug-connected electric fans shall be provided with factory-installed LCDI or AFCI protection. The LCDI and AFCI protection shall be an integral part of the attachment plug or be located in the power supply cord within 300 mm (12 in.) of the attachment plug.

Substantiation:

Electric fans were responsible for 2,600 fires attended by the Fire Services in 1998 according to the 1998 Residential Fire Loss Estimates published by the U.S. Consumer Product Safety Commission (CPSC) in 2002. These fires resulted in 10 deaths, 120 civilian injuries and $35.9 million in property damage. This is the highest number of electric fan fires over the past five years. The CPSC conducted 243 indepth incident investigations from 1990 to 2001. Sixty-three of these fires (26 percent) involved cord failures.

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

Panel Meeting Action: Accept in Principle

Revise to read:

422.16(B)(7) Electric Fans. All single-phase, cord-and plug-connected electric fans shall be provided with factory-installed LCDI or AFCI protection. The LCDI or AFCI protection shall be an integral part of the attachment plug or be located in the power supply cord within 300 mm (12 in.) of the attachment plug.

Panel Statement:

These changes made by the panel are editorial in nature.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 7 Negative: 4 Abstain: 1

Explanation of Negative:

CRIPPS: This proposal refers to "all single phase cord-and-plug connected electric fans." However, there are several products contained in a broad definition of "fans," under the scope of the UL standard for fans UL 507. This includes bathroom fans, commercial duty fans, range hood fans, portable evaporative coolers, portable fans, air cleaners listed to UL 507, and other air movement appliances. The place to examine this information, make decisions on specific types of appliances and the applicability of new technology is not with the NEC but in the STP.

See also my Explanation of Negative Vote on Proposal 17-7.

HIRSCH: The integrity of the electrical safety system is anchored in the systematic integration of the NEC, product safety standards, installation inspection and product testing. Any activity to weaken one component will weaken the entire process. If product safety issues were usurped by the Code, the product safety standard process would be weakened resulting in the entire process being weakened.

The EL&P Group's position is that the requirements for listed appliance cords, lamp cords, and extension cords that are not installed as part of the permanent premises wiring system are best covered by the appropriate product standard. It is not the Code's intent or scope to require supplemental overcurrent protection, AFCI, or LCDI, to be provided as part of a listed lamp or appliance cord or listed extension cord sets that would typically be purchased by the after market consumer. EL&P supports the entire electrical safety system that integrates product standards, installation standards, product testing and evaluation, electrical inspection, manufacturer's products, qualified electrical installation, electric supply system characteristics and owner's use and operation. Covering product standards in the installation standard such as the NEC could negate the responsibility of the appropriate product standard and adversely impact the entire process.

KOESSEL: I wish to change my vote from affirmative to a a negative vote and the reason is: The proposed requirements for cord-mounted AFCIs or ALCIs on portable electric fans, and portable heaters. These product requirements belong in the product standards not in the installation documents such as the NEC.

SARDINA: See my Explanation of Negative Vote on Proposal 17-6.

Explanation of Abstention:

HUTCHINGS: Since the most recent Code Panel 17 meeting, UL staff has continued to review the field data provided as justification with Proposal 17-22. From this review, UL has determined additional scrutiny of the data is needed to validate the substantiation statements and the fire incident data provided with Proposal 17-22. Also, appropriate research and analysis might be necessary to determine how the reported fault conditions in cords can actually occur in the field, to what extent they are actually occurring and how these conditions can best be mitigated. UL believes it is of utmost importance to delineate product safety standards from code or installation requirements. As such ULs stated position is that Proposal 17-22 is a product issue that should be handled via a consensus product safety standard development process rather than as a NEC code change.

17-23 Log #603 NEC-P17 **Final Action: Accept**
(422-18)

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

Recommendation:

Revise text to read as follows:
Support of Ceiling-Suspended (Paddle) Fans
Ceiling-Suspended (Paddle) Fans shall be ~~permitted to be~~ supported independently of an outlet box or by ~~an~~ listed outlet box or outlet box systems identified for the use and installed in accordance with 314~~70~~.27(~~c~~D).
~~(A) Ceiling-suspended (Paddle) fans 16 kg (35 lb) or Less. Ceiling suspended (paddle) fans that do not exceed 16 kg (35 lb) in weight, with or without accessories, shall be permitted to be supported by outlet boxes identified for such use and supported in accordance with Sections 314.23 and 314.27.~~
~~(B) Ceiling Suspended (Paddle) Fans Exceeding 16 kg (35 lb). Ceiling suspended (paddle) fans exceeding 16 kg (35 lb) in weight, with or without accessories, shall be supported independently of the outlet box. See Section 314.23.~~
~~Exception: Listed outlet boxes or outlet box systems that are identified for the purpose shall be permitted to support ceiling suspended fans, with or without accessories, that weigh 32 kg (70 lb) or less.~~

Substantiation:

This proposal has a companion proposal for Panel 9 for 314.27(D) to revise the current text to add requirements for Ceiling-Suspended (Paddle) Fans supported by an outlet box. Supporting requirements for outlet boxes belongs in Article 314. This change eliminates users from having to refer to two sections in the code to determine if and what size Ceiling-Suspended (Paddle) Fans is permitted to be supported by an outlet box.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-24 Log #1690 NEC-P17 **Final Action: Accept**
(422-31(B))

Submitter: James T. Dollard, Jr., IBEW Local 98

Recommendation:

Revise section 422.31(B) with new text as follows:
422.31(B) Appliances Rated Over 300 Volt-Amperes or 1/8 Horsepower. For permanently connected appliances rated over 300 volt-amperes or 1/8 hp, the branch-circuit switch or circuit breaker shall be permitted to serve as the disconnecting means where the switch or circuit breaker is within sight from the appliance or is capable of being locked in the open position. The provision for locking or adding a lock to the disconnecting means shall be permanently installed on or at the switch or circuit breaker used as the disconnecting means.
FPN: For appliances employing unit switches, see 422.34.

Substantiation:

The problem with the present wording of this section is that the disconnect in many appliance applications is a circuit breaker in a panelboard or a switch that is not made with permanent provisions for locking the circuit breaker or switch in the open position. This clearly does not meet the requirements of 422-31(B). This section states "capable of being locked in the open position." With lock in hand an installer/maintainer can apply it and work safely. This language does not include "through the use of a device which will permit a lock to be utilized."
However, the onset of circuit breaker & toggle switch locking devices have given the impression that any circuit breaker or switch is capable of being locked in the open position.
Existing circuit breaker/toggle switch lockout devices are not permitted by OSHA.
OSHA requires that they be approved (listed by National Recognized Testing Laboratory). None are listed. If these devices were recognized by OSHA then the NEC would expect that every installer/maintainers in the United States and Internationally would each carry dozens of different accessory devices to safely lockout motor power sources. This is not practical. Permanent provisions for making circuit breakers and switches capable of being locked in the open position are readily available from manufacturers today. This proposal does not represent a large increase in the cost of an installation but will result in a dramatic increase in safety.
Where appliances are involved we know that regular maintenance will take place, we must ensure that only a lock is needed by an installer/maintainer to work safely. The practical safeguarding of persons from electrical hazards as detailed in the scope of the NEC must not be permitted to hinge on whether or not an installer just happens to have enough different types of devices and hopefully one that that happens to fit the circuit breaker or switch in an installation.
Where appliances are involved we know that regular maintenance will take place, we must ensure that only a lock is needed by an installer/maintainer to work safely.
Note that this language was accepted by CMP-11 and is a present requirement, in the 2002 NEC, when a circuit breaker or switch is used as a disconnecting means not within sight of a motor. The same level of safety is needed for these disconnecting means for larger appliances.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-25 Log #743 NEC-P17 **Final Action: Reject**
(422-33(A))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise second sentence: Where the separable connector or plug and receptacle are not readily accessible..." (remainder unchanged).

Substantiation:

This section infers that connectors, plugs, and receptacles may not be accessible, i.e., permanently closed in by the building structure or finish. Receptacles are usually installed in boxes which are required by 314.29 to be accessible. Cords are not permitted by 400.8 where concealed (rendered not accessible).

Panel Meeting Action: Reject

Panel Statement:

This would require a disconnecting means which would be in conflict with 422.16(B) waste disposers, dish washers, trash compactors, etc.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-26 Log #782 NEC-P17 **Final Action: Reject**
(422-33(A) and (B))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:

(A) Separable Connector or an Attachment Plug and Receptacle. For coed-and plug-connected appliances an accessible separable connector or an accessible plug and receptacle shall be permitted to serve as the disconnecting means. Where the separable connector or plug and receptacle are not readily accessible, cord-and plug-connected appliances shall be provided with a readily accessible disconnecting means ~~in accordance with 422.31~~ within sight from the appliance or with provisions for being locked in the open position.

FPN: For room air conditioners see 440.63.

(B) Connection at the Rear Base of a Range, Clothes Dryer, or Clothes Washer. For cord-and plug-connected ~~household~~ electric ranges, clother dryers, and clother washers, an attachment plug and receptacle at the rear base of ~~a range~~ the appliance, ~~if it is accessible from the front by removal of a drawer~~ shall be considered as readily accessible. ~~meeting the intent of 422.33(A).~~

Substantiation:

The second sentence of (A) infers a receptacle may be not accessible (permanently closed in by the structure or finish of the building). However, there is no rule permitting this. Receptacles are generally installed in boxes; 314.29 requires boxes to be accessible, but not readily accessible. A plug and receptacle inside a cabinet space occupied by an oven is accessible but may not be readily accessible if the oven (obstacle) has to be removed to gain access. Sections 210.8(A)(3), Exception and 210.52(C)(5) refer to receptacles not "readily" accessible.

The reference to 422.31 in (A) infers that only the branch circuit disconnecting means may be used where additional disconnecting means is required.

As a practical matter, it is almost impossible to apply the provisions of (B) when receptacle installation and inspection are done prior to the range being on site, and the limitation to household ranges doesn't seem warranted.

If the intent of "not accessible" in (A) is intended to mean "not readily accessible" a plug and receptacle behind a range or dryer that requires moving the appliance to gain access would invoke the requirements of 422.31.

The provisions of 422.34 would not apply for many ranges which contain clocks or timers since unit switches generally do not disconnect the ungrounded conductors applying them.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects part (A) of the submitters proposal. This would require a disconnecting means which would be in conflict with 422.16(B) waste disposers, dish washers, trash compactors, etc. The panel rejects part (B) because it does not meet the definition of readily accessible. There is no substantiation for adding non-household ranges, clothes washers and dryers.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-27 Log #687 NEC-P17 **Final Action: Reject**
(422-33(C))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
Rating. The ampere and voltage ratings of a receptacle or of a separable connector, and an attachment plug shall not be less than the ratings of any appliance connected thereto.
Exception: Demand factors authorized elsewhere in this Code shall be permitted to the ampere rating.

Substantiation:

Edit. Rating of a receptacle includes HP rating; 430.109(F) indicates a HP rated receptacle (and plug) is not required for this section but does cover plugs. While factory-installed plugs will likely be properly rated, this may not be so for field-installed plugs.

Panel Meeting Action: Reject

Panel Statement:

The additional words do not clarify the intent of this section. The substantiation is not accurate. Each NEMA configuration attachment plug is HP rated in accordance with UL guide card information AXUT and ANSI/UL 498.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-17 Log #40 NEC-P17 **Final Action: Reject**
(422-45)

NOTE: The following proposal consists of Comment 20-6 on Proposal 20-7 in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 20-7 was:
Accept in principle, revise panel action as follows:
422-15(b)(3)a Delete ~~not to be installed as the disconnecting means required by Section 422-30.~~ 422-32(a) revise first sentence:
For cord- and plug-connected appliances an accessible separable connector or accessible plug and receptacle shall be permitted to serve as the disconnecting means. Where the separable connector or plug and receptacle are not readily accessible ~~cord-and plug-connected appliances shall be provided with~~ a disconnecting means in accordance with Section 422-31 shall be provided.

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Accept in Principle revised as follows:
Delete 422-45.

Substantiation:

This section is virtually unenforceable. Is the authority having jurisdiction to require an ironing board for every dwelling unit that has a smoothing iron? There are hand-held appliances designed and intended for smoothing of clothing suspended from a hanger. This is akin to requiring safety glasses or a hard hat when performing electrical work; desirable perhaps but not related to an electrical safety code.

Panel Meeting Action: Reject

Panel Statement:

The present wording provides a degree of safety and should remain in the NEC.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-28 Log #744 NEC-P17 **Final Action: Reject**
(424-2)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise first sentence as follows:
All ~~requirements~~ provisions of this Code shall apply where applicable.

Substantiation:

Edit. The proposal is intended to clarify that applicable provisions which are not requirements, per se, are allowed.

Panel Meeting Action: Reject

Panel Statement:

See panel Proposal 17-28a (Log #CP1703).

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-28a Log #CP1703 NEC-P17 **Final Action: Accept**
(424-2)

Submitter: Code-Making Panel 17

Recommendation:

Delete the first and second sentence of Section 424.2.

Substantiation:

The first sentence is already covered by 90.3. The second sentence is covered because Chapter 5 applies to hazardous locations where classified as such.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-29 Log #714 NEC-P17 **Final Action: Accept**
(424-3(A))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise last sentence:
In ~~other than residential~~ nondwelling occupancies, fixed infrared hearing equipment shall be permitted to be supplied from branch circuits rated not over 50 amperes.

Substantiation:

Edit. There is no Code definition for residential occupancies. A building with sleeping rooms without permanent provisions for cooking may be residential but have no dwelling units. A similar rule in 210.23(C) uses the phrase "other than dwelling units". In lieu of that phrase, the Style Manual suggests "nondwelling".

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-30 Log #779 NEC-P17 **Final Action: Accept in Principle**
(424-3(B))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete first paragraph and substitute:
Continuous Load. Fixed electric space heating equipment shall be considered continuous load.

Substantiation:

This section implies the equipment is continuous load but is not explicit; if that is the intent it should be stated to clarify that continuous load requirements for the equipment also apply to (1) the feeders and service conductors; (2) the overcurrent devices and assemblies covered by 230.42(A)(2) and Exceptions for 210.19(A) and 215.3. Section 210.4(B) is not amended by this article and already applies.

Panel Meeting Action: Accept in Principle

Editorially delete heading in the recommendation and retain existing heading "Branch-Circuit Sizing."

Panel Statement:

The panel accepts the recommendation but desired to retain the existing code text for the section heading.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-31 Log #1321 NEC-P17 **Final Action: Accept**
(424-3(B), 424.36, 424.94, 424.95)

Submitter: National Electrical Code Technical Correlating Committee
Recommendation:

Replace the term "computed" with the term "calculated" in the following sections:
424.3(B)
424.36
424.94
424.95.

Substantiation:

This proposal is the result of an effort by the NEC Usability Task Group to standardize the language throughout the NEC relative to the use of the terms computed and calculated. After analyzing the usage, the group agreed that the term "calculated" was the best term for use throughout the NEC. This is one in a series of proposals to standardize on the term calculated.

The term "calculate" and its derivatives is presently used in the article title, section titles, and throughout portions of the existing article. Other Articles of the NEC such as for calculating conductor ampacties (under engineering supervision), calculating the size of enclosures, and in Annex D use the term calculate. Additionally, the term "calculate" is more commonly used in other NFPA codes and standards e.g. NFPA 70E, arc flash calculation. Adversely, the term "computation" has a connotation of using a computer, although "load calculations" are frequently determined using a calculator. It appears that the term "computation" was used more frequently beginning with the 1975 NEC based on an editorial revision project.

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

17-32 Log #2516 NEC-P17 **Final Action: Reject**
(424-6)

Submitter: Russell LeBlanc, Peterson School of Engineering
Recommendation:

Add text to read as follows:
426.6 Listed Equipment. Electric baseboard heaters, heating cables, duct heaters, and radiant heating systems shall be listed and labeled.

Substantiation:

Massachusetts State Building Code (780 CMR 3615.2) requires this equipment to be listed and labeled to allow installers and inspectors to be ensured of the integrity of this equipment.
Panel Meeting Action: Reject
Panel Statement:
The manufacturers of this equipment provide installation instructions. The submitter has not provided evidence that a hazard exists.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

17-33 Log #2515 NEC-P17 **Final Action: Accept in Principle**
(424-12(B))

Submitter: Russell LeBlanc, Peterson School of Engineering
Recommendation:

Change the word "approved" to "identified".

Substantiation:

This is the proper terminology to use here. It will give installers and inspectors better guidance for choosing correct equipment.
Panel Meeting Action: Accept in Principle
Change the word "approved" to "listed".
Panel Statement:
This more accurately identifies the submitters intention based on the substantiation.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

17-34 Log #2517 NEC-P17 **Final Action: Accept in Principle**
(424-13)

Submitter: Russell LeBlanc, Peterson School of Engineering

Recommendation:

Revision after the comma.
", unless it (~~has been found to be acceptable where~~) (is identified to be) installed in direct contact with combustible material."

Substantiation:

This is the correct terminology to be used here. If the Code-Making Panel feels this equipment should be listed for this purpose, then change "identified" to "listed". This wording will provide a clearer understanding of the requirement.

Panel Meeting Action: Accept in Principle

Revision after the comma.
", unless it ~~has been found to be acceptable where~~ is listed to be installed in direct contact with combustible material."

Panel Statement:

This more accurately identifies the submitter's intention based on the substantiation.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-35 Log #716 NEC-P17 **Final Action: Reject**
(424-19)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
Disconnecting Means Except as permitted in 424.20 a ~~means~~ switch or circuit breaker that simultaneously disconnects all ungrounded conductors of the circuit shall be provided to disconnect the heater, motor controller(s) and the supplementary overcurrent device(s) of all fixed space heating equipment from all ungrounded conductors. (remainder unchanged).

Substantiation:

No specific type of disconnecting means is indicated. The panel statement for Comment 1-65 in the 2001 ROC indicated a wire connector may be a disconnecting means if not specifically excluded, which can influence interpretations. The present definition of disconnecting means does not exclude wire connectors. Section 427.55(A), which is similar, specifies an indicating type and lockable disconnecting means, which excludes wire connectors.

Panel Meeting Action: Reject

Panel Statement:

The proposed text does not add clarity. There is no indication of a problem with this requirement. The submitter's substantiation is out of context and Comment 1-65 of the 2001 Report on Comments does not apply in this situation.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-36 Log #3342 NEC-P17 **Final Action: Accept**
(424-22(B) Exception (New))

Submitter: Thomas L. Harman, Univ. of Houston Clear Lake

Recommendation:

Add new text to read as follows:
Exception: Listed instantaneous electric water heaters shall have their loads subdivided as defined in Article 422.

Substantiation:

Due to the technological advances in tankless (instantaneous) water heater design, I believe that 424.22(B) should not apply as presently written to instantaneous electric water-heaters used for space heating applications as long as the heaters are protected within their rating. If an instantaneous water heater is a listed (UL) product that has been field tested with a variety of supply circuits, there is no technical or safety reason to limit the branch circuit protection to 60 amperes or cause the loads to be subdivided to 48 amperes.

This requirement for water heaters was introduced in the 1975 code with the justification that heaters with "small internal conductors" might be protected by unspecified sizes of overcurrent devices.

The restrictions on overcurrent protection of water heaters in the present code are unnecessarily restrictive for the new types of instantaneous water heaters. No technical justification has been given to limit the loads to 48 amperes. Field experience and testing has indicated that the design and control of today's instantaneous water heaters allows for their safe installation as described in 422-11(F)(3).

For example, an instantaneous water heater with four elements drawing a maximum of 25 amperes each would require four 30-ampere branch circuits by the present wording of the NEC. A safer alternative would be to subdivide the loads using two elements each on a 60-ampere circuit as allowed by 422-11. Then, only two circuit breakers need be turned off to disconnect the unit. Since the heater must be a listed appliance, the internal wiring would be sufficient for the 60-ampere circuits.

Panel Meeting Action: Accept

Editorially correct "Article 422" to Section "422.11(F)(3)" in the recommendation.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-36a Log #CP1704 NEC-P17 (424-37) **Final Action: Accept**

Submitter: Code-Making Panel 17

Recommendation:

Delete Section 424.37.

Substantiation:

Articles 300 and 310 apply generally to all installations.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-37 Log #291 NEC-P17 (424-38) **Final Action: Reject**

Submitter: Edward Witte, Delta-Therm Corp.

Recommendation:

Add new text to read as follows:
424.38 Area Restrictions for Wall and Ceiling Heating Cables.

Substantiation:

424.38 precludes floor warming of closets, some walk-in closets are, of course, of substantial size. It also precludes hallways or corridors leading into an area, which would need to be treated as a separate area.

Panel Meeting Action: Reject

Panel Statement:

This requirement is based upon the fact that closets are used for storage increasing the risk of fire. The proposal does not contain sufficient substantiation to allow such a change.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-38 Log #2664 NEC-P17 (424-44(G)) **Final Action: Accept in Part**

Submitter: Phil Simmons, Simmons Electrical Services

Recommendation:

Revise existing Section 424.44(G) as follows:
(G) Ground-Fault Circuit-Interrupter Protection ~~for Heated Floors of Bathrooms, and in Hydromassage Bathtub, Spa, and Hot Tub Locations.~~ Ground-fault circuit-interrupter protection for personnel shall be provided for cables installed in electrically heated floors of ~~in~~ bathrooms, and in hydromassage bathtub, spa, and hot tub locations.
FPN: See 680.27(C)(3) for restrictions on the installation of radiant heating cables for spas and hot tubs installed outdoors.

Substantiation:

For revising the title of the section; since Part V of Article 422 has a title of "Electric Space-Heating Cables," and since the text of the section tells where the rule applies, it does not seem necessary to have the location information in the title.
For revisions to the text, the proposal intends to be an editorial improvement. Clearly, the requirements for GFCI protection is intended to apply to the cable and not to the floor.
For adding the FPN; the section referenced in the proposal has limitations on the installation of spas and hot tubs that are installed outdoors. See 680.42 which requires that "A spa or hot tub installed outdoors shall comply with the provisions of Parts I and II of this article …" Section 680.27 is in Part II of Article 680 so the restrictions on the installation of radiant heating cables applies. The FPN will provide valuable information for the user of the NEC.

Panel Meeting Action: Accept in Part

In the recommendation, revise the proposal by deleting "spa and hot tub," and the entire FPN.

Panel Statement:

680.42 Outdoor Locations and 680.43 Indoor Locations states that provisions of Part II of this article shall apply. In Part II, 680.27(C)(3) does not permit radiant heating cables in or below the deck. Hence, the deletion of the wording and the FPN is in order.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

17-40 Log #2226 NEC-P17 **Final Action: Reject**
(424-99)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
424.99 Installation Under Floor Covering.
(A) Identification. Heating panels or heating panel sets for installation under floor covering shall be identified as suitable for installation under floor covering.
(B) Maximum Heated Area. Heating panels or panel sets, installed under floor covering, shall not exceed 160 watts/m2 (15 watts/ft^2) of heated area.
(C) Installation. Listed heating panels or panel sets, if installed under floor covering, shall be installed on floor surfaces that are smooth and flat in accordance with the manufacturer's instructions and shall also comply with 424.99(C)(1) through (C)(5).
(1) Expansion Joints. Heating panels or heating panel sets shall not be installed where they bridge expansion joints unless protected from expansion and contraction.
(2) Connection to Conductors. Heating panels and heating panels sets shall be connected to branch-circuit and supply wiring by wiring methods recognized in Chapter 3.
(3) Anchoring. Heating panels and heating panel sets shall be firmly anchored to the floor using an adhesive or anchoring system identified for this use.
(4) Coverings. After heating panels or heating panel sets are installed and inspected, they shall be permitted to be covered by a floor covering that has been identified by the manufacturer as being suitable for the installation. The covering shall be secured to the heating panel or heating panel sets with release type adhesives or by means identified for this use.
(5) Fault Protection. A device to open all ungrounded conductors supplying the heating panels or heating panel sets, provided by the manufacturer, shall function when a low- or high-resistance line-to-line, line-to-~~grounded~~ earth conductor, or line-to-~~grounded~~ earth fault occurs, such as the result of a penetration of the element or element assembly.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject
Panel Statement:
The panel believes that the present wording is clearer than that proposed.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

17-41 Log #719 NEC-P17 **Final Action: Reject**
(426-3)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
All applicable provisions ~~requirements~~ of this Code shall apply except... (remainder unchanged).

Substantiation:

Edit. "Applicable provisions" is more suitable since all requirements are not applicable and some provisions are not requirements (rules, per se:) but permissive. "Applicable appropriate" and "provisions" are used in similar sections such as 378.3, 402.2, 424.2, 445.3 650.2, 675.3, 701.3, 702.3, 705.3, 780.2, etc. Lack of consistency creates confusion.

Panel Meeting Action: Reject
Panel Statement:
See panel Proposal 17-41a (Log #CP1705).
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

17-41a Log #CP1705 NEC-P17 **Final Action: Accept**
(426-3)

Submitter: Code-Making Panel 17

Recommendation:

Delete the first and last sentence.

Substantiation:

The first sentence was deleted because Chapters 1-4 apply generally. Chapters 5,6 and 7 apply to any of the installations under their scope. The last sentence was deleted because Articles 500-516 apply to any installation classified as such.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

17-42 Log #766 NEC-P17 **Final Action: Accept**
(426-4)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete present wording and substitute:
Continuous Load. Fixed outdoor electric deicing and snow-melting equipment shall be considered as a continuous load.

Substantiation:

This section implies the equipment is continuous load but is not specific; if that is the intent, it should be stated to clarify (1) continuous load requirements also apply to feeders and service conductors; (2) overcurent devices and assemblies covered by the Exceptions for 210.19(A), 215.3, and 230.42(A)(2) apply. Section 240.4(B) is not amended in this article and doesn't need to be noted as it already applies. If determined to be continuous load, this section doesn't permit the Exception for 210.19(A) to apply but permits the Exception for 215.3 and 230.42(A)(2), which is confusing.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

17-43 Log #1782 NEC-P17 **Final Action: Accept**
(426-23(A))

Submitter: Ben C. Johnson, Thermon Manufacturing Company

Recommendation:

Add text to read as follows:
Nonheating Leads. Power supply nonheating leads (cold leads) for resistance elements shall be suitable for the temperature encountered. Not less than 150 mm (6 in.) of nonheating leads shall be provided within the junction box. Preassembled, factory supplied, and field assembled nonheating leads on approved heaters shall be permitted to be shortened if the markings in 426.25 are retained.

Substantiation:

The terminations for the heating devices covered in Article 426 may be factory or field assembled with listed equipment and termination assemblies. Listed termination assemblies are commonly available, with non- heating leads less than 6 in. within the junction box, which provide safe transition from heating devices to power wiring. The text is rearranged to support industry practice utilizing listed termination assemblies.

Panel Meeting Action: Accept

Editorially remove two commas in the second sentence of the recommended action; one before "factory supplied" and one after "factory supplied".

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

17-44 Log #725 NEC-P17 **Final Action: Reject**
(426-50(A))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
(A) Disconnection. Except as permitted in 426.51 a switch or circuit breaker that simultaneously disconnects all ungrounded conductors of the circuit shall be provided for all fixed outdoor deicing and snow-melting equipment. ~~shall be provided with a means for disconnection from all ungrounded conductors.~~ Where readily accessible to the user of the equipment, the branch-circuit switch or circuit breaker shall be permitted to serve as the disconnecting means. ~~Switches used as~~ The disconnecting means shall be of the indicating type and provided with a positive lockout in the "off" position.

Substantiation:

No specific type of disconnecting means is indicated. The panel statement for comment 1-65 in the 2001 ROC indicated a wire connector may be a disconnecting means if not specifically excluded. The present definition of disconnecting means does not exclude wire connectors. Section 427.55(A), which is similar specifies an indicating type and lockable disconnecting means which excludes wire connectors. The requirement for indicating type should apply to circuit breakers used as switches, and the proposed lockout provision is in line with 426.51 and 427.55(A). iI a controller used as a disconnecting means is required to have a positive lockoff, shouldn't this apply to other disconnects.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement on Proposal 17-35.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

17-39 Log #772 NEC-P17 **Final Action: Reject**
(426-50(A))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
(A) Disconnection. All fixed deicing and snow melting equipment shall be provided with a switch, circuit breaker, or other approved means for simultaneous disconnection from all ungrounded conductors. Where readily available to the user of the equipment, the branch circuit switch or circuit breaker shall be permitted to serve as the disconnection means. ~~Switches used as the disconnecting means~~ The disconnecting means shall be of the indicating type and provided with a positive lockout means in the "off" position.

Substantiation:

No switch means for the disconnection is specified. The panel statement for comment 1-65 in the 2001 ROC indicated a wire connector may be the disconnecting means if not specifically excluded. The definition of disconnecting means does not exclude wire connectors.
A switch, circuit breaker, or other means should be provided with lockoff means and all disconnecting means should be included in the requirement to be indicating type. A switch and circuit breaker are different entities. The temperature controller of 426.51(A) used as a disconnecting means is required to open all ungrounded conductors and have a positive lockout provision. Lockoff provisions are required for pipeline heating equipment in 427.55(A) and 427.56(A). The Style Manual indicates lack of consistency creates confusion.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement on Proposal 17-35.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

17-45 Log #1784 NEC-P17 **Final Action: Accept**
(427-1, Scope)

TCC Action:

The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee "Accepts" the Panel Action.

Submitter: Ben C. Johnson, Thermon Manufacturing Company

Recommendation:

Add FPN to existing scope:
FPN: For further information, see Standard for the Testing, Design, Installation and Maintenance of Electrical Resistance Heat Tracing for Industrial Applications, ANSI/IEEE Std. 515-1997 and Recommended Practice for Electrical Impedance, Induction, and Skin Effect Heating of Pipelines and Vessels, ANSI/IEEE Std. 844-2000.

Substantiation:

Article 427 addresses the complex subject of fixed electric heating equipment in a limited way. ANSI/IEEE Std. 515-1997 and ANSI/IEEE Std. 844-1991 add substantially to the information which will enhance all aspects of a safe installation.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

17-46 Log #718 NEC-P17 **Final Action: Reject**
(427-3)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise first sentence:
All applicable provisions ~~requirements~~ of this Code shall apply except... (remainder unchanged).

Substantiation:

Edit. "Applicable provisions" is a more suitable since all requirements are not applicable and some provisions are not requirements (rules, per se:) but permissive. "Applicable appropriate" and "provisions" are used in similar sections such as 378.3, 402.2, 424.2, 445.3 650.2, 675.3, 701.3, 702.3, 705.3, 780.2, etc. Lack of consistency creates confusion per 3.3.5 of the Style Manual.

Panel Meeting Action: Reject

Panel Statement:

See panel Proposal 17-46a (Log #CP1706).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

17-46a Log #CP1706 NEC-P17 **Final Action: Accept**
(427-3)

Submitter: Code-Making Panel 17

Recommendation:

Delete the first and last sentence.

Substantiation:

The first sentence was deleted because Chapters 1-4 apply generally. Chapters 5,6 and 7 apply to any of the installations under their scope. The last sentence was deleted because Articles 500-516 apply to any installation classified as such.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

17-47 Log #758 NEC-P17 **Final Action: Accept**
(427-4)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete present wording and substitute:
Continuous Load. Fixed electric heating equipment for pipelines and vessels shall be considered continuous load.

Substantiation:

Present wording infers such equipment is continuous load, but does not apply the 125 percent requirement to feeder or service conductors, nor permit the 100 percent rating for overcurrent devices permitted by the Exceptions for 210.19(A), 210.20(A), and 215.2(A). This can cause confusion as to whether those sections may or may not apply. Since nothing in this article abrogates 240.4, the last sentence is superfluous.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Sequence Number 17-48 is not used.

17-49 Log #1783 NEC-P17 **Final Action: Accept**
(427-18(A))

Submitter: Ben C. Johnson, Thermon Manufacturing Company

Recommendation:

Add text to read as follows:
Nonheating Leads. Power supply nonheating leads (cold leads) for resistance elements shall be suitable for the temperature encountered. Not less than 150 mm (6 in.) of nonheating leads shall be provided within the junction box. Preassembled, factory supplied, and field assembled nonheating leads on approved heaters shall be permitted to be shortened if the markings in 427.20 are retained.

Substantiation:

The terminations for the heating devices covered in Article 427 may be factory or field assembled with listed equipment and termination assemblies. Listed termination assemblies are commonly available, with non- heating leads less than 6 in. within the junction box, which provide safe transition from heating devices to power wiring. The text is rearranged to support industry practice utilizing listed termination assemblies.

Panel Meeting Action: Accept

Editorially remove two commas in the second sentence of the recommended action; one before "factory supplied" and one after "factory supplied".

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

17-50 Log #1846 NEC-P17 **Final Action: Reject**
(427-23)

Submitter: Richard H. Hulett, Thermon Manufacturing Company

Recommendation:

Add new text to read as follows:
427.23 Grounded Braid or Sheath. Electric heating equipment shall be listed and have a grounded metallic braid, metallic sheath, or other equivalent conductive material in accordance with 427.23(A) or (B). The metallic braid, metallic sheath or equivalent conductive material shall provide an effective ground path for equipment protection.
(A) Heating Wires or Cables. Heating wires or cables shall have a grounded metallic braid, metallic sheath or other equivalent conductive material that surrounds the heating element and bus wires, if any, and their electrical insulation.
(B) Heating Panels. Heating panels shall have a grounded metallic braid, metallic sheath or other equivalent conductive material over the heating element and its electrical insulation on the side opposite the side attached to the surface to be heated.

Substantiation:

The current language may be supporting constructions, which are covered by patented technology. At its most recent meeting, the IEEE 515 Standard for the Testing, Design, Installation, and Maintenance of Electrical Resistance Heat Tracing for Industrial Applications, Working Group, after a year's debate at several meetings passed the following motion: "Whereas the IEEE 515 working group at their July 15, 2002 meeting, realized, and discussed that the requirements for technologies for conductive coverings are or may be being made for constructions which are covered by patented technologies: The working group elects not to include the proposed requirements at this time. Vote was 13 for, 0 opposed, 1 abstention." The IEEE 515 Working Group agreed to the following definition: Braid or Sheath: Metallic braid, metallic sheath, or other equivalent conductive material intended to provide an electrical path to operate an electrical protective device. This proposal alleviates the issue of patented technology while allowing for alternative innovative constructions.

Panel Meeting Action: Reject

Panel Statement:

The present wording is not restrictive and does not prohibit the usage of the metallic braid or sheath.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

CRIVELL: The proposal should be accepted because it achieves the intent of 427-23 and it is consistent with language in IEEE 517.

17-51 Log #2060 NEC-P17 (427-23) **Final Action: Reject**

Submitter: Daleep C. Mohla Missouri City, TX

Recommendation:

Reword the existing Articles 427.23, 427.23(A) and 427.23(B) as follows:

427.23 Ground Path for Equipment Protection Electrical heating equipment shall be listed and have ~~a grounded conductive covering in accordance with 427.23(A) and (B) the conductor covering shall provide~~ an effective ground path for equipment protection in accordance with 427.23(A) and (B).

427.23(A) Heating Wires or Cables. Heating wires or cables shall have an overall grounded metallic braid, metallic sheath, or an equally effective grounded conductive material that surrounds the heating element and bus wires, if any, and their electrical insulation.

427.23(B) Heating Panels. Heating panels shall have an overall grounded metallic sheath, or an equally effective grounded conductive material over the heating element and its electrical insulation on the side opposite the side attached to the surface to be heated.

Substantiation:

The current requirements of the Code require a conductive covering that is available from a supplier who has a patent on this technology. Proposed wording will permit use of metallic braid or sheath for ground path. The new title will more accurately reflect the contents and intent of this section.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement on Proposal 17-50.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Sequence Number 17-52 is not used.

17-53 Log #228 NEC-P17 **Final Action: Accept**
(427-27)

Submitter: C. J. Erickson, Independant Consultant

Recommendation:

Add new text to read as follows:
In industrial establishments where all of the following apply:
(1) Conditions of maintenance and supervision ensure that only qualified persons service the installed systems.
(2) Ground fault protection is provided.
(3) The pipeline or vessel being heated is completely enclosed in a grounded metal enclosure.
(4) The transformer secondary connections to the pipeline or vessel being heated are completely enclosed in a grounded metal mesh or metal enclosure.
The isolation transformer connected to the pipeline or vessel being heated shall not have an output voltage greater than 132 volts to ground.

Substantiation:

Industry is finding that impedance heating is a very efficient heat exchanger for heating fluids to a high temperature. The only temperature limitation is the withstand temperature of the piping material used as the heater.
These heat exchangers are fully enclosed in metal vessels, with the only exposure the inlet end outlet connections, which are kept at ground potential. Figure 1 shows one of these heaters. It is approximately 50 ft long, 15 ft high and contains one half mile of 3 in. metal pipeline used for heating a fluid to around 538° C (1000° F). 570 kW was required to accomplish this heating with 2000 to 3000 amperes in the pipeline.
Figure 2 is a view of one end of the assembly showing control panels, which will be installed remotely in the actual installation, and one of the four transformers required for the assembly under present code rules. The control panel modulates the voltage to the transformer primary.
Figure 3 is a view of one end of the assembly showing the piping connection between the two chambers, and the outlet flange. Both these items are grounded in the installation.
Figure 4 is a simplified wiring diagram showing how two three phase transformers are connected to the piping to drive the necessary currents through the pipe wall. The exchanger shown in Figures 1 through 3 actually uses four transformers, connected in essentially the same way.
If the code is modified in accordance with the proposal, installations like this will require fewer transformers, reducing capital costs and making electrical heating more competitive when evaluated against other kinds of heating. In addition standard transformer configurations, the 132 voltage to ground limitation will include a 120/208V three phase transformer set at its +10 percent tap, can be used, further reducing cost and construction time. These installations are at least as safe as motor installations in industrial plants, where voltages can range up to 13.8 kV.
Note: Supporting Material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept

Editorially correct the recommendation.
Add new third paragraph to read as follows:
In Industrial establishments, the isolation transformer connected to the pipeline or vessel being heated shall not have an output voltage greater than 132 volts ac to ground where all of the following apply:
(1) Conditions of maintenance and supervision ensure that only qualified persons service the installed systems.
(2) Ground fault protection is provided.
(3) The pipeline or vessel being heated is completely enclosed in a grounded metal enclosure.
(4) The transformer secondary connections to the pipeline or vessel being heated are completely enclosed in a grounded metal mesh or metal enclosure.

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

17-54 Log #763 NEC-P17 **Final Action: Accept**
(427-57)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text as follows:
Overcurrent Protection. Heating equipment shall be considered as protected against overcurrent where supplied by a branch circuit as specified in ~~427.4~~ 210.3 and 210.23.

Substantiation:

The sections referenced in the proposal are not specifically abrogated by this article. Those sections are more comprehensive in specifying ratings for individual or multioutlet circuits.

Panel Meeting Action: Accept
Number Eligible to Vote: 11
Ballot Results: Affirmative: 11

11-6 Log #2540 NEC-P11 **Final Action: Accept**
(430)

Submitter: Alan Manche, Schneider Electric/Square D

Recommendation:

Create a new Part X in Article 430 to address Adjustable Speed Drive Systems to read as shown below. Renumber existing Parts X, XI, XII and XIII as XI, XII, XIII, and XIV respectively and renumber the sections within these parts by changing them from the 100 series to the 200 series. For example, existing 430.121, 430.131, and 430.141 would be renumbered as 430.221, 430.231, and 430.241 respectively.

X - Adjustable Speed Drive Systems

430.120 General. The installation provisions of Part I through Part IX are applicable unless modified or supplemented by this Part.

430.122 Conductors – Minimum Size and Ampacity.

(A) Branch / Feeder Circuit Conductors. Circuit conductors supplying power conversion equipment included as part of an adjustable-speed drive system shall have an ampacity not less than 125 percent of the rated input to the power conversion equipment.

(B) Bypass Device. For an adjustable speed drive systems that utilizes a bypass device, the conductor ampacity shall not be less than required by 430.6. The ampacity of circuit conductors supplying power conversion equipment included as part of an adjustable-speed drive system that utilizes a bypass device shall be the larger of:

1) 125 percent of the rated input to the power conversion equipment, or

2) 125 percent of the motor full-load current rating as determined by 430.6.

430.124 Overload Protection. Overload protection of the motor shall be provided.

(A) Included in Power Conversion Equipment. Where the power conversion equipment is marked to indicate that motor overload protection is included, additional overload protection shall not be required.

(B) Bypass Circuits. For adjustable speed drive systems that utilize a bypass device to allow motor operation at rated full load speed, motor overload protection as described in Article 430 Part III shall be provided in the bypass circuit.

(C) Multiple Motor Applications. For multiple motor application, individual motor overload protection shall be provided in accordance with Article 430 Part III.

430.126 Motor Overtemperature Protection.

(A) General. Adjustable speed drive systems shall protect against motor overtemperature conditions. Overtemperature protection is in addition to the conductor protection required in 430.32. Protection shall be provided by one of the following means.

1) Integral motor thermal protector in accordance with 430.32.

2) Adjustable speed drive controller with load and speed sensitive overload protection and thermal memory detention upon shutdown or power loss.

3) Overtemperature protection relay utilizing thermal sensors embedded in the motor and meeting the requirements of 430.32(A)(2) or 430.32(B)(2).

(B) Motors with Cooling Systems. Motors that utilize external forced air or water cooling systems require overtemperature protection in the event that cooling system is inoperative or has failed.

(C) Multiple Motor Applications. For multiple motor application, individual motor overtemperature protection shall be provided.

FPN: The relationship between motor current and motor temperature changes when the motor is operated by an adjustable speed drive. When operated at reduced speed, overheating of motors may occur at current levels less than or equal to a motor's rated full load current. This is the result of reduced motor cooling when its shaft-mounted fan is operating less than rated nameplate RPM.

(D) Automatic Restarting and Orderly Shutdown. The provisions of 430.43 and 430.44 shall apply to the motor overtemperature protection means.

430.128 Disconnecting Means. The disconnecting means shall be permitted to be in the incoming line to the conversion equipment and shall have a rating not less than 115 percent of the rated input current of the conversion unit.

Substantiation:

Adjustable speed drive systems have gained enormous popularity over the last few years. The NEC is inadequate in addressing those systems with appropriate installation rules. This proposal is to establish a specific Part of Article 430 to address the key rules for installation of ASD systems. There are companion proposals to move material present material pertaining to drives from 430.2 and 430.22 Ex.2 to this new part. In addition, some additional rules are proposed as substantiated below. In addition, there is a companion proposal to add some definitions pertaining to drive systems to 430.2.

430.120 – provides the intro language that states the earlier parts of Article 430 apply to drive systems unless Part X supplements or modifies the rules.

430.122 – Provides the rules the apply to conductor sizing.

The text in (A) is from 430.22(A) Exception 2 that presently applies to ASD systems.

The text in (B) is new and is necessary to make sure that the motor circuit is properly protected when the drive includes a bypass device that allows the motor to be connected directly to line voltage. This rule would require that conductors be sized based on 125% of the input current or based on the motor values from 430.6, whichever is larger. This will ensure that the conductors are properly sized in either ASD or bypass operation.

430.124 – provides the basic rule that motor overload protection must be provided.

The text in (A) is from the existing language in 430.2 and carries forward the rule stating if overload protection is part of the power conversion equipment, then additional overload protection is not required.

The text in (B) is to again make sure the bypass circuit (if provided) is properly designed. Motor overload protection must be provided when the circuit is in bypass mode. This overload protection would have to comply with Part III of Article 430.

430.126 – This new text provides the needed rules regarding overtemperature protection of motors. This is a critical area for drive installations since motors are operating at a reduced speed and at current levels less than the rated motor current. The result is less motor cooling and as a result needs additional protection measures.

The text in (A) provides the basic overtemperature protection rules. This requires that overtemperature protection by provided by thermal protectors in the motor, by the drive system itself, or by means of a protection relay that works with integral thermal protection means.

The text in (B) requires that motors which rely on forced air or water cooling systems must also have overtemperature protection in the event of failure of the external cooling means.

The text in (C) requires that individual motor overtemperature protection must be provided for each motor.

The text in (D) makes specific reference to the Orderly Shutdown and Automatic Restarting provisions of 430.43 and 430.44. It is

important that motor overtemperature protection be subject to the same provisions as normal overload devices for motor circuits.
430.128 – this provision for the disconnecting means is from the second paragraph of the present 430,2.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

BRIED: To 430.126(A)(3), add a reference to 430.32(A)(4) to accommodate medium voltage drives and motors.
CLOSSON: I agree with the comments made in Mr. Cox's Comment on Vote.
COX: The panel should have accepted in principle, with the addition of "600 volts or less" added to the title of the section.

11-7 Log #3242 NEC-P11 **Final Action: Accept**
(430)

TCC Action:

The Technical Correlating Committee directs that this Proposal be forwarded to the Usability Task Group for Comment.

Submitter: Paul Dobrowsky Holley, NY

Recommendation:

Change the terms "full load amperes (FLA)" and "full load current (FLC)" to use "full load current (FLC)" throughout Article 430.

Substantiation:

Presently both are used and interpretations are made that FLA means motor nameplate data and FLC means table values. Based on the definition of ampacity in Article 100, current should be used when describing loads, including motor loads.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-8 Log #1573 NEC-P11 **Final Action: Accept in Principle in Part**
(430-2)

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the action on this proposal and determine if the reference to Article 100 in the new FPN is necessary since the mandatory text defines a controller for the application of the entire article. This action will be considered by the panel as a public comment.

Submitter: Michael J. Johnston, Int'l Assn. of Electrical Inspectors

Recommendation:

430.2 Definitions
Relocate the definition of "controller" to Section 430.81(A) from 430.2.
Controller. ~~(A) Definition. For the definition of Controller, see Article 100.~~ For the purpose of this article, a controller is any switch or device that is normally used to start and stop a motor by making and breaking the motor circuit current.

Substantiation:

This change is needed to locate the definitions in the article to Section 430.2 in accordance with the style manual. The revision involves renumbering existing sections 430.2, 430.3, also. See companion proposal to renumber those sections.

Panel Meeting Action: Accept in Principle in Part

Revise the proposal to read as follows:
Relocate the definition of "controller" to Section 430.2 from 430.81(A).
430.2 Definitions:
Controller. For the purpose of this article, a controller is any switch or device that is normally used to start and stop a motor by making and breaking the motor circuit current.
Add the following text as a new FPN:
"For the definition of Controller, see Article 100."

Panel Statement:

Based on the submitter's substantiation, relocate the definition of "controller" to 430.2 from 430.81(A) and add a new FPN, which is in concert with the NEC Style Manual.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-9 Log #1574 NEC-P11 (430-2) **Final Action: Accept**

Submitter: Michael J. Johnston, Int'l Assn. of Electrical Inspectors

Recommendation:

430.2 Definitions

Relocate the definition of "motor control circuit" to Section 430.2 from 430.72.

Motor Control Circuit. The circuit of a control apparatus or system that carries the electric signals directing the performance of the controller but does not carry the main power current.

Substantiation:

This change is needed to locate the definitions in the article to Section 430.2 in accordance with the style manual. The revision involves renumbering existing sections 430.2, 430.3, also. See companion proposal to renumber those sections.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-10 Log #2537 NEC-P11 (430-2) **Final Action: Accept**

TCC Action:

The Technical Correlating Committee understands that the panel action on this proposal will create a "Definitions" section in 430.2 and additional definitions are added by the action on other proposals.

Submitter: Alan Manche, Schneider Electric/Square D

Recommendation:

Delete the present 430.2 and replace it with the text shown below:

430.2 Definitions.

Adjustable Speed Drive. A combination of the power converter, motor and motor mounted auxiliary devices such as encoders, tachometers, thermal switches and detectors, air blowers, heaters and vibration sensors.

Adjustable Speed Drive System. An interconnected combination of equipment that provides a means of adjusting the speed of a mechanical load coupled to a motor. A drive system typically consists of an adjustable speed drive and auxiliary electrical apparatus.

Substantiation:

This proposal is a companion to other proposals to include a new Part X specifically addressing the installations of Adjustable Speed Drive Systems. The material in NEC 430.2 will be moved to new Part X – Adjustable Speed Drive Systems and 430.2 will become the Definitions section in accordance with the style manual. New definitions are provided as a part of this proposal in order to support the newly proposed Part X.

These definitions are derived from NEMA ICS 7-2000- Industrial Control and Systems: Adjustable-Speed Drives. Three definitions are provided because of their interrelationship with each other. The primary term used in the new Part X is "adjustable speed drive system". Integral to the term "adjustable speed drive system" is the term "adjustable speed drive" so that term is defined here as well.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-11 Log #1507 NEC-P11 (430-3) **Final Action: Reject**

TCC Action:

The Technical Correlating Committee notes that the panel statement reference to 11-15a is an error. The submitter of the Proposal may want to review the actions on Proposals 11-6 and 11-10 for additional actions relating to the material covered by this proposal.

Submitter: Dann Strube Lanesville, IN

Recommendation:

Delete the first paragraph except the last sentence. Place the last sentence of this paragraph into the section as the new third paragraph. Place the deleted text in a new Fine Print Note to Section 430.3.

Substantiation:

No code rules are contained in this text. This information, while useful, is tutorial or at best is a definition. A Fine Print Note is the proper format for this text.

Panel Meeting Action: Reject

Panel Statement:

The language contained in section 430.3 is general information for a more clear understanding of the remainder of Article 430. The present language is properly located in section 430.3.

See the panel action and statement on Proposal 11-15(a).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-12 Log #1576 NEC-P11 (430-3) **Final Action: Accept**

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 11-6 which added the requirement in new Part X and Proposal 11-10 which added the definition into 430.2. This action will be considered by the Panel as a Public Comment.

Submitter: Michael J. Johnston, Int'l Assn. of Electrical Inspectors

Recommendation:

Relocate and renumber Section 430.2 to 430.3.

~~430.2~~ 430.3 Adjustable-Speed Drive Systems

The incoming branch circuit or feeder to power conversion equipment included as a part of an adjustable-speed drive system shall be based on the rated input to the power conversion equipment. Where the power conversion equipment is marked to indicate that overload protection is included, additional overload protection shall not be required.

The disconnecting means shall be permitted to be in the incoming line to the conversion equipment and shall have a rating not less than 115 percent of the rated input current of the conversion unit.

FPN: Electrical resonance can result from the interaction of the nonsinusoidal currents from this type of load with power factor correction capacitors.

Substantiation:

This revision is needed to allow 430.2 to include the definitions in that exist in Section 430.71 and 430.81 to be relocated to Section 430.2. This is a revision to provide consistency with Style Manual requirements.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-13 Log #1575 NEC-P11 (430-4) **Final Action: Accept**

Submitter: Michael J. Johnston, Int'l Assn. of Electrical Inspectors

Recommendation:

Relocate and renumber Section 430.3 to 430.4.

~~430.3~~ 430.4 Part-Winding Motors.

A part-winding start induction or synchronous motor is one that is arranged for starting by first energizing part of its primary (armature) winding and, subsequently, energizing the remainder of this winding in one or more steps. A standard part-winding start induction motor is arranged so that one-half of its primary winding can be energized initially, and, subsequently, the remaining half can be energized, both halves then carrying equal current. A hermetic refrigerant compressor motor shall not be considered a standard part-winding start induction motor.

Where separate overload devices are used with a standard part-winding start induction motor, each half of the motor winding shall be individually protected in accordance with 430.32 and 430.37 with a trip current one-half that specified.

Each motor-winding connection shall have branch-circuit short-circuit and ground-fault protection rated at not more than one-half that specified by 430.52.

Exception: A short-circuit and ground-fault protective device shall be permitted for both windings if the device will allow the motor to start. Where time-delay (dual-element) fuses are used, they shall be permitted to have a rating not exceeding 150 percent of the motor full-load current.

Substantiation:

This revision is needed to allow 430.2 to include the definitions in that exist in Section 430.71 and 430.81 to be relocated to Section 430.2. This is a revision to provide consistency with Style Manual requirements.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

SAPORITA: The words "trip current" should be changed to "operating current" in the second paragraph. Overload devices can operate either mechanically or thermally. Therefore, "operating current" more correctly describes the event.

11-14 Log #461 NEC-P11 **Final Action: Reject**
(430-6)

Submitter: Peter B. Olson, ABB Lummus Global Inc.

Recommendation:

Revise text as follows:
430.6 Ampacity and Motor Rating Determination. "The required ampacity and motor ratings shall be determined as specified in 430.6(A), (B), and (C)."
(A) General Motor Application. For general motor applications, current ratings shall be determined based on (1) and (2).
(1) Table Vales. The values given in tables 430.147, 430.148, 430.149 and 430.150, including notes, shall be used to determine the ampacity of conductors or ampere ratings of switches, branch-circuit and ground fault protection, instead of the actual current rating marked on the motor nameplate...
(2) Nameplate Values. Separate motor overload protection shall be based on the motor nameplate current rating.
430.22 Single Motor.
(A) General Branch-circuit conductors that supply a single motor use in a continuous duty application shall have an ampacity of not less than 125 percent of the motor's full-load current as determined by 430.6(A)(1).
Table 430.150 Full-Load Current, Three Phase Alternating-Current Motors
Example:
10 -hp motor at 460 volts full load current is shown as 14 amperes.
50 -hp motor at 460 volts full load current is shown as 65 amperes.
100 -hp motor at 460 volts full load current is shown as 124 amperes.
Proposal recommends new wording:
(1) Table values. The values given in Table 430.147, 430.148, 430.149 and 430.150, including notes, shall be used to determine the ampacity of conductors or ampere ratings of switches, branch-circuit and ground fault protection, ~~instead of the actual current rating marked on the motor nameplate~~ when actual nameplate ampacity is not know. When actual nameplate amperage is known, the amperage may be used for conductor sizing or ampere ratings of switches, branch-circuit and ground fault protection.

Substantiation:

Table 430.150 is outdated and causes additional, unneeded costs when sizing wire for motor feeders. The 1937 NEC, table 14 (pg. 276), Full-Load Currents, Three Phase A.C. motors at 440 volts gives the following vales:
10 hp = 14 amps
50 hp = 63 amps
100 hp = 123 amps
These values are actually lower than the 2002 Code for 460-volt motors. With today's high efficiency motors, the values in the tables are high when compared with a motor's nameplate amperage.
Example:

*** Insert Table Here***

(Table shown on page 2738)

This data shows that on top of the 25% safety factor in the wire sizing there is an additional factor of 11% to 18% when compared with the actual motor full load amps from a Reliance motor catalog verses the Table 430.150.
The following show wiring sizing using the actual motors full load amperage verses Table 430.150:
using table 310.16 for 7%C wire @ 40C ambient the wire sizes required would be:
50 hp
73.5A (from motor nameplate x 1.25) = #4
81.3A (from table 430.150 x 1.25) = #3
100 hp
140A (from motor nameplate x 1.25) = 2/0
155A (from table 430.150 x 1.25) = 3/0
In many cases due to standardization of wire sizes (not using odd sizes) #2 and 4/0 wire would be used. This added cost could be considerable in a modern large plant.
By adding "When actual nameplate amperage is known, that amperage may be used for conductor sizing." and leaving the requirement to use the table if actual nameplate amperage is not known, safety will not be compromised. The plant electrician installing one motor can use the table. The engineering company installing hundreds of motors in a new plant will want to use the actual motor nameplate current to be most cost efficient.

Panel Meeting Action: Reject

Panel Statement:

The panel disagrees with the intent of the submitter to allow the use of actual nameplate values for determination of sizing for conductors, switches, and branch-circuit short-circuit, and ground-fault protection. Since there is no assurance that future replacement motors will be as efficient, the values provided in Tables 430.147 through 430.150 provide a degree of safety to assure that the conductors, switches, and branch-circuit short-circuit, and ground-fault protection is not unnecessarily overloaded. The panel considers the submitter's substantiation to be inadequate since it only references a single source.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-15 Log #22 NEC-P11 **Final Action: Accept in Principle**
(430-6(A)(1))

NOTE: The following proposal consists of Comment 11-6 on Proposal 11-7 in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 11-7 was:
Add the following text:
The nameplate rating shall be used when it is greater than the table value.

Submitter: Technical Correlating Committee National Electrical Code

Recommendation:

It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting relative to the Style Manual. This action will be considered by the panel as a public comment.

Substantiation:

This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept in Principle

Panel Statement:

See the panel action on Panel Proposal 11-88a.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-16 Log #2308 NEC-P11 **Final Action: Accept**
(430-7(A)(9))

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

Recommendation:

Revise as shown below:
(9) Design letter for design B, C, or D, ~~or E~~ motors.

Substantiation:

The Design E motor standard was rescinded by NEMA in February 2000. All references to Design E motors have been removed from NEMA Standards Publication MG 1-1998 "Motors and Generators".

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-17 Log #1339 NEC-P11 **Final Action: Accept**
(430-7(A)(15) (New))

Submitter: Thomas F. Mueller, Southern Company Generation

Recommendation:

Add a new item (15) to Section 430.7(A) as follows:
"(15) Motors equipped with electrically powered condensation prevention heaters shall be marked with the rated heater voltage, number of phases, and the rated power in watts."

Substantiation:

Many motors, especially those used outdoors, come equipped by the motor manufacturer with such condensation prevention heaters to be used when the motor is turned off. Without the stated information, circuit designers are left to guess about circuit loading, voltage drop, etc. Worse still is the problem of connecting them to the incorrect voltage resulting in at best, insufficient heating, and at worst, destruction of the heater. Such circuits are usually not monitored for correct operation, so that incorrect connection may not be found until the motor is damaged as a result of excessive moisture. While an argument could be advanced that Section 110.21 already requires such marking, the fact is that motor manufacturers are not complying in all instances.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-18 Log #1322 NEC-P11 **Final Action: Accept**
(430-7(D)(1))

Submitter: National Electrical Code Technical Correlating Committee

Recommendation:

Replace the term "computed" with the term "calculated" in the following sections:
430.7(D)(1)

Substantiation:

This proposal is the result of an effort by the NEC Usability Task Group to standardize the language throughout the NEC relative to the use of the terms computed and calculated. After analyzing the usage, the group agreed that the term "calculated" was the best term for use throughout the NEC. This is one in a series of proposals to standardize on the term calculated.

The term "calculate" and its derivatives is presently used in the article title, section titles, and throughout portions of the existing article. Other Articles of the NEC such as for calculating conductor ampacties (under engineering supervision), calculating the size of enclosures, and in Annex D use the term calculate. Additionally, the term "calculate" is more commonly used in other NFPA codes and standards e.g. NFPA 70E, arc flash calculation. Adversely, the term "computation" has a connotation of using a computer, although "load calculations" are frequently determined using a calculator. It appears that the term "computation" was used more frequently beginning with the 1975 NEC based on an editorial revision project.

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

11-19 Log #3348 NEC-P11 **Final Action: Accept in Principle**
(430-8)

Submitter: Brannon Wiltse Tampa, FL

Recommendation:

Revise text to read as follows:
430.8 Marking on Controllers.
A controller shall be marked with the manufacturer's name or identification, the voltage, the current or horsepower rating, the short-circuit current rating and such other necessary data to properly indicate the motors for which it is suitable. A controller that includes motor overload protection suitable for group motor application shall be marked with the motor overload protection and the maximum branch-circuit short-circuit and ground-fault protection for such applications.
Combination controllers that employ adjustable instantaneous trip circuit breakers shall be clearly marked to indicate the ampere settings of the adjustable trip element. Where a controller is built-in as an integral part of a motor or of a motor-generator set, individual marking of the controller shall not be required if the necessary data are on the nameplate. For controllers that are an integral part of equipment approved as a unit, the above marking shall be permitted on the equipment nameplate.
FPN: See 110.10 for information on circuit impedance and other characteristics.

Substantiation:

Controllers are subjected to significant amounts of available short circuit current and must have an adequate short circuit current ratings for these faults. Fortunately, UL 508, Industrial Control Equipment, provides a means to mark this short circuit current rating.

Panel Meeting Action: Accept in Principle

Revise the text to read as follows:
Change "motors" to "applications" at the end of the first sentence in the first paragraph of 430.8, so that it would read "…such other necessary data to properly indicate the applications for which it is suitable."
Add three exceptions after "which it is suitable." at the end of the first sentence in the first paragraph of 430.8, to read: "Exception No. 1: The short-circuit current rating is not required for controllers applied in accordance with 430.81(B), 430.81(C), or 430.83(C).
Exception No. 2: The short-circuit current rating is not required to be marked on the controller when the short-circuit current rating of the controller is marked elsewhere on the assembly.
Exception No. 3: The short-circuit current rating is not required to be marked on the controller when the assembly into which it is installed has a marked short-circuit current rating.

Panel Statement:

The changes to the proposal meet the submitter's intent. The controller must now meet the requirements for the entire application, including the motor, and not just the motor. Exception No. 1 was added to exempt certain controllers for small motors as allowed in Part VII, such as clock motors, attachment plugs and receptacles, and snap switches. The second exception was added to permit controller short-circuit current ratings to be marked elsewhere on the assembly. The third exception was added because a short-circuit current rating on an assembly covers all of the internal components.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

BUNCH: There is no demonstrated justification for this added requirement. This would require recognized components such as definite purpose contactors to be tested and rated. Even though UL 508 is referenced in the substantiation, that is not necessarily how the rating might be established, neither is pass and fail criteria agreed upon. This type of requirement should not be mandated in the Code, but addressed through a product standard.
SAUNDERS: The new Exception 2 and Exception 3 in the panel action may create confusion and result in misapplication especially if they are intended to apply to MCCs.
The following is my understanding on ratings on MCCs with draw-out units:
Under NEMA ICS-3-, MCC vertical sections and combination motor control units and feeder tap units can have two different short circuit ratings. The motor control center short circuit rating is smaller of the following three ratings:
a) Short circuit rating of the bus structure (from 22 kA to 100 kA)
b) Short circuit rating of the motor control unit (from 5 kA to 100 kA depending on CB or fuse utilized)
c) Short circuit rating of the feeder tap units (from 5 kA to 100 kA depending on CB or fuse utilized)
In MCC, there are normally two UL short circuit ratings stickers. One normally installed inside the wire way door is for the fixed buses in the vertical and horizontal section normal bus bracing as per NEMA standards is 22 kA or more. The second sticker is on each motor control or feeder unit that is based on the protective device utilized. For example, the buses may be braced for 65 kA. In motor control units, if 22 kA CBs are used, the motor control unit short circuit rating will be indicated as 22 kA. The MCC rating in this case would be actually 22 kA (smaller of the two ratings). I understand from the MCC manufacturer and UL personnel, this is done to avoid over duty on the MCC if the combination motor control unit or feeder unit protective device is changed to a different rating to accommodate a smaller motor or feeder. Frequently, blank spaces in MCCs are equipped at a later date so it will be hard to depend on one marking.
If Exceptions 2 and 3 stay as it is, it may result in motor control units or feeder units being utilized above its rating since the assembly rating in this case may be different than the unit ratings. My recommendation is to delete exceptions 2 & 3 and require all motor control units to have short circuit rating which is currently required in NEMA standards ICS-3 "Industrial Control and Factory Built Assemblies".

11-18a Log #CP1104 NEC-P11 **Final Action: Accept**
(430.8)

Submitter: Code-Making Panel 11

Recommendation:

Revise references in the exceptions to 430.8 from 430.81(B) and 430.81(C) to 430.81(A) and 430.81(B) respectively.

Substantiation:

Panel action on proposal 11-19 added exceptions to 430.8 which make reference to 430.81(B) and 430.81(C) which were subsequently changed to 430.81(A) and 430.81(B), respectively, due to panel action on proposal 11-53. This proposal coordinates the references between these sections.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-20 Log #1936 NEC-P11Meeting Action: Accept **Final Action: Reject**
(430-12(E))

TCC Action: Reject

It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" to correlate with the action of the Technical CorrelatingCommittee on Proposal 11-1.

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:

(E) Equipment ~~Grounding~~ Bonding Connections. A means for attachment of an equipment ~~grounding~~ bonding conductor termination in accordance with 250.8 shall be provided at motor terminal housings for wire-to-wire connections or fixed terminal connections. The means for such connections shall be permitted to be located either inside or outside the motor terminal housing.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

SAUNDERS: See my Explanation of Negative on Proposal 11-1.

WRIGHT: NEMA disagrees with the Panel Action. The proposal has fostered significant debate in the Code process. After considering all of the debate, it is clear that the issue is one of education and not terminology. Changing the term from "equipment grounding conductor" to "equipment bonding conductor" in no way changes the need for qualified persons and continuing education. The present terminology is well understood by those who understand the purposes of grounding and bonding. The panel members and the public need to consider the magnitude of the change compared to the benefit. The change will create a nightmare of revisions and changes in terminology across the entire electrical system. The benefit is practically nonexistent.

Comment on Affirmative:

GOETZ: See my affirmative comment on Proposal 11-1 (Log #2453k).

11-21 Log #2538 NEC-P11 **Final Action: Accept**
(430-22 Exception No. 2)

Submitter: Alan Manche, Schneider Electric/Square D

Recommendation:

Delete Exception No. 2.

~~*Exception No. 2: Circuit conductors supplying power conversion equipment included as part of an adjustable speed drive system shall have an ampacity not less than 125 percent of the rated input to the power conversion equipment.*~~

Substantiation:

The NEC presently provides limited guidance for the installation of adjustable speed drive systems.

This proposal is a companion to other proposals to include a new Part X specifically addressing the installations of Adjustable Speed Drive Systems. The material in NEC 430.22 Exception No. 2 will be moved to new Part X – Adjustable Speed Drive Systems. This proposal deletes NEC 430.22 Exception No. 2 and moves the material to new Part X.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-22 Log #765 NEC-P11 **Final Action: Accept in Part**
(430-22(A))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
Single Motor ~~Branch Circuit Conductors~~. Conductors that supply only a single motor ~~in a~~ rated for continuous duty ~~application~~ shall have... (remainder unchanged).

Substantiation:

All conductors supplying a single motor should be included. A circuit may supply a single motor and other type load; this is covered by 430.24. It is not reasonable that circuit conductors with proper overcurrent protection, originating at service equipment and terminated at an unfused switch at a motor are covered, since the circuit is a branch circuit, but if terminated at a fused switch at the motor are not covered, since they are defined as a feeder. Subsection (E) for example, applies to all conductors supplying other than continuous duty motors.

Continuous duty is not the same as continuous load but may be confused as being the intent. Since a continuous duty rated motor may be used for other than continuous duty, the motor rating rather than the application seems preferable.

Panel Meeting Action: Accept in Part

The panel accepts the deletion of the words "Branch Circuit". The remainder of the proposal is not accepted.

Panel Statement:

It is the panel's intent that 430.22 apply to circuit conductors for various types of motors. The panel does agree continuous duty application is not the same as continuous load and that subsection (E) covers other than continuous duty motors. The submitter has provided no evidence that confusion exists in the field.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-23 Log #780 NEC-P11 **Final Action: Accept**
(430-22(A))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
(A) General. ~~Branch circuit conductors~~ Conductors that supply a single motor... (remainder unchanged).

Substantiation:

This requirement should also apply to service and feeder conductors that only supply a single motor and no other load whereby 430.24 would not apply. Note that (E) could apply to such a single motor load since it covers all supply conductors.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-24 Log #2931 NEC-P11 (430-26) **Final Action: Accept in Principle in Part**

Submitter: Dorothy Kellogg, American Chemistry Council

Recommendation:

Revise as follows:

430.26. Feeder Demand Factor.

(A) Industrial Installations. For Industrial Installations, where conditions of maintenance and engineering supervision ensure that only qualified persons design, control, monitor and service the system, the ampacity of feeder conductors supplying several motors, or a motor(s) and other load(s) shall be permitted to be the product of the ampacity calculated in 430.24 and a demand factor. The demand factor shall be calculated and applied under engineering supervision.

(FPN): Demand factors determined in the design of new facilities can often be validated against actual historical experience from similar installations. Refer to ANSI/IEEE Std. 141, IEEE Recommended Practice for Electric Power Distribution for Industrial Plants and ANSI/IEEE Std. 241 for information on the calculation of loads and demand factor.

(B) Other Installations. Where reduced heating of the conductors results from motors operating on duty-cycle, intermittently, or from all motors not operating at one time, the authority having jurisdiction may grant permission for feeder conductors to have an ampacity less than specified in 430.24, provided the conductors have sufficient ampacity for the maximum load determined in accordance with the sizes and number of motors supplied and the character of their loads and duties.

Substantiation:

430.26 recognizes ampacities calculated per 430.24 may be overly conservative for motor installations where not all motors operate at the same time and/or motors are sized at levels above the actual mechanical load served. However, it does not offer a practical alternative for determining a safe operating ampacity in these circumstances. This proposal offers such an alternative for Industrial Installations in which conditions of maintenance and engineering supervision ensure that only qualified persons design, control, monitor and service the system. In addition, the alternative offered here makes use of concepts the NEC already recognizes such as Demand Factor, Industrial Installations, and Engineering Supervision.

It is widely recognized that utilities have been successfully sizing and operating supplies using a demand-based approach for many years. As compared to services sized per the NEC requirements, utility supplies typically have much lower ratings yet safely address the same load. Industry has also had success applying a demand-based approach in calculating loads when allowed. Further, if a miscalculation is made, the overcurrent protection required by the NEC will ensure the practical safety of persons and property from a fire and/or electrical related hazard.

Finally, for Industrial Installations, this proposal appropriately places the responsibility for the proper determination of a demand factor on the engineer and not the code inspector.

Panel Meeting Action: Accept in Principle in Part

The panel accepts only the FPN with the following correction. Add the text: "Recommended Practice for Electric Power Systems in Commercial Buildings"

after "ANSI/IEEE Std.241" which indicates the title for that standard. The remainder of the Proposal is rejected.

Panel Statement:

New language particular to industrial installations is not needed. A demand based approached in calculating loads is currently permitted in 430.26. The submitter did not justify why the current language is inadequate.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

COX: The proposal should have been accepted.

As the submitter states in the substantiation, the safety of persons or property will not be jeopardized, even if a miscalculation is made. Proper over-current protection requirements of the NEC for equipment and wiring would be in place to remove the equipment from service. Further, in many industrial installations, demand factor calculations and equipment specifications/purchases may be made years in advance of the time that the Authority Having Jurisdiction is involved with the installation. As a result, engineers are reluctant to pursue designs based on demand factors concerned that the Authority Having Jurisdiction may not allow such designs during the construction phase of a project - when it is most costly to make changes. Demand factor based designs of industrial installations are the responsibility of the design engineer and based on engineering calculation and supervision. Requiring the Authority Having Jurisdiction to approve such installation, especially as they do not constitute a safety hazard, is not needed. However, it is understandable that demand based calculations should be made available to the Authority Having Jurisdiction upon request as proof they have been completed.

11-25 Log #729 NEC-P11 **Final Action: Accept in Principle in Part**
(430-28)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Feeder Taps. Feeder tap conductors shall have an ampacity not less than that required by Part II, shall terminate in a ~~branch-circuit protective~~ overcurrent device, and, in addition shall meet one of the following requirements:
(1) No change.
(2) No change.
(3) Have ~~the same~~ an ampacity not less than as the feeder conductors. (Remainder unchanged).

Substantiation:

Tap conductors may terminate in a feeder overcurrent device. The requirement of (3) literally does not allow for higher ampacity conductors which may be desired for voltage drop or other considerations.

Panel Meeting Action: Accept in Principle in Part

The panel accepts the following text:
"(3) Have ~~the same~~ an ampacity not less than the ~~as~~ feeder conductors."
The Exception is to remain unchanged.
Revise text to read as follows:
"Feeder Taps. Feeder tap conductors shall have an ampacity not less than that required by Part II, shall terminate in a device permitted by Article 430, Part IV, for Motor Branch-Circuit Short-Circuit and Ground-Fault Protection. Supplementary overcurrent protective devices are not permitted for this use. In addition, one of the following requirements shall be met:
(1) No change.
(2) No change.
(3) Have ~~the same~~ an ampacity not less than ~~as~~ the feeder conductors."

Panel Statement:

The panel revised the wording to exclude supplementary type protection in order to avoid confusion over the phrase "branch circuit protective device." Overcurrent devices listed to protect branch circuits must be used in this application.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

D'AMICO: If accepted, this change would reduce the safety requirements for motor feeder tap circuits by allowing overprotective devices that are not suitable. This would increase the possibility of injury to workers in the field.
SAPORITA: The proposed change reduces safety by allowing a non full-range overcurrent device such as an MCP or MSCP to protect a feeder tap. These devices, sized at up to 1700 percent of motor full load current, are not appropriate for feeder tap protection. Note that protection of motor feeders requires a branch circuit overcurrent protection device such as a thermal-magnetic circuit breaker or full range fuse. See 430.62(A). It makes no sense to reduce these safety requirements for a motor feeder tap circuit, which is potentially more vulnerable than a feeder protected at its source of supply.

11-26 Log #760 NEC-P11 **Final Action: Accept in Principle in Part**
(430-28)

TCC Action:

The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal with respect to the reference being in conflict with the NEC Style Manual. This action will be considered by the Panel as a Public Comment

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text as follows:
Feeder tap conductors shall have an ampacity not less than that required by Part II, shall terminate in ~~a branch-circuit~~ an overcurrent protective device and in addition, shall meet at least one of the following conditions:
(1) no change;
(2) no change;
(3) have ~~the same~~ an ampacity not less than ~~as~~ the feeder conductors.
Make present exception Exception No. 1.
Add Exception No. 2: Feeder taps in accordance with 240.21(B)(5) shall be permitted.

Substantiation:

A "branch circuit" overcurrent devices is misleading and implies that all tap conductors are branch circuits, whereas they may be a feeder, as indicated in condition (b) of the Exception. Fuses and circuit breakers are not generally limited or indicated as to the type of circuit. "Overcurrent" is defined in Article 100 as an excessive current from overload, short-circuit, or ground-fault. Section 110.3(B) requires listed equipment to be used in accordance with the listing. The panel statement regarding supplementary protective devices in Comment 11-1 of the 2001 ROC is irrelevant since if they are so listed or otherwise not suitable for short-circuit or ground-fault protection they could not be used. "Overcurrent devices" is the term used in (1) of this section and many other sections without the "branch-circuit" modifier.
In (3), the present literal wording prohibits tap conductors with a higher ampacity, which may be desired for voltage drop or other considerations. A higher ampacity does not impose a hazard.
The proposed Exception No. 2 will clarify that this section, without specific wording to the contrary does not negate application of 240.21(B)(5) since these articles are equal in rank, and 240.4(G) indicates Article 430 overcurrent protection requirements shall be permitted but do not prohibit application of Article 240.

Panel Meeting Action: Accept in Principle in Part

The panel accepts the editorial change to 430.28(3) to comply with NEC Style Manual, section 3.2.1. The panel does not accept the proposed Exception No. 2.

Panel Statement:

The reference 240.21(B)(5) does not comply with section 4.1 of the NEC Style Manual. See the panel statement and action on proposal 11-25.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

D'AMICO: See my Explanation of Negative on Proposal 11-25.
SAPORITA: See my Explanation of Negative on Proposal 11-25.

11-27 Log #771 NEC-P11 **Final Action: Accept in Principle**
(430-28)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
Feeder Taps. Feeder taps conductors shall have an ampacity not less than that required by Part II, shall terminate in a ~~branch-circuit protective~~ overcurrent device, and in addition, shall meet one of the following requirements:
1. No change.
2. No change.
3. Have ~~the same~~ an ampacity not less than the feeder conductors. (remainder unchanged)

Substantiation:

Tap conductors may terminate in feeder overcurrent device. The requirement of (3) literally does not allow for higher ampacity conductors which may be desired for voltage drop or other considerations.

Panel Meeting Action: Accept in Principle

Panel Statement:

See the panel action and statement on Proposal 11-25.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

D'AMICO: See my Explanation of Negative on Proposal 11-25.
SAPORITA: See my Explanation of Negative on Proposal 11-25.

11-28 Log #2539 NEC-P11 (430-28) **Final Action: Reject**

Submitter: Alan Manche, Schneider Electric/Square D

Recommendation:

Revise NEC 430.28 with the additions (underlined) and deletions (strike through) as shown. The first paragraph of 430.28 is shown for clarity, but only those changes shown underlined or strike through are part of this proposal.

430.28 Feeder Taps. Feeder tap conductors shall have an ampacity not less than that required by Part II, shall terminate in a branch-circuit short-circuit and ground-fault protective device, and, in addition, shall meet one of the following requirements:

Substantiation:

The present wording branch-circuit protective device is not consistent with the terminology used throughout Article 430. The revised wording clarifies the feeder tap must terminate in a branch-circuit short-circuit ground-fault protective device.

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 11-25.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-29 Log #2011 NEC-P11 (430-31) **Final Action: Reject**

TCC Action:

The Technical Correlating Committee directs that the Panel clarify the Panel Statement and clearly explain the intended level of protection. This action will be considered by the Panel as a Public Comment.

Submitter: Neil F. LaBrake, Jr., Niagara Mohawk, a National Grid Company / Rep. Edison Electric Institute - Electric Light & Power Group

Recommendation:

Revise the first sentence as follows:

430.31 General. Part III specifies overload devices intended to protect motors, motor-control apparatus, and motor branch-circuit conductors against excessive heating due to motor overloads, ~~and~~ failure to start~~.~~, voltage imbalance, loss of phase and phase reversal conditions.

Substantiation:

The present code language does not clearly recognize that motors require protection against dangerous overheating caused by voltage imbalance and single-phase conditions. This proposal incorporates the panel statement made by CMP-11 in the May 2001 NEC ROP on page 742 regarding Proposal 11-28 on Section 430.31 into the code text. The last paragraph of the panel statement is as follows: "Meeting the requirement of Article 430 provides the intended level of protection against voltage imbalance, phase loss, and phase reversal conditions." Utilities administer many motor damage claims per year that are denied since the customer must protect their own equipment from voltage imbalance, phase loss, or phase reversal. This change would provide the user with the specific requirement and avoid their potential losses, property damage.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided substantiation that would justify the proposed change. The panel reaffirms that meeting the requirement of Article 430 provides the intended level of protection against voltage imbalance, phase loss, and phase reversal conditions.

The present wording meets the intent of Article 90.1 of the 2002 NEC. In addition, if the customer desires an additional level of protection, that option is permitted by this Code.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

HAAS: The panel statement in the previous cycle affirmed that "Meeting the requirement of Article 430 provides the intended level of protection against voltage imbalance, phase-loss, and phase-reversal conditions'". To improve clarity and the panel's intent, it is reasonable to include this language in the Code. To not include this text will continue the misinterpretation of the Code requirements to achieve 90.1, "practical safeguarding of persons and property from hazards arising from the use of electricity". This proposal should be accepted.

11-30 Log #195 NEC-P11 **Final Action: Accept**
(430-32(A))

Submitter: Michael Owen, Electrical Training & Consulting Service

Recommendation:

Revise text as follows:
(A) More than 1 horsepower. Each motor used in a continuous duty application and rated more than 1 hp shall be protected against overload by one of the means in 430.32(A)(1) through (A)(4).

Substantiation:

The existing wording may lead individuals to think motors are rated as "continuous-duty". The "duty" of a motor is determined by the motor's application and defined in Article 100 under "duty". A motor "rated" by the manufacturer as "continuous" and used other than continuous duty requires no overloads.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-31 Log #1487 NEC-P11 **Final Action: Accept in Principle**
(430-32(B)(1))

Submitter: Cam Zinda, Rocky Mountain Encompass Electrical Technologies

Recommendation:

Revise text to read as follows:
430.32(B)(1)
(B). One Horsepower or Less Automatically Started. Any motor of 1 horsepower or less that is started automatically shall be protected against overload by one of the following means.
~~(1). Separate Overload Device. A separate overload device shall be selected to trip or shall be rated at not more than the following percentage of the motor nameplate full-load current rating.~~
~~Motors with a marked service factor 1.15 or greater 125%~~
~~Motors with a marked temperature rise 40 degrees C or less 125%~~
~~All other motors 115%~~
(1) By a separate overload device following the rules of 430.32(A)(1).
For a multispeed motor, each winding connection shall be considered separately. Modification of this value shall be permitted as provided in 430.32(C).

Substantiation:

The paragraph in 430.32(B)(1) already exists word for word on the previous page in 430.32(A)(1). This is redundant text and can be eliminated by making a reference back to 430.32(A)(1), thus reducing the size of the code book.

Panel Meeting Action: Accept in Principle

Revise the word "rules" in (1) to read "requirements."

Panel Statement:

The word requirements more clearly defines the list of items in Article 430.32(A)(1).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-31a Log #CP1103 NEC-P11 **Final Action: Accept**
(430.32(B)(4))

Submitter: Code-Making Panel 11

Recommendation:

Revise 430.32(B)(4) to change reference from 430.32(D)(1) to 430.32(D)(2)(a):
(4) Impedance-Protected. In case the impedance of the motor windings is sufficient to prevent overheating due to failure to start, the motor shall be permitted to be protected as specified in 430.32(D)~~(1)~~ (2)(a) for manually started motors if the motor is part of an approved assembly in which the motor will limit itself so that it will not be dangerously overheated.

Substantiation:

The revision is necessary to due to panel action on 11- 32 which renumbered subitems under 430.32(D).

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-32 Log #558 NEC-P11 **Final Action: Accept in Principle**
(430-32(D) (New))

Submitter: J. Kevin Vogel, Crescent Electrical Supply

Recommendation:

Delete (1) and (2).
Replace with:
(1) Permanently Installed. Overload protection shall be in accord with 430.32(B).
(2) Not Permanently Installed.
(1) Within Sight From Controller. Overload protection shall be permitted to be furnished by the branch circuit short-circuit and ground-fault protective device; such device, however, shall not be larger than that specified in Part IV of article 430.
(2) Not Within Sight From Controller. Overload protection shall be in accord with 430.32(B).

Substantiation:

In the 2002 Code, the second sentence in 430.32(D)(2) is intended to apply to all "...one horsepower or less, nonautomatically started, continuous duty motors", whether or not they are installed within sight of the controller. That section, however, is titled "Not Within Sight from Controller". The proposed revision, without changing the intent of the language, clarifies its meaning.

Panel Meeting Action: Accept in Principle

Revise the listed (1) and (2) to "(a)" and "(b)" as shown below.
(1) Permanently Installed. Overload protection shall be in accordance with 430.32(B).
(2) Not Permanently Installed.
(a)~~(1)~~ Within Sight From Controller. Overload protection shall be permitted to be furnished by the branch circuit short-circuit and ground-fault protective device; such device, however, shall not be larger than that specified in Part IV of article 430.
(b)~~(2)~~ Not Within Sight From Controller. Overload protection shall be in accordance with 430.32(B).
The existing exception to (D)(1) was not deleted in the submitter's proposal and moves to new "430.32(2)(a)."

Panel Statement:

This change is in conformance with 2.1.5.3 of the NEC Style Manual. The panel clarified the proper placement of the exception.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-33 Log #2228 NEC-P11 **Final Action: Reject**
(430-36)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
403.36 Fuses — In Which Conductor. Where fuses are used for rmotor overload protection, a fuse shall be inserted in each ungrounded conductor and also in the ~~grounded~~ earth conductor if the supply system is 3-wire, 3-phase ac with one conductor grounded (earthed).

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided the necessary substantiation to make such a dramatic change to this well-established term. Evidence of the significant misunderstanding needs to be provided.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-34 Log #2249 NEC-P11 **Final Action: Reject**
(Table 430-37)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise table to read as follows:

Insert table 430.37/A04/NEC-ROP here

(Table shown on page 2738)

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 11-33.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-35 Log #2718 NEC-P11 **Final Action: Reject**
(430-43)

Submitter: Christopher R. Pharo, IBEW-ECAG

Recommendation:

Amend 430.43 as follows:

430.43 Automatic restarting

(1) A motor overload device that can automatically reset after an overload trip shall not be able to restart the motor automatically upon reset. Manual means must be used to restart the motor.

(2) A motor overload device that can restart a motor automatically after overload tripping shall not be installed unless approved for use with the motor it protects, such as submersible pumps and hermetic refrigerant motor-compressors. This device and the associated motor must be labeled "Warning - Motor will restart upon overload reset".

Substantiation:

This proposal realizes that there are applications where automatic restarting is useful. However, there is a danger associated with restarting and it must be noted.

With most overloads there is a reason for it. If the motor is able to restart after the overload has passed then more serious problems can occur. Fire and personal injury become real possibilities as well as more costly downtime due to changing out the motor - all because the motor is able to restart and people are not aware of the potential problem in the first place.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided the necessary substantiation to add the additional marking label. Code already requires that auto restart not be used if any danger exists to persons. If equipment damage results, owner can require non-auto-restarting.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 11 Negative: 3

Explanation of Negative:

D'AMICO: I feel the submitter has a legitimate concern about motors restarting after overload conditions. There are also other situations where auto restart should be addressed, such as outages. This would increase safety in the workplace. Perhaps these other issues could be addressed by moving 430.43 to the General section of Article 430, and address all conditions where auto restarting could pose a danger.

GARVEY: The proposed warning should have been accepted in principal. The label marking should read "Warning-Motor will restart automatically upon overload reset." The Code permits auto-restart after overload reset if no significant injury hazard exists for machine operators, employees or the public. Restart automatically after overload reset may create a hazard for the maintenance technician or electrician servicing or troubleshooting the motor. Automatic restart after overload reset is not the norm and warning of this condition is useful information for the troubleshooter. The warning label would serve to alert such individuals to the potential for hazard and as such enhances safety.

SAPORITA: I agree with the Submitter's concern. As written, 430.43 addresses auto restart after overload operation. The larger safety issue as identified by the Submitter needs to address auto restart after other conditions, e.g., power outage.

11-36 Log #2309 NEC-P11 **Final Action: Accept**
(Table 430-52)

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

Recommendation:

Revise table as shown below:
Table 430.52
In two places delete the words "Design E or".

Substantiation:

The Design E motor standard was rescinded by NEMA in February 2000. All references to Design E motors have been removed from NEMA Standards Publication MG 1-1998 "Motors and Generators".

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-37 Log #3019 NEC-P11 **Final Action: Accept in Principle**
(430-52(6), FPN (New))

Submitter: Brannon Wiltse Tampa, FL

Recommendation:

Add the following Fine Print Note to 430.52(6):
FPN: Proper application of self protected starters on 3-phase systems, other than solidly grounded wye, particularly on corner grounded delta systems, considers the self protected starters' individual pole-interrupting capability.

Substantiation:

This change should be made to correlate with that change in 240.85 for the 2002 NEC as the testing programs and application limitations are the same for self protected starters as for circuit breakers. Short circuit testing across a single pole of a multipole self protected starter is considerably less than its marked short circuit current rating. The addition of this Fine Print Note will provide guidance to the public on the proper application of these devices and reduce the risk of an unsafe installation due to misapplication of the device.

Panel Meeting Action: Accept in Principle

Revise the text in 430.52(C)(6) to read as follows: Delete the word "starters" and insert "combination controllers" after the word "protected."

FPN: Proper application of self-protected combination controllers ~~starters~~ on 3-phase systems, other than solidly grounded wye, particularly on corner grounded delta systems, considers the self-protected combination controllers' ~~starters~~' individual pole-interrupting capability.

Panel Statement:

The panel has corrected the submitter's Code reference to the proper section. "Starters" was changed to "combination controllers" to align with current code text.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-38 Log #1506 NEC-P11 **Final Action: Reject**
(430-52(A))

Submitter: Dann Strube Lanesville, IN

Recommendation:

Delete the present language and renumber the remaining sections.

Substantiation:

Section 430.52(A) is adequate in this case.
Section 90.1 is clear that the purpose of the code is safety. However, Section 90.1 does not promise that the installation will be efficient, convenient or adequate for good service. If the protective device is undersize, the equipment will not run. To be sure, that it is not adequate for good service but it is in no way unsafe. This change brings this section into compliance with the intent of Section 90.1.

Panel Meeting Action: Reject

Panel Statement:

The substantiation is in conflict with the submitters recommended action.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-39 Log #1708 NEC-P11 **Final Action: Reject**
(430-52(C)(1) Exception No. 3 (New))

Submitter: Jeffrey L. Howard, R & W Engineering, Inc.

Recommendation:

Add new text as follows:
Exception No. 3: For motors with a full-load current rating of 6 amperes or less, the rating of an inverse time circuit breaker used for motor branch-circuit, short-circuit and ground-fault protection shall be permitted to be 20 amperes, provided the branch-circuit conductors are not smaller than #12 AWG.

Substantiation:

Currently, when a small exhaust fan (with a full-load current rating of 6 amperes or less), such as for a bathroom, is fed directly from a standard panelboard (with inverse time circuit breakers) on a circuit with no other loads, a 15A CB must be used, as it is the "next higher standard ampere rating" (allowable per exception No. 1 of the same paragraph), even if the conductors are #12 AWG. If any other load is connected to the same circuit (as permitted by Code), no matter how small the other load is, a 20A CB can be used, provided the branch circuit conductors are #12 AWG, or larger. If all the other CBs in the panelboard are 20A, requiring only one CB to be 15A can actually increase the cost of the panelboard.

Panel Meeting Action: Reject

Panel Statement:

The submitter has provided no evidence that a problem exists in the field.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-40 Log #2310 NEC-P11 **Final Action: Accept**
(430-52(C)(3) Exception No. 1)

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

Recommendation:

Revise text as follows:
Exception No. 1: Where the setting specified in Table 430.52 is not sufficient for the starting current of the motor, the setting of an instantaneous trip circuit breaker shall be permitted to be increased but shall in no case exceed 1300 percent of the motor full-load current for other than ~~Design E motors or~~ Design B energy efficient motors and no more than 1700 percent of full-load motor current for ~~Design E motors or~~ Design B energy efficient motors. Trip settings above 800 percent for other than ~~Design E motors or~~ Design B energy efficient motors and above 1100 percent for ~~Design E motors or~~ Design B energy efficient motors shall be permitted where the need has been demonstrated by engineering evaluation. In such cases, it shall not be necessary to first apply an instantaneous-trip circuit breaker at 800 percent or 1100 percent.

Substantiation:

The Design E motor standard was rescinded by NEMA in February 2000. All references to Design E motors have been removed from NEMA Standards Publication MG 1-1998 "Motors and Generators".

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-41 Log #2311 NEC-P11 **Final Action: Accept**
(430-52(C)(6))

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

Recommendation:

Delete text as follows:
(6) A listed self-protected combination controller shall be permitted in lieu of the devices specified in Table 430.52. Adjustable instantaneous-trip settings shall not exceed 1300 percent of full-load motor current for other than ~~Design E motors or~~ Design B energy efficient motors and not more than 1700 percent of full-load motor current for ~~Design E motors or~~ Design B energy efficient motors.

Substantiation:

The Design E motor standard was rescinded by NEMA in February 2000. All references to Design E motors have been removed from NEMA Standards Publication MG 1-1998 "Motors and Generators".

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-42 Log #2312 NEC-P11 **Final Action: Accept**
(430-52(C)(7))

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

Recommendation:

(7) A motor short-circuit protector shall be permitted in lieu of devices listed in Table 430.52 if the motor short-circuit protector is part of a listed combination motor controller having coordinated motor overload protection and short-circuit and ground-fault protection in each conductor and it will open the circuit at currents exceeding 1300 percent of motor full-load current for other than ~~Design E motors or~~ Design B energy efficient motors and 1700 percent of motor full-load motor current for ~~Design E motors or~~ Design B energy efficient motors.

Substantiation:

The Design E motor standard was rescinded by NEMA in February 2000. All references to Design E motors have been removed from NEMA Standards Publication MG 1-1998 "Motors and Generators".

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-42a Log #1709 NEC-P11 **Final Action: Reject**
(430-53(A))

Submitter: Jeffrey L. Howard, R & W Engineering, Inc.

Recommendation:

Revise text as follows:
(A) Not over 1 Horsepower. Several motors, each not exceeding 1 hp in rating, shall be permitted on a ~~nominal 120-volt~~ branch circuit protected at not over 20 amperes ~~or a branch-circuit of 600 volts, nominal, or less, protected at not over 15 amperes,~~ if all of the following conditions are met:
(1) The full-load rating of each motor does not exceed 6 amperes.
(2) The rating of the branch-circuit short-circuit and ground-fault protective device marked on any of the controllers is not exceeded.
(3) Individual overload protection conforms to 430.32.
(4) The branch-circuit conductors are not smaller than #12 AWG.

Substantiation:

Proposal would resolve an anomaly, if proposal for 430.53(C)(1) is adopted. Also, voltage of branch circuit shouldn't matter as long as the voltage is 600 volts, or less, and the branch-circuit conductors are #12 AWG, or larger.

Panel Meeting Action: Reject

Panel Statement:

The submitter has provided no technical substantiation that a problem exists in the field.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-43 Log #220 NEC-P11 **Final Action: Reject**
(430-53(A)(1))

Submitter: Shawn McGaw, Fluor

Recommendation:

Revise text to read as follows:
(1) The full-load rating of each motor does not exceed 6 amperes as determined by 430.6.
OR
(1) The full-load rating of each motor does not exceed 6 amperes as marked on the motor nameplate.

Substantiation:

The intent of 430.53 (A)(1) is confusing. As the text is now, it seems to leave the full-load ratings of the motors into two possible interpretations. I suggest adding the correctly interpreted text to this condition to eliminate any misunderstandings.

Panel Meeting Action: Reject

Panel Statement:

The submitter's concerns are covered in 430.6, and redundant wording does not add clarity.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-44 Log #2329 NEC-P11 **Final Action: Accept**
(430-53(C)(6))

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

Recommendation:

Add a new item (6), as follows:
(6) Overcurrent protection for loads other than motor loads shall be in accordance with Parts I through VII of Article 240.

Substantiation:

The present wording has led to some improper interpretations as to the protection for circuits that supply loads other than motor loads in a group application. This proposed text makes it clear that for anything other than a motor, the rules in Article 240 are the appropriate rules to be applied. For example, if a resistance heater was also part of the group installation, the protection for the conductors to the heater (as well as the heater itself) would have to comply with Article 240. Some have interpreted (incorrectly) that some of the motor protective devices specified in items in the present text can be used for other than motors. This was never intended by the original language.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-45 Log #2550 NEC-P11 **Final Action: Accept**
(430-53(C)(3))

Submitter: Jim Pauley, Square D Company

Recommendation:

Revise the text to read as follows:
(3) Each circuit breaker is listed and is ~~one~~ of the inverse time type. ~~and listed for group installation.~~

Substantiation:

This proposal has been submitted for numerous code cycles and CMP 11 has flip-flopped between acceptance and rejection from the proposal to comment stages. Each time, it appears that continued misinformation supplied verbally to the panel at the comment stage reverses the issue.

The following facts are undisputable:

1) There is only one marking for a circuit breaker to indicate that it is "listed for the purpose" as stated in 430.53(C)(3) and that marking is HACR type. There is no other marking.

2) Since December 4th 1998, the UL standard covering molded case circuit breakers (UL 489) has stated that circuit breakers meeting the requirements of "standard circuit breakers" can be marked with a HACR marking without any further evaluation. This means that ANY inverse time circuit breaker listed under UL 489 can carry a HACR marking.

3) The 430.53(C)(3) requirement results in the added cost of a label without any justification. Why? Because any listed inverse time circuit breaker without the HACR marking meets exactly the same requirements.

It is time for CMP 11 to accept this revision. The previously stated reasons by the panel members for not accepting the proposal are inaccurate when you consider the undisputed facts stated above. There is no technical justification to keeping this requirement and it only adds confusion. The requirement that the breaker be "listed for the purpose" has no meaning and all listed molded case circuit breakers are acceptable on group motor installations.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

SAPORITA: The submitter's substantiation does not apply to this section of the Code. 430.53(C)(3) addresses Group motor installations as assembled in the field. The reference to HACR CB performance is germane to Article 440.

No technical substantiation was submitted to change this long-standing safety requirement in Article 430.

11-46 Log #3386 NEC-P11 **Final Action: Reject**
(430-53(C)(3))

Submitter: John W. Young, Siemens Energy & Automation

Recommendation:

Delete 430.53(C)(3).
~~(3) Each circuit breaker is one of the inverse time type and listed for group installation.~~

Substantiation:

All UL Listed circuit breakers are suitable for group installation just as all fuses are suitable for group installation. Fuses are not required to be marked and this continued requirement in the NEC for a marking for circuit breakers is meaningless from an application standpoint. It is time to delete this marking requirement from the NEC. Its only purpose is an attempt to limit the use of circuit breakers.

Panel Meeting Action: Reject

Panel Statement:

The submitter has provided insufficient technical substantiation to delete the requirement of listed circuit breakers. The panel does not agree with the last sentence of the submitter's substantiation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-47 Log #1629 NEC-P11 **Final Action: Reject**
(430-53(C)(4))

Submitter: Gordan C. Davis, Moeller Electric Corp.

Recommendation:

Additional and new wording:
Motor controllers listed for group installation and used in the tap circuits of non-motor loads shall be considered supplementary protective devices. The use of such supplementary protection shall not affect the size of the branch circuit protective device specified above.

Substantiation:

Although all loads (including non-motor loads) are protected in 430-53(C)(4) by listed branch circuit protective devices, there is some confusion in industry about the use of motor controllers listed for group installation in the tap circuit of non-motor loads. The use of such motor controllers should not increase the size of the branch circuit protective devices found in 430-53(C)(4).
The standard is needed in 430-53(C)(4) as most panel manufacturers rarely look at other articles of the NEC when building panels. It is mostly panel manufacturers who use the standards for group installations found in 430-53(C)(4). Placing technical information in one place for group installations facilitates panel manufacturers' understanding of the NEC.

Panel Meeting Action: Reject

Panel Statement:

Only motor controllers listed as being suitable for tap conductor protection in motor group applications provide short-circuit protection. The requirements for non-motor loads are not covered specifically in Article 430. The panel is unclear as to the recommendations of the submitter.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-48 Log #1578 NEC-P11 **Final Action: Accept**
(430-71)

Submitter: Michael J. Johnston, Int'l Assn. of Electrical Inspectors

Recommendation:

Delete text as follows:
VI. Motor Control Circuits
430.71 General.
Part VI contains modifications of the general requirements and applies to the particular conditions of motor control circuits.
FPN: See 430.9(B) for equipment device terminal requirements.
~~Definition: Motor Control Circuit. The circuit of a control apparatus or system that carries the electric signals directing the performance of the controller but does not carry the main power current.~~

Substantiation:

This change is needed to locate the definitions in the article to Section 430.2 in accordance with the style manual. The revision involves renumbering existing sections 430.2, 430.3, also. See companion proposal to renumber those sections.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-49 Log #913 NEC-P11 **Final Action: Reject**
(430-71–Motor Control Circuit)

Submitter: Phillip Andrew Smith, CRB Consulting Engineers

Recommendation:

Revise text to read as follow:
Definition: Motor Control Circuit. The circuit of a control apparatus or system that carries the electric signals directing the performance of the controller or providing status of the motor but does not carry the main power current.

Substantiation:

The NEC does not appear to address wiring within a motor controller not intended for control, but for motor status. An example situation is an auxiliary set of M1 contacts in a motor starter is wired to a 24 VDC process control system for INDICATION that a motor is running. This wiring by current definition is not part of a motor control circuit since it does not "direct the performance" of the motor. As a result, subsequent articles such as 430.74 regarding motor control circuit disconnecting means does not apply to this 24 volt circuit in the starter. The motor controller disconnecting means can be locked out, and 24 volts will still exist on the M1 auxiliary contacts terminals. The motor control circuit definition should be revised to make it clear that all wiring within a motor controller should be de-engerized.

Panel Meeting Action: Reject

Panel Statement:

The words "or providing status of the motor" in the submitter's recommendation refers to a signaling circuit as defined in Article 100. The submitter has not provided the necessary technical substantiation to make this change.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

GARVEY: The submitter recognized that the current Code does not require that status signals within a motor controller be disconnected. This may place service personnel at risk due to electrical shock. Operating the controller disconnect and/or the control circuit disconnect would give service personnel false assurance that all circuits are "opened" when the controller disconnect is operated. Article 430 is the appropriate place to address this hazard. One acceptable method of addressing the hazard is to require a means to disconnect the status signals at the controller location. Another acceptable solution would be to require marking of the controller if hazardous status signal voltages are present within the controller while the controller disconnecting means is in the open position.

11-50 Log #3346 NEC-P11 **Final Action: Accept**
(430-71–Motor Control Circuit)

Submitter: Charles J. Palmieri, Palmieri Assoc.

Recommendation:

Strike the definition of Motor Control Circuit from this section and relocate to 430.2.
~~Definition: Motor Control Circuit. The circuit of a control apparatus or system that carries the electric signals directing the performance of the controller but does not carry the main power current.~~

Substantiation:

This definition is currently located in 430.71. Section 2.2.2.2 of the Style Manual would suggest that it be located in 430.2.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-51 Log #745 NEC-P11 **Final Action: Accept in Principle**
(430-74(A))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise first sentence as follows:
General. Motor control circuits shall be so arranged that they will be disconnected from all ungrounded ~~sources of supply~~ conductors when the disconnecting means is in the open position. (remainder unchanged).

Substantiation:

"All sources of supply" includes connections provided by grounded conductors. Present wording requires disconnection of a grounded conductor of a separate 120 volt control circuit supplied from a lighting/appliance panel or a common 120 volt transformer in a motor control center supplying control power for multiple motor circuits.
The panel statement for proposal 11-53 in the 2001 ROP indicated concern that a delta-connected corner-grounded leg would remain energized with the disconnecting means in the open position. A grounded conductor is a grounded conductor whether the system is delta, wye, or single-phase, and carries current. The panel didn't dispute that present wording includes disconnection of a grounded conductor. Is anyone doing this? The disconnecting means and the controller for a motor are only required to open all ungrounded conductors of a 3-wire delta circuit with a grounded leg. What specific hazard requires opening the grounded conductor of the control circuit?

Panel Meeting Action: Accept in Principle

Revise the text in the submitters proposal to retain the word "supply" in the phrase "ungrounded sources of supply conductors."

Panel Statement:

Retaining the word "supply" adds clarity.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

D'AMICO: The submitter has not supplied any technical substantiation for this change. Disconnecting all conductors, whether they are grounded or not, provides a level of safety that I do not wish to see removed. Since the corner-grounded conductor is a "supply" conductor, it should be disconnected to allow for safe and proper maintenance of these systems.
SAPORITA: The proposed change introduces a safety hazard to personnel. Existing text has been in the NEC since at least the 1947 edition. The proposer has supplied no technical substantiation for the change. His example of disconnecting means for a controller is moot as that applies to the power branch circuit.430.74 deals with the control circuit, which is significantly more complex. For safety sake, all sources of supply, both grounded and ungrounded, must be open to prevent inadvertent starting of the motor and driven machinery especially during maintenance. A corner grounded delta system may lose its ground, the system can still operate; however, an abnormal condition in the control circuit with the disconnect as proposed can energize the motor and driven machinery.

11-52 Log #3216 NEC-P11 **Final Action: Accept**
(430-81–Controller)

Submitter: William F. Laidler Hanover, MA

Recommendation:

Delete the definition of controller and relocate to section 430.2.
~~(A) Definition. For the definition of Controller, see Article 100. For the purpose of this article, a controller is any switch or device that is normally used to start and stop a motor by making and breaking the motor circuit current.~~

Substantiation:

This definition is currently located in 430.81. Section 2.2.2.2 of the style manual would suggest that it be located in section 430.2. The definition states that it differs from that located in Article 100 "for the purpose of this article" meaning for the purpose of Article 430.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-53 Log #1579 NEC-P11 **Final Action: Accept in Principle in Part**
(430-81(A))

Submitter: Michael J. Johnston, Int'l Assn. of Electrical Inspectors

Recommendation:

Relocate the definition of "controller" from the text in Section 430.81(A) to Section 430.2 under definitions.
430.81 General.
(A) Part VII is intended to require suitable controllers for all motors.
~~(A) Definition~~. For the definition of Controller, see Article 100. ~~For the purpose of this article, a controller is any switch or device that is normally used to start and stop a motor by making and breaking the motor circuit current.~~

Substantiation:

This change is needed to locate the definitions in the article to Section 430.2 in accordance with the style manual. The revision involves renumbering existing sections 430.2, 430.3, also. See companion proposal to renumber those sections.

Panel Meeting Action: Accept in Principle in Part

The panel does not accept the relocation from General, to paragraph (A) for the following text: "Part VII is intended to require suitable controllers for all motors."

Panel Statement:

See the panel action and statement on Proposal 11-8. The panel did not accept the relocation from "General" to paragraph "(A)" in order to comply with the NEC Style Manual 2.1.5.3.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-55 Log #1485 NEC-P11 **Final Action: Reject**
(430-83(A)(1))

Submitter: Dwight Miller, Encompass Electrical Technologies, Rocky Mountain Inc.

Recommendation:

Revise text to read as follows:
430.83
(A) General
(1) Horsepower ratings. Controllers, other than inverse time circuit breakers and molded case switches, shall have horsepower ratings at the application voltage not lower than the horsepower rating of the motor. A controller for a Design E motor rated more than 2 hp shall (1) be marked as rated for use with a Design E motor or (2) have a horsepower rating ~~not less than~~ 1.4 times or greater the rating of a motor rated 3 through 100 hp or ~~not less than~~ 1.3 times greater the rating of a motor rated over 100 hp.

Substantiation:

To stay in better compliance of the NEC Style Manual.

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 11-56. The panels action on Proposal 11-56 deleted the affected text.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-56 Log #2313 NEC-P11 **Final Action: Accept**
(430-83(A)(1))

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

Recommendation:

Note: This is a companion proposal to 430.83(A)(2)
Delete text as follows:
(1) Controllers, other than inverse time circuit breakers and molded case switches, shall have horsepower ratings at the application voltage not lower than the horsepower rating of the motor. ~~A controller for a Design E motor rated more than 2 hp shall (1) be marked as rated for use with a Design E motor, or (2) have a horsepower rating not less than 1.4 times the rating of a motor rated 3 through 100 hp, or not less than 1.3 times the rating of a motor rated over 100 hp.~~

Substantiation:

The Design E motor standard was rescinded by NEMA in February 2000. All references to Design E motors have been removed from NEMA Standards Publication MG 1-1998 "Motors and Generators".

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-54 Log #2314 NEC-P11 **Final Action: Accept**
(430-83(A)(2))

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

Recommendation:

Note: This is a companion proposal to 430.83(A)(1)
Delete text as follows:
(2) A branch-circuit inverse time circuit breaker rated in amperes shall be permitted as a controller for all motors~~, including Design E~~. Where this circuit breaker is also used for overload protection, it shall conform to the appropriate provisions of this Section governing overload protection.

Substantiation:

The Design E motor standard was rescinded by NEMA in February 2000. All references to Design E motors have been removed from NEMA Standards Publication MG 1-1998 "Motors and Generators".

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-57 Log #23 NEC-P11 **Final Action: Accept**
(430-83(A)(3))

NOTE: The following proposal consists of Comment 11-30 on Proposal 11-57a in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 11-57a was:
Add new 430-83(a)(3), to read as follows:
"(3) Molded Case Switch. A molded case switch rated in amperes shall be permitted as a controller for all motors, including Design E."

Submitter: R. L. Nailen Hales Corners, WI

Recommendation:

As accepted, this proposal specifically includes "Design E" motors. All references to such motors should be stricken form the Code. As of Feb. 2000, NEMA has rescinded its Design E motor standard. Furthermore, no such motors were ever offered on the market by either U.S. or foreign manufacturers, as can readily be verified through NEMA. This and any other Code references to "Design E" characteristics are therefore unnecessary and inappropriate.

Substantiation:

The problem in continuing to cite a nonexistent standard in the Code is that it inevitably casts doubt on the product knowledge of the Code-making panel and on the currency of the Code itself. When a product has never existed except on paper, and will not exist in the future, it need not and should not be cited in a Code of practice.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-57a Log #CP1105 NEC-P11 **Final Action: Accept**
(430.83(B))

Submitter: Code-Making Panel 11

Recommendation:

Revise references in 430.83(B) from 430.81(B) and 430.81(C) to 430.81(A) and 430.81(B) respectively:
(B) Small Motors. Devices as specified in 430.81~~(B)~~ (A) and ~~(C)~~ (B) shall be permitted as a controller.

Substantiation:

Panel action on Proposal 11-53 changes 430.81(B) and 430.81(C) to 430.81(A) and 430.81(B), respectively. This proposal coordinates the references between these sections.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-58 Log #1350 NEC-P11 (430-83(C)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete the word "stationary" in the head and text.

Substantiation:

Whether the motor is stationary or portable should have no bearing on the provisions as long as there is compliance with the specified devices. Electrical parameters for a motor do not change due to being portable or stationary. Specifying a stationary motor does not ensure against a future motor replacement which is not compliant. A similar provision in 550.15(G) does not specify a stationary motor.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided sufficient technical substantiation that a problem exists in the field.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-58a Log #3050 NEC-P11 (430-83(E)) **Final Action: Accept in Principle**

Submitter: Todd F. Lottmann Washington, MO

Recommendation:

Revise 430.83(E) to read:

(E) Voltage Rating. A controller with a straight voltage rating, for example, 240 volts or 480 volts, shall be permitted to be applied in a circuit in which the nominal voltage between any two conductors does not exceed the controller's voltage rating. A controller with a slash rating, for example, 240/120 volts or 480/277 volts, shall only be applied in a solidly grounded circuit in which the nominal voltage to ground from any conductor does not exceed the lower of the two values of the controller's voltage rating and the nominal voltage between any two conductors does not exceed the higher value of the controller's voltage rating.

Substantiation:

This change should be made to correlate with change in 240.85 for the 2002 NEC as the testing programs and application limitations are the same for motor controllers as for circuit breakers. Motor controllers with a slash voltage rating are only evaluated for the lower of the two voltages across one pole. Solidly grounded systems are the only systems that can guarantee that only line to ground voltage will appear across one pole. This change will clarify the proper installation and application of slash rated motor controllers.

Panel Meeting Action: Accept in Principle

Revise 430.83(E) to read, by adding the letter "Y" in (E) where indicated:

(E) Voltage Rating. A controller with a straight voltage rating, for example, 240 volts or 480 volts, shall be permitted to be applied in a circuit in which the nominal voltage between any two conductors does not exceed the controller's voltage rating. A controller with a slash rating, for example, 240/120 volts or 480Y/277 volts, shall only be applied in a solidly grounded circuit in which the nominal voltage to ground from any conductor does not exceed the lower of the two values of the controller's voltage rating and the nominal voltage between any two conductors does not exceed the higher value of the controller's voltage rating.

Panel Statement:

The panel added the letter "Y" in the term 480"Y"/277 to correlate with Section 240.85.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-59 Log #2229 NEC-P11 **Final Action: Reject**
(430-85)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
430.85 In ~~Grounded~~ Earth Conductors. One pole of the controller shall be permitted to be placed in a permanently ~~grounded~~ earth conductor, provided the controller is designed so that the pole in the ~~grounded~~ earth conductor cannot be opened without simultaneously opening all conductors of the circuit, in Part III of this article for motor overload protection.
Exception: Where fuses having time delay appropriate for the starting characteristics of the motor are used, fuseholders of smaller size than specified in Part III of this article.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 11-33.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-60 Log #781 NEC-P11 **Final Action: Reject**
(430-87(2) Exception No. 2 (New))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add:
Exception No. 2: Where the controller is a branch-circuit protective device as permitted in 430.81(B).

Substantiation:

Edit. To correlate with 430.81(B) whereby the controller may supply more than one motor.

Panel Meeting Action: Reject

Panel Statement:

The proposed change or substantiation does not correspond to the referenced section. The panel assumes the proposal is to add a new exception to 430.87. The proposed text is currently addressed by 430.87 exception (b). Section 430.87(2) does not exist. Addition of the proposed new exception would be redundant.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-61 Log #2307 NEC-P11 **Final Action: Accept**
(430-91, FPN (New))

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 1 for action relative to the text added by Code-Making Panel 1 in Proposal 1-157. This action will be considered by Code-Making Panel 1 as a Public Comment.

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

Recommendation:

Add new FPN as follows:
FPN: The term "Raintight" is typically used in conjunction with Enclosure Types 3, 3S, 3SX, 3X, 4, 4X, 6, 6P. The term "Rainproof" is typically used in conjunction with Enclosure Type 3R, 3RX. The term "Watertight" is typically used in conjunction with Enclosure Types 4, 4X, 6, 6P. The term "Driptight" is typically used in conjunction with Enclosure Types 2, 5, 12, 12K, 13. The Term "Dusttight" is typically used in conjunction with Enclosure Types 3, 3S, 3SX, 3X, 5, 12, 12K, 13.

Substantiation:

The terms introduced in this new FPN are permitted to be used in conjunction with the Type Number by the product standards for Listed enclosures. With the exception of "Driptight", these terms are defined in Article 100 and are used elsewhere in the NEC. Enclosures and other products identified or Listed with these Type Numbers should be implied as meeting the intent of the requirements throughout the Code where the related term is specified (such as "raintight type").

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

BRIED: Addition of this material creates confusion. In order to be meaningful, ingress protection (IP) designiations should be added.

11-62 Log #2230 NEC-P11 **Final Action: Reject**
(430-95)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
430.95 Service-Entrance Equipment. Where used as service equipment, each motor control center shall be provided with a single main disconnecting means to disconnect all ungrounded service conductors.
Exception: A second service disconnect shall be permitted to supply additional equipment. Where a ~~grounded~~ earth conductor is provided, the motor control center shall be provided with a main bonding jumper, sized in accordance with 250.28(D), within one of the sections for connecting the ~~grounded~~ earth conductor, on its supply side, to the motor control center equipment ground bus.
Exception: High-impedance ~~grounded~~ earthed neutral systems shall be permitted to be connected as provided in 250.36.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 11-33.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-63 Log #1940 NEC-P11Meeting Action: Accept in Principle **Final Action: Reject**
(430-96)

TCC Action: Reject

It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" to correlate with the action of the Technical Correlating Committee on Proposal 11-1.

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
430.96 Grounding. Multisection motor control centers shall be bonded together with an equipment ~~grounding~~ bonding conductor or an equivalent grounding bus sized in accordance with Table 250.122. Equipment grounding conductors shall terminate on this grounding bus or to a grounding termination point provided in a single-section motor control center.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Accept in Principle

Change "equipment grounding" to "equipment bonding" in the second sentence of the submitters recommendation.

Panel Statement:

Additional change to second sentence was made to be consistent with the change made to the term in first sentence and to meet the submitters intent. See panel statement on Proposal 11-1.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

WRIGHT: NEMA disagrees with the Panel Action. The proposal has fostered significant debate in the Code process. After considering all of the debate, it is clear that the issue is one of education and not terminology. Changing the term from "equipment grounding conductor" to "equipment bonding conductor" in no way changes the need for qualified persons and continuing education. The present terminology is well understood by those who understand the purposes of grounding and bonding. The panel members and the public need to consider the magnitude of the change compared to the benefit. The change will create a nightmare of revisions and changes in terminology across the entire electrical system. The benefit is practically nonexistent.

Comment on Affirmative:

GOETZ: See my affirmative comment on Proposal 11-1 (Log #2453k).

11-64 Log #3272 NEC-P11 **Final Action: Reject**
(430-102(B) and Exception)

Submitter: Joseph A. Hertel, Safety and Buildings / Rep. Dept. of Commerce, State of Wisconsin

Recommendation:

Delete current language of 430.102(B) and the Exception, replace with:
430.102(B) Motor. A separate disconnecting means shall be located in sight from the motor location and the driven machinery location.
Exception: A disconnecting means, in addition to the controller disconnecting means required in accordance with 430.102(A), shall not be required for the motor where the disconnecting means for the controller is individually capable of being locked in the open position. The provision for locking or adding a lock to the disconnecting means shall be permanently installed on or at the switch or circuit breaker used as the disconnecting means.

Substantiation:

The change in the 2002 NEC to this section did not address current practice of a locking disconnect at the controller location. The FPN implies that it may be impracticable or hazards increased when disconnects are added for submersible motors, and motors located in hazardous locations among others. The addition of disconnects in hazardous locations can be accomplished with the appropriately listed equipment. While this is expensive, it does not increase the hazard merely the cost of the installation since the equipment is clearly evaluated for the use. A well pump is an example of a submersible motor and while it is impracticable to place a disconnect in the casing so as to be insight less than 50 feet from the motor, it can be placed at the top of the casing. The use of locking disconnects at the controller for motors has been in the NEC since the 1987 edition. Instead of adding additional requirements to the NEC, it may be more appropriate to educate users as to why there are locking mechanisms on these already present disconnects.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided any technical substantiation to warrant this revision. The proposed new exception is the exception as it appeared in the 1999 NEC. The Panel reaffirms its position that where practicable and where the installation does not add increased or additional hazards, the motor disconnecting means shall be located within sight from the motor and driven machinery. The Panel further reaffirms its position on the effectiveness of lockout/tagout programs that were established during the 2002 Code cycle. The data reviewed by the panel on the effectiveness of Lockout/Tagout programs shows a correlation between the type of the facility and the effective implementation of the program. Part (b) of the exception currently provides that for industrial installations, with written safety procedures, where conditions of maintenance and supervision ensure that only qualified persons service the equipment, the local disconnecting means is not required. This provision should ensure that only those facilities that are most likely to have an effective Lockout/Tagout program can utilize the exception.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-65 Log #1122 NEC-P11 **Final Action: Accept in Principle in Part**
(430-102(B) Exception)

Submitter: Grant Guymon, Comforce Technical Services

Recommendation:

Delete the following words in first sentence of Exception:
" ...to be in sight from the motor and the driven machinery location...".

Substantiation:

The present language suggests that the disconnect would still be required, even if the installation satisfied either (a) or (b) of the Exception. I do not feel that was the intent of the panel. Otherwise a literal reading of the rule could end up requiring two disconnects, with both possibly out of sight of the motor.

Panel Meeting Action: Accept in Principle in Part

Revise Section 430.102(B). Delete the words: "to be in sight from the motor and the driven machinery location" from the exception. In FPN No. 1, replace "variable frequency" with "adjustable speed" and relocate the second sentence to follow FPN No. 2, to read as follows:

B) Motor. A disconnecting means shall be located in sight from the motor location and the driven machinery location. ~~The disconnecting means required in accordance with 430.102(A) shall be permitted to serve as the disconnecting means for the motor if it is located in sight from the motor location and the driven machinery location.~~

Exception: The disconnecting means shall not be required ~~to be in sight from the motor and the driven machinery location~~ under either condition (a) or (b), provided the disconnecting means required in accordance with 430.102(A) is individually capable of being locked in the open position. The provision for locking or adding a lock to the disconnecting means shall be permanently installed on or at the switch or circuit breaker used as the disconnecting means.

(a) Where such a location of the disconnecting means is impracticable or introduces additional or increased hazards to persons or property

(b) In industrial installations, with written safety procedures, where conditions of maintenance and supervision ensure that only qualified persons service the equipment

FPN No. 1:Some examples of increased or additional hazards include, but are not limited to, motors rated in excess of 100 hp, multimotor equipment, submersible motors, motors associated with adjustable speed ~~variable frequency~~ drives, and motors located in hazardous (classified) locations.

FPN No. 2:For information on lockout/tagout procedures, see NFPA 70E-2000, Standard for Electrical Safety Requirements for Employee Workplaces.

The disconnecting means required in accordance with 430.102(A) shall be permitted to serve as the disconnecting means for the motor if it is located in sight from the motor location and the driven machinery location.

Panel Statement:

The action taken by the panel clarifies correct application of the exception.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-66 Log #2815 NEC-P11 **Final Action: Reject**
(430-102(B) Exception)

Submitter: Michael I. Callanan, NJATC / Rep. IBEW

Recommendation:

Revise Section 430.102(B) Exception by adding a new last sentence to read as follows:

Exception: The disconnecting means shall not be required to be in sight from the motor and the driven machinery location under either condition (a) or (b), provided the disconnecting means required in accordance with 430.102(A) is individually capable of being locked in the open position. The provision for locking or adding a lock to the disconnecting means shall be permanently installed on or at the switch or circuit breaker used as the disconnecting means. The locking means shall not be capable of being defeated by the removal of a cover.

(a) Where such a location of the disconnecting means is impracticable or introduces additional or increased hazards to persons or property

(b) In industrial installations, with written safety procedures, where conditions of maintenance and supervision ensure that only qualified persons service the equipment.

FPN No. 1: Some examples of increased or additional hazards include, but are not limited to, motors rated in excess of 100 hp, multimotor equipment, submersible motors, motors associated with variable frequency drives, and motors located in hazardous (classified) locations.

FPN No. 2: For information on lockout/tagout procedures, see NFPA 70E-2000, Standard for Electrical Safety Requirements for Employee Workplaces.

Substantiation:

CMP-11 took a bold step towards enhancing worker safety during the 2002 code cycle. The revisions to the Exception to 430.102 should help in closing the loopwhole that has permitted, over the past several years, the practice of omitting local motor disconnecting means on far too many installations. This proposal is merely an attempt to clarify the application of the requirement put in place during the last code cycle. The need for this additional sentence is based on the fact that on some panelboards or distribution centers the locking means is rendered ineffective when the dead front or cover is removed. This can cause an unsafe condition for persons working on the equipment and was not the intent of the original proposal to permit this by-passing of the new requirement.

This proposal represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Reject

Panel Statement:

Insufficient evidence has been submitted indicating that a problem exists of removing covers after lockout/tagout has been accomplished. A commonly used lockout means for motors 2HP and less is a particular type of 4 inch square raised cover. This lockout/tagout means has proven to be adequate in the field.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

D'AMICO: This proposal was submitted in an effort to increase the level of protection, and decrease the safety hazards for personnel working in the field. I know that we cannot limit the action that one might take to defeat a proper lock out - tag out system, but if it can be defeated by easily removing a cover, it creates a greater hazard. This is intended to make the locking means harder to defeat and tighten up this Article.

SAPORITA: I support the proposal. Multiple crews may work on a specific motor circuit. Where an approved lockout/tagout scheme is used, each crewmember can install their own lockout or tagout. If this procedure can be defeated by simply removing the cover, a potential serious safety hazard exists. This proposal should be accepted.

11-67 Log #3387 NEC-P11 **Final Action: Reject**
(430-102(B) Exception)

Submitter: John W. Young, Siemens Energy & Automation

Recommendation:

Revise text to read as follows:

Exception: The disconnecting means shall not be required to be in sight from the motor and the driven machinery location under either condition (a) or (b), provided the disconnecting means required in accordance with 430.102(A) is individually capable of being locked in the open position. The provision for locking or adding a lock to the disconnecting means shall be ~~permanently~~ installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place at all times.

Substantiation:

The word "permanently" is causing confusion. The intent of this change in 2002 was to require the provisions for locking to always be in place and not removed when the lock is removed. Permanently was used to convey this but some interpretations are that permanently means it shall not be possible to remove the locking means. That was not the intent and there are few, if any, locking means that are permanent to the point they cannot be removed.

Panel Meeting Action: Reject

Panel Statement:

The Code requires that the lockout provision is permanently installed. The panel cannot limit the extent to which an individual may resort in an attempt to re-energize equipment that is locked out and tagged off. The proposed text would be difficult to enforce and open to interpretation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

WRIGHT: Proposal 11-67 should be accepted, with the revisions to the proposal as indicated below.

The Panel Statement reinforces the submitter's concerns. There is confusion concerning what "permanently" means; the existing wording is open to interpretation. The original purpose of adding "permanently" to the Code was to require that a locking means be available at all times, i.e., to prohibit a portable locking means that is removed when the lock is removed. The suggested revisions clarify the intent of the requirement and this proposal.

11-67 (430-102(B), Exception):

Exception: The disconnecting means shall not be required to be in sight from the motor and the driven machinery location under either condition (a) or (b), provided the disconnecting means required in accordance with 430.102(A) is individually capable of being locked in the open position. The provision for locking or adding a lock to the disconnecting means shall be ~~permanently~~ installed on or at the switch or circuit breaker used as the disconnecting means and shall remain in place ~~at all times~~ with or without the lock installed.

Comment on Affirmative:

D'AMICO: The Panel Action on this proposal re-enforces the commitment to safety. The word "permanently" belongs in the Article.

11-68 Log #551 NEC-P11 **Final Action: Reject**
(430-102(B) Exception (b))

Submitter: Stephen Gemmell, University of Alaska, Fairbanks

Recommendation:

Revise text to read as follows:
(b) In industrial installations and facilities having permanently employed maintenance or operation staff, with written safety procedures, where conditions of maintenance and supervision ensure that only qualified persons service the equipment.

Substantiation:

The 1999 version of the NEC 430-102(b) Exception stated:
"A disconnecting means, in addition to the controller disconnecting means as required in accordance with Section 430-102(a), shall not be required for the motor where the disconnecting means for the controller is individually capable of being locked in the open position."
The 2002 Version of the NEC, 430.102(B), tightens the exemptions of the "in sight" rule to only two cases:
(a) Where such a location of the disconnecting means is impracticable or introduces additional or increased hazards to persons or property.
(b) In industrial installations, with written safety procedures, where conditions of maintenance and supervision ensure that only qualified persons service the equipment.
The first exemption allows subjective interpretation of a design. The second exemption implies that only industrial installations have qualified persons servicing equipment.
We submit that 2002 NEC 430.102(B) language unreasonably bars national, state, and local governmental agencies, such as military installations, local school districts, and university campuses (i.e., University of Alaska), that have qualified maintenance staff on duty with written lockout/tagout procedures on file, from utilizing the second exemption of the "in sight" rule.
In the 1999 and earlier editions of the code, one was allowed to locate all controller/disconnects in a motor control center (MCC). This satisfied the intent of the code as long as the motor could be disconnected and then locked out. The MCC also helped to create a neat and orderly installation that located all controllers and disconnects in a single protected area for ease in identification, servicing, and troubleshooting.
Often motors are situated in, or on, elevated equipment in the middle of rooms with very high ceilings, making placement of a disconnect "in sight" of the motor difficult. In HVAC rooms, a motor may be 30 feet from the MCC but still be out of sight around the corner of the air handling equipment it serves. In both these situations, the application of the first exemption dealing with impracticability of installation becomes a subjective decision.
In older buildings, space and environmental requirements for electrical equipment was often not a major design consideration. Consider the case of an existing, intermittently soggy MCC located in a 30-year old building's HVAC room. Replacement of this MCC with a new MCC located in a water free, adjoining electrical room may not be economically feasible if additional disconnects have to be located in sight of their respective motors.
The purpose of the NEC is the practical safeguarding of persons and property from hazards arising from the use of electricity. It is our supposition that 430.102(B) Exception (b) should include non-industrial facilities if they have written safety procedures and a supervised permanent staff of qualified persons performing maintenance.

Panel Meeting Action: Reject

Panel Statement:

It is not the intent of Panel 11 to reduce the level of safety by expanding the exception for other than industrial installations. section 90.4 provides a possible solution for the submitter.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

D'Amico: The Panel Action on this proposal ensures a higher level of safety in the workplace.

11-69 Log #2227 NEC-P11 **Final Action: Reject**
(430-105)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
430.105 ~~Grounded~~ Earth Conductors. One pole of the disconnecting means shall be permitted to disconnect a permanently ~~grounded~~ earth conductor, provided the disconnecting means is designed so that the pole in the ~~grounded~~ earth conductor cannot be opened without simultaneously disconnecting all conductors of the circuit.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 11-33.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-70 Log #3267 NEC-P11 **Final Action: Reject**
(430-107)

Submitter: Leif O. Pihl, IBEW Local 292

Recommendation:

Revise as follows:
430.107 Readily Accessible.
(1) At least one of the disconnecting means shall be readily accessible.
(2) When an inaccessible disconnect is concealed by an access panel, door, or similar obstruction, a sign, label or similar notice shall be posted on such panel or door that notifies personnel of where that disconnect is located.

Substantiation:

I have noticed a situation where a HVAC unit was built into a ceiling with a sheet rocked/fire rated wall and floor on all six sides. Minimal access for service was provided, and an access panel in a different room provided access to the disconnect only. This proposal increases safety by allowing maintenance personnel to know where and how to disconnect the motor.

Panel Meeting Action: Reject

Panel Statement:

Section 430.107 requires that one of the disconnecting means required by 430.102(A) or (B) shall be readily accessible. The submitter's reference to HVAC equipment is covered in 424.19 for heating equipment and in 440.14 for air conditioning equipment.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

D'AMICO: I understand the submitter's concern, having seen similar situations in the field. A label would make it easier and safer for maintenance personnel to service HVAC equipment, however HVAC disconnects are covered in sections other than 430.107.

11-71 Log #3514 NEC-P11 **Final Action: Reject**
(430-107)

Submitter: Leif O. Pihl Minneapolis, MN

Recommendation:

Revise as follows:
Place an item number one before the existing text, and add new text as item number two. Section will then read as follows:
430.107 Readily Accessible.
(1) At least one of the disconnecting means shall be readily accessible.
(2) When an inaccessible disconnect is concealed by an access panel, door, or similar obstruction, a sign, label, or similar notice shall be posted on such panel or door that notifies personnel of where that disconnect is located.

Substantiation:

I have noticed a situation where an HVAC unit was built into a ceiling with a sheet-rocked and/or fire rated wall and floor on all six sides. Minimal access for service was provided, and an access panel in a different room provided access to the disconnect only. This proposal increases safety by allowing maintenance personnel to know where and how to disconnect the motor.

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 11-70.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

D'AMICO: See my Comment on Affirmative on Proposal 11-70.

11-72 Log #739 NEC-P11 **Final Action: Accept in Part**
(430-108)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Every ~~Switch~~ Disconnecting Means. Every disconnecting means in the motor circuit between the point of attachment to the feeder and the point of connection to the motor shall comply with the provisions ~~requirements~~ of 430.109 and 430.110.

Substantiation:

Edit. Switch and disconnecting means are not necessarily the same device. Circuit breakers and plug/receptacles are not switches, per se. Compliance with requirements (Rules) do not allow for the permissive provisions of 430.109 and 430.110.

Panel Meeting Action: Accept in Part

The panel accepts replacing "switch" in the heading to "disconnecting means". The panel rejects replacing "requirements" with "provisions."

Panel Statement:

The term "requirements" is used as the preferred term for clarity and mandatory in nature and complies with 3.2.1 of the NEC Style Manual.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-73 Log #900 NEC-P11 **Final Action: Reject**
(430-109(6))

Submitter: Gordon Davis, Moeller Electric Corporation

Recommendation:

Listed manual motor controllers additionally marked "Suitable As Motor Disconnect" shall be permitted as branch disconnecting means for devices in 430-52(5).

Substantiation:

The fuses used in the protection of the devices found in 430-52(5) are extremely fast acting with very little let-through energy in order to protect the sensitive electronics.

Listed manual motor controllers additionally marked as "Suitable for Motor Disconnect" are always protected on their lineside by branch protective devices marked on their label as confirmed by Code-Making Panel 11 in NEC 2002 ROC 11-220 (Log #340), (see figure 1). The additional fuses found in the 430-52(5) devices open within the short circuit withstand of the Motor Disconnect and its lineside branch fuses and adds to the safety of the assembly (see Figure 2).

Motor Disconnect with Lineside Branch Protection

Insert Artwork (Figure 1) Here

Motor Disconnect with Lineside Branch Protection and Loadside Fuses of 430-52(5) Devices

Insert Artwork (Figure 2) Here

Panel Meeting Action: Reject

Panel Statement:

The references to the Code sections appear to be incorrect. The proposal does not comply with 4-3.3(c) of the Regulations Governing Committe Projects.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-74 Log #1029 NEC-P11 **Final Action: Reject**
(430-109(7))

Submitter: William E. Anderson, The Procter & Gamble Company

Recommendation:

Add wording to NEC Art 430.109 Type (A) General:
(7) Safety Lockout System. A redundantly monitored, remotely operated contactor-isolating system that incorporates control lockout provisions and is listed for disconnection purposes.

Substantiation:

This proposal is intended to align with the latest edition of NFPA 79 specifically "5.5 Devices for Disconnecting (Isolating) Electrical Equipment, Paragraph 5.54 (3) Redundantly monitored, remotely operated contactor isolating system that incorporates control lockout provisions and is listed for disconnection purposes."

This type of equipment [A redundantly monitored, remotely operated contactor isolating system that incorporates control lockout provisions] is principally intended for industrial machines, covered by NFPA 79, where because of multiple entry points or high frequency of usage the use of other isolation devices become impracticable.

Because of size, manufacturing machines often have several entry points used by operators and maintenance personnel who cannot always see each other. With a 'monitored safety lockout system' each point of entry has a 'lockout capable disconnecting means', and a method to verify to the user that the disconnection function has succeeded. Each of the several point of entry 'disconnecting means' is monitored and opens a magnetic contactor that prevents the mass production industrial machine from being energized.

The system (equipment) including the controls and contactor(s) is physically and [with the exception of the power circuit that is being controlled] electrically isolated from the rest of the industrial machine. This isolation feature is intended to prevent accidental compromising of the safety of the operators and maintenance personnel using the isolation system (equipment). Although referred to as a system the equipment consists of a collection of components contained as a single rated piece of equipment which includes the contactor(s)as the machine power isolating component, the monitoring component(s), the multiple local lockout capable disconnecting means components and the component(s) used to verify the disconnection function.

The magnetic contactor of the system (equipment) can not be again closed until all the point of entry disconnecting means are closed. The machine thus cannot be energized accidentally with someone still working on it.

The use of a magnetic contactor that isolates the industrial machine's power lends it self to this application because of the relatively long electrical and mechanical life of the contactors nominally available in today's market.

Although sized to be capable of operating under full load, and to allow coordination of over current protection devices, the "redundantly monitored, remotely operated contactor isolating system", would normally be operated when the machine is in a stopped mode.

The function and performance of a contactor can be monitored with performance [isolation] verification indications given to the operators and maintenance personnel using the isolation system (equipment) in this recommendation.

Presently other disconnecting means and manual controllers are often not suitable for applications requiring numerous opening and closing operations nor for applications requiring the multiple operating points that are found to be required on many industrial machines used in manufacturing.

A failure of the traditional disconnecting means usually means a tremendous loss of production and possible undetected unsafe conditions. In many situations it is difficult to provide the machine operators and maintenance personnel a simple way to verify that the disconnecting means has not failed, this is especially difficult when there is more that one point of entry being used during the course of industrial machine maintenance activity.

The 'redundantly monitored, remotely operated contactor isolating system', is always located within the machine's electrical system on the load side of a circuit breaker or fuse.

A typical 'redundantly monitored, remotely operated contactor isolating system', that incorporates control lockout provisions has been reviewed with OSHA and interpreted that it can be part of an energy control program and therein be a suitable disconnecting means for such purposes. Reference: [Interpretation/variance with the energy isolation device requirements 01/05/1998 1910.147, 1910.147(b), 1910.147(c)(1).

Additional analysis of typical 'redundantly monitored, remotely operated contactor-isolating systems', as a component of an energy control program, has also been done in other independent studies. The analysis of those typical forms of the proposed technology, when properly constructed [e.g. by following the points in the OSHA Interpretation/variance or by confirmation though the proposed method of listing], has shown a significant advantage by reduced risk of injury when compared to existing technologies.

As the need becomes clearer, UL is expected to begin the process of developing one or more standards for 'a redundantly monitored, remotely operated contactor isolating system that incorporates control lockout provisions that provides a disconnecting means', technology.

The use of a 'redundantly monitored, remotely operated contactor isolating system', [equipment] that incorporates control lockout provisions can increase the safety of any large equipment on which it is used. Potentially it could save lives and prevent many unnecessary injuries.

Panel Meeting Action: Reject

Panel Statement:

The submitter has provided no technical documentation as to the testing or the creepage and clearance distances of the proposed devices. The panel does not wish to expand the list of safety devices without detailed documentation that safety would be assured for other than NFPA 79 applications. The submitter has not included sufficient evidence of an acceptable standard to which this system could potentially be listed.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

COX: The panel should have accepted this proposal. Since "Safety Lockout System" is acceptable to NFPA 79, it should be acceptable to the NEC. There is nothing to suggest that device creepage and clearance distances would be reduced for industrial machinery so as to be unacceptable for the requirements of 430.

SAUNDERS: This practice is accepted under NFPA 79 and approved by OSHA for specific applications. Rejecting this proposal is in direct conflict with the actions of NFPA 79.

direct conflict with the actions of NFPA 79.

11-75 Log #751 NEC-P11 **Final Action: Reject**
(430-109(A)(1))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text as follows:
Motor Circuit Switch. A listed motor circuit switch suitable for the current type (ac or dc), with a ~~rated in~~ horsepower rating at the application voltage, number of phases not less than the motor horsepower for a single motor, or the horsepower determined by 430.110(C)(1). (remainder unchanged).

Substantiation:

Horsepower ratings are associated with specific voltages, number of phases, and current type, and not intended for use on circuits with different characteristics. While this is covered in 110.3(B), the proposal would be helpful to Code users who are not aware of listing information.

Panel Meeting Action: Reject

Panel Statement:

Insufficient technical substantiation has been submitted to show that a problem exists. The proposal does not add clarity to current requirements.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-76 Log #2315 NEC-P11 **Final Action: Accept**
(430-109(A)(1))

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

Recommendation:

Revise as shown:
(A) General.
(1) Motor Circuit Switch. A listed motor-circuit switch rated in horsepower. ~~For Design E motors rated greater than 2 hp, the motor circuit switch shall be either (a) marked as rated for use with Design E motors or (b) have a horsepower rating not less than 1.4 times the rating of a motor rated 3 – 100 hp, or not less than 1.3 times the rating of a motor rated over 100 hp.~~
Note: This is a companion proposal to 430.109(F).

Substantiation:

The Design E motor standard was rescinded by NEMA in February 2000. All references to Design E motors have been removed from NEMA Standards Publication MG 1-1998 "Motors and Generators".

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-77 Log #1351 NEC-P11 **Final Action: Reject**
(430-109(C))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete the word "stationary" in the head and text.

Substantiation:

Whether the motor is stationary or portable should have no bearing on the provisions as long as there is compliance with the specified devices. Electrical parameters for a motor do not change due to being portable or stationary. Specifying a stationary motor does not ensure against a future motor replacement which is not compliant. A similar provision in 550.15(G) does not specify a stationary motor.

Panel Meeting Action: Reject

Panel Statement:

See panel statement on proposal 11-58.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-78 Log #2316 NEC-P11 **Final Action: Accept**
(430-109(F))

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

Recommendation:

Delete text as follows:
(F) Cord- and Plug-Connected Motors. For a cord- and plug-connected motor, a horsepower-rated attachment plug and receptacle having ratings no less than the motor ratings shall be permitted to serve as the disconnecting means ~~for other than a Design E motor, and for a Design E motor rated 2 hp or less. For a Design E motor rated more than 2 hp, an attachment plug and receptacle used as the disconnecting means shall have a horsepower rating not less than 1.4 times the motor rating.~~ A horsepower-rated attachment plug and receptacle shall not be required for a cord- and plug-connected appliance in accordance with Section 422.33, a room air conditioner in accordance with Section 440.63, or a portable motor rated 1/3 hp or less.
Note: This is a companion proposal to 430.109(A)(1).

Substantiation:

The Design E motor standard was rescinded by NEMA in February 2000. All references to Design E motors have been removed from NEMA Standards Publication MG 1-1998 "Motors and Generators".

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-79 Log #746 NEC-P11 **Final Action: Accept in Part**
(430-110(A))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
(A) General. The disconnecting means for motor <u>branch</u> circuits rated 600 volts, nominal, or less, shall have an ampere rating ~~of at least~~ <u>not less than</u> 115 percent of the full-load rating of the motor.
<u>Exception:</u> A listed ~~nonfused~~ <u>nonfusible</u> motor circuit switch having a horsepower rating ~~equal to or greater~~ <u>not less</u> than the motor horsepower, <u>or a listed molded case</u> switch shall be permitted to have an ampere rating <u>not</u> less than <u>100</u> ~~115~~ percent of the full-load current rating of the motor.

Substantiation:

This section appears directed to branch circuits; feeder conductors may also comprise a motor circuit. Molded case switches are tested and listed for suitability as a motor disconnecting means and are indicated in 430.109(A)(3) and permitted as a controller by 430.83(A)(3). Although not the intent a fusible type motor-circuit switch with jumpers or copper tubing in the fuse clips may be deemed to be nonfused.

Panel Meeting Action: Accept in Part

The panel accepts replacement of the terms "of at least" with "not less than" and "equal to or greater" with "not less."

Panel Statement:

The panel accepts replacement of the terms "of at least" and "equal to or greater" to be in compliance with 3.2.4 of the Style Manual. The panel does not agree with the submitter that this section applies only to branch circuits. Section 430.110(A) does not prohibit the use of a molded case switch. No substantiation was given to reduce the 115 percent requirement to 100 percent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-80 Log #1151 NEC-P11 **Final Action: Reject**
(430-110(C)(1) Exception)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete exception.

Substantiation:

A permissive exception usually relaxes a rule. This exception results in a horsepower rated switch with a higher ampere rating than would be required by the basic rule. Why would anyone utilize the exception?

Panel Meeting Action: Reject

Panel Statement:

There are cases where the exception may be used, such as the case where the disconnect switch has a low horsepower rating and high ampere rating.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-81 Log #740 NEC-P11 **Final Action: Reject**
(430-112(I))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise latter part. "...shall be grounded where the system ~~grounding~~ is ~~required~~ grounded."

Substantiation:

If equipment grounding is required where the system is required to be grounded, it should be required where the system is grounded by choice.

Panel Meeting Action: Reject

Panel Statement:

The proposal is not consistent with the Code section referenced.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-82 Log #3193 NEC-P11 **Final Action: Reject**
(430-143)

Submitter: Truman C. Surbrook, Michigan State University

Recommendation:

Delete the reference to 150 volts and add a provision for motors that are double insulated or by some other means are not required to be grounded. The section will then read:
The frames of portable motors ~~that operate at over 150 volts to ground~~ shall be guarded or grounded unless listed as not requiring grounding.

Substantiation:

There are a large number of portable machines and equipment that are powered with motors that operate at under 150 volts to ground. This section only requires equipment to be grounded if it operates at over 150 volts to ground. Most portable motors that operate at 120 volts to ground should also be grounded.

Panel Meeting Action: Reject

Panel Statement:

Section 250.114(4), as referenced in FPN No. 1, covers the grounding requirements of portable motors in other than residential occupancies. If portable motors operating over 150 volts to ground are not required to be grounded by other articles, then it is the panel's intent that they be guarded.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-83 Log #1937 NEC-P11Meeting Action: Accept **Final Action: Reject**
(430-143, FPN 2)

TCC Action: Reject

It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" to correlate with the action of the Technical Correlating Committee on Proposal 11-1.

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
FPN No. 2: See 250.119(B) for color of equipment ~~grounding~~ bonding conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

SAUNDERS: See my Explanation of Negative on Proposal 11-1.
WRIGHT: NEMA disagrees with the Panel Action. The proposal has fostered significant debate in the Code process. After considering all of the debate, it is clear that the issue is one of education and not terminology. Changing the term from "equipment grounding conductor" to "equipment bonding conductor" in no way changes the need for qualified persons and continuing education. The present terminology is well understood by those who understand the purposes of grounding and bonding. The panel members and the public need to consider the magnitude of the change compared to the benefit. The change will create a nightmare of revisions and changes in terminology across the entire electrical system. The benefit is practically nonexistent.

Comment on Affirmative:

GOETZ: See my affirmative comment on Proposal 11-1 (Log #2453k).

11-84 Log #1938 NEC-P11Meeting Action: Accept **Final Action: Reject**
(430-144)

TCC Action: Reject

It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" to correlate with the action of the Technical Correlating Committee on Proposal 11-1.

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
430.144 Controllers. Controller enclosures shall be grounded regardless of voltage. Controller enclosures shall have means for attachment of an equipment ~~grounding~~ bonding conductor termination in accordance with 250.8.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

SAUNDERS: See my Explanation of Negative on Proposal 11-1.
WRIGHT: NEMA disagrees with the Panel Action. The proposal has fostered significant debate in the Code process. After considering all of the debate, it is clear that the issue is one of education and not terminology. Changing the term from "equipment grounding conductor" to "equipment bonding conductor" in no way changes the need for qualified persons and continuing education. The present terminology is well understood by those who understand the purposes of grounding and bonding. The panel members and the public need to consider the magnitude of the change compared to the benefit. The change will create a nightmare of revisions and changes in terminology across the entire electrical system. The benefit is practically nonexistent.

Comment on Affirmative:

GOETZ: See my affirmative comment on Proposal 11-1 (Log #2453k).

11-85 Log #721 NEC-P11 **Final Action: Reject**
(430-144 Exception No. 2 (New))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add:
Exception No. 2: Metal enclosures for equipment supplied by ungrounded circuits covered in 250.112(I) shall not be required to be grounded.

Substantiation:

Section 250.112(I) only requires equipment (controllers) for specified circuits to be grounded where system grounding is required.

Panel Meeting Action: Reject

Panel Statement:

The panel assumes that the correct reference is 250.112(I). The types of circuits described in this section do not fall under the scope of Article 430.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-86 Log #3192 NEC-P11Meeting Action: Accept in Principle (430-145) **Final Action: Reject**

TCC Action: Reject

It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" to correlate with the action of the Technical Correlating Committee on Proposal 11-1. In addition, the Technical Correlating Committee directs the panel to reconsider the proposal and take any necessary action based on the technical merits relative to whether the section should reference the "grounding" or the "bonding" parts of Article 250. This action will be considered by the Panel as a Public Comment.

Submitter: Truman C. Surbrook, Michigan State University

Recommendation:

In the main paragraph to this section, change the reference to Part V of Article 250 to Part VI of Article 250 so the paragraph will read: Where required, grounding shall be done in the manner specified in Part ~~V~~ VI of Article 250.

Substantiation:

Part V of Article 250 is on bonding not grounding, although what is being done is bonding across a piece of flexible conduit in many cases. The rules that are referenced seem to all be in Part VI. Either change Part V to Part VI or if the Panel feels both are needed, then reference both parts. Making reference to grounding in 430.145 then referring to a section on boding is confusing.

Panel Meeting Action: Accept in Principle

Change Section 430.145 to read: "Method of Bonding." Where required, bonding shall be done in the manner specified in Part V of Article 250.

Revise the FPN to 430.145(A) to read: FPN: See 430.12(E) for equipment "bonding" ~~grounding~~ connection means required at motor terminal housings.

Panel Statement:

The changes made to Section 430.145 satisfy the intent of the submitter. The FPN text was changed to correspond with the change made in Section 430.145 from"grounding to bonding."

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

WRIGHT: NEMA disagrees with the Panel Action. The proposal has fostered significant debate in the Code process. After considering all of the debate, it is clear that the issue is one of education and not terminology. Changing the term from "equipment grounding conductor" to "equipment bonding conductor" in no way changes the need for qualified persons and continuing education. The present terminology is well understood by those who understand the purposes of grounding and bonding. The panel members and the public need to consider the magnitude of the change compared to the benefit. The change will create a nightmare of revisions and changes in terminology across the entire electrical system. The benefit is practically nonexistent.

Comment on Affirmative:

GOETZ: See my affirmative comment on Proposal 11-1 (Log #2453k).

11-87 Log #1939 NEC-P11Meeting Action: Accept **Final Action: Reject**
(430-145(B))

TCC Action: Reject

It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" to correlate with the action of the Technical Correlating Committee on Proposal 11-1.

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:

(B) Separation of Junction Box from Motor. The junction box required by 430.145(A) shall be permitted to be separated from the motor by not more than 1.8 m (6 ft), provided the leads to the motor are Type AC cable or armored cord or are stranded leads enclosed in liquidtight flexible metal conduit, flexible metal conduit, intermediate metal conduit, rigid metal conduit, or electrical metallic tubing not smaller than metric designator 12 (trade size), the armor or raceway being connected both to the motor and to the box.

Liquidtight flexible nonmetallic conduit and rigid nonmetallic conduit shall be permitted to enclose the leads to the motor, provided the leads are stranded and the required equipment ~~grounding~~ bonding conductor is connected to both the motor and to the box.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

SAUNDERS: See my Explanation of Negative on Proposal 11-1.

WRIGHT: NEMA disagrees with the Panel Action. The proposal has fostered significant debate in the Code process. After considering all of the debate, it is clear that the issue is one of education and not terminology. Changing the term from "equipment grounding conductor" to "equipment bonding conductor" in no way changes the need for qualified persons and continuing education. The present terminology is well understood by those who understand the purposes of grounding and bonding. The panel members and the public need to consider the magnitude of the change compared to the benefit. The change will create a nightmare of revisions and changes in terminology across the entire electrical system. The benefit is practically nonexistent.

Comment on Affirmative:

GOETZ: See my affirmative comment on Proposal 11-1 (Log #2453k).

11-88 Log #2502 NEC-P11 **Final Action: Accept in Principle**
(430-145(B))

Submitter: George W. Flach, Nat'l Armored Cable Mfrs' Assn. (NACMA)

Recommendation:

Revise 430.145(B) to add Type MC cable as follows:

(B) Separation of Junction Box from Motor. The junction box required by 430.145(A) shall be permitted to be separated from the motor by not more than 1.8 m (6 ft), provided the leads to the motor are Type AC cable, Type MC cable, or armored cord or are stranded leads enclosed in liquidtight flexible metal conduit, flexible metal conduit, intermediate metal conduit, rigid metal conduit, or electrical metallic tubing not smaller than metric designator 12 (trade size 3/8), the armor or raceway being connected both to the motor and to the box.

Liquidtight flexible nonmetallic conduit and rigid nonmetallic conduit shall be permitted to enclose the leads to the motor, provided the leads are stranded and the required equipment grounding conductor is connected to both the motor and to the box.

Where stranded leads are used, protected as specified above, each strand within the conductor shall be not larger than 10 AWG and shall comply with other requirements of this Code for conductors to be used in raceways.

Substantiation:

MC cable should be added because it provides an equivalent wiring method to that currently permitted.

Panel Meeting Action: Accept in Principle

Revise text to read by adding the underlined to (B):

"(B) Separation of Junction Box from Motor. The junction box required by 430.145(A) shall be permitted to be separated from the motor by not more than 1.8 m (6 ft), provided the leads to the motor are stranded conductors within Type AC cable, interlocked metal tape Type MC cable where listed and identified in accordance with section 250.118(11), or armored cord or are stranded leads enclosed in liquidtight flexible metal conduit, flexible metal conduit, intermediate metal conduit, rigid metal conduit, or electrical metallic tubing not smaller than metric designator 12 (trade size 3/8), the armor or raceway being connected both to the motor and to the box."

The remainder of the Code text is unchanged.

Panel Statement:

Not all types of MC cable are listed and identified for grounding. Only the interlocked metal tape type cable with stranded conductors have sufficient flexibility for this application. The panel believes the change satisfies the submitter's concern.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-88a Log #CP1101 NEC-P11 **Final Action: Accept**
(Table 430-148, Table 430.149, Table 430.150 and 430.6(A)(1))

Submitter: Code-Making Panel 11

Recommendation:

Delete the sentence from the Table Headers in Tables 430.148 and 430.149: "Motors built for especially low speeds or high torques may have higher full-load currents, and multispeed motors will have full-load current varying with speed, in which case the nameplate current ratings shall be used."

Delete the sentence from the Table Header in Table 430.150: "Motors built for low speeds (1200 RPM or less) or high torques may require more running current, and multispeed motors will have full-load current varying with speed. In these cases, the nameplate current ratings shall be used."

Add the sentence "Motors built for low speeds (less than 1200 RPM) or high torques may have higher full-load currents, and multispeed motors will have full-load current varying with speed, in which case the nameplate current ratings shall be used" as a new last sentence to 430.6(A)(1).

Delete the words "including notes" from the first sentence of 430.6(A)(1).

Substantiation:

Deleting the sentence from the Table Headers in 430.148, 149 and 150 "Motors built for… " and adding the same sentence as a new last sentence 3 to 430.6(A)(1) will add clarity. Deleting the words "including notes" from the first sentence of 430.6(A)(1) further adds clarity to this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-89 Log #1368 NEC-P11 **Final Action: Reject**
(Table 430-151)

Submitter: David Sroka Turner Falls, MA

Recommendation:

Add a second table note as follows:
"***Polyphase NEMA design a motors have currents 5 percent higher than the column B, C, D values."

Substantiation:

1. No direction is currently given for the NEMA design "A" motors.
2. Five percent value is only my best educated guess.

P.S. Motor curves are so readily available, none are attached.

Panel Meeting Action: Reject

Panel Statement:

Per the submitter's substantiation, 5% is a guess. Possible incorrect information should not be provided in the NEC.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-90 Log #2317 NEC-P11 **Final Action: Accept**
(Table 430-151(B))

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

Recommendation:

Revise table title as shown below:

Table 430-151(B). Conversion Table of Polyphase Design B, C, <u>and</u> D, ~~and E~~ Maximum Locked-Rotor Currents for Selection of Disconnecting Means and Controllers as Determined from Horsepower and Voltage Rating and Design Letter.

Also deleted table columns headed "E".

Substantiation:

The Design E motor standard was rescinded by NEMA in February 2000. All references to Design E motors have been removed from NEMA Standards Publication MG 1-1998 "Motors and Generators".

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-91 Log #24 NEC-P11 **Final Action: Accept in Principle**
(Table 430-152)

NOTE: The following proposal consists of Comment 11-227 on Proposal 11-89 in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 11-89 was:
Revise the table headings as follows:
Change the Type of Motor for Squirrel cage motors designated "Other than Design E" to "Other than Design E or Design B energy efficient." Also change the Type of Motor for Squirrel cage motors designated "Design E" to "Design E or Design B energy efficient."

Insert Table 430-152

(Table shown on page 2738)

Submitter: R. L. Nailen Hales Corners, WI

Recommendation:

As accepted, this proposal includes specific reference to "Design E" motors. All such references should be deleted from the Code. As of Feb. 2000, NEMA has rescinded its Design E motor standard. Furthermore, no such motors were ever offered on the market by either U.S. or foreign manufacturers, as can readily be verified through NEMA. This and any other Code references to "Design E" characteristics are therefore unnecessary and inappropriate.

Substantiation:

The problem in continuing to cite a nonexistent standard in the Code is that it inevitably casts doubt on the product knowledge of the Code-Making Panel and on the currency of the Code itself. When a product has never existed except on paper, and will not exist in the future, it need not and should not be cited in a Code of practice.

Panel Meeting Action: Accept in Principle

Panel Statement:

See the panel's action on Proposal 11-36. Note: Table 430.152 was its location in the 1999 NEC and is relocated as Table 430.52 in the 2002 NEC.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-92 Log #361 NEC-P11 **Final Action: Reject**
(Table 430-152)

Submitter: Edwin Obias, Zeiger Engineers, Inc.

Recommendation:

Please put back Table 430.152 on NEC 2002.

Substantiation:

None.

Panel Meeting Action: Reject

Panel Statement:

The submitter has failed to provide sufficient substantiation in accordance with 4-3.3 of the Regulations Governing Committee Projects. Note: Table 430.152 was its location in the 1999 NEC and is relocated as Table 430.52 in the 2002 NEC.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-93 Log #3142 NEC-P11 **Final Action: Reject**
(440-2 and 440.60)

Submitter: Patrick McLaughlin, McLaughlin and Associates

Recommendation:

1. Revise 440.60 to read as follows:

440.60 General. The provisions of Part VII shall apply to electrically energized room air conditioners that control temperature and humidity. ~~For the purpose of Part VII, a room air conditions (with or without provisions for heating) shall be considered as an ac appliance of the air cooled window, console, or in wall type that is installed in the conditioned room and that incorporates a hermetic refrigerant motor compressor(s). The provisions of Part VII cover equipment rated not over 250 volts, single phase, and such equipment shall be permitted to be cord and attachment plug connected.~~

A room air conditioner that is rated three phase or rated over 250 volts shall be directly connected to a wiring method recognized in Chapter 3, and provisions of Part VII shall not apply.

2. Add new definition to 440.2 to read:

Room Air-Conditioner. A consumer product, other than a packaged terminal air-conditioner or package terminal heat pump, which is powered by a single phase electric current and which is an encased assembly designed as a unit for mounting in a window or through the wall for the purpose of providing delivery of conditioned air to an enclosed space.

3. Add new definition to 440.2 to read:

Packaged Terminal Air-Conditioner. A wall sleeve and a separate unencased combination of heating and cooling assemblies specified by the manufacturer and intended for mounting through the wall. It includes refrigeration components, separable outdoor louvres, forced ventilation, and heating availability by purchaser's choice of hot water, steam, or electrical resistance heat.

4. Add new definition to 440.2 to read:

Packaged Terminal Heat Pump. A separate unencased refrigeration system installed in a cabinet of similar function and configuration to that of a packaged terminal air-conditioner. It utilizes reverse cycle refrigeration as its prime heat source and supplementary heat source availability by purchaser's choice of hot water, steam, or electric resistance heat.

Substantiation:

At its May 2001 ROP meeting, NFPA Panel 11 considered proposal 11-104 for consideration in the 2002 edition of NFPA 70. The proposal recommended that all single-phase cord-and plug-connected room air-conditioners shall be provided with factory-installed LCDI or AFCI protection. Technology Research Corporation (TRC), a manufacturer of electrical safety products, submitted the proposal, and it was incorporated into the 2002 edition of NFPA 70, National Electric Code, as section 440.65, *Leakage Current Detection and Interruption (LCDI) and Arc Fault Circuit Interrupter (AFCI).* The proposal, as adopted inadvertently ensnared packaged terminal equipment.

Section 440.65 was proposed in response to an alleged problem concerning incidences of fires in U.S. homes involving room and portable air conditioners. As noted in proposal 11-105, the source of statistical data cited in the substantiation came from "The U.S. Home Product Report," tables titled "Room Air Conditioner Fires in U. S. Homes" and "Portable Refrigerator or Air Conditioner Fires in U. S. Homes". The cited tables in the January 2002 edition of the report define the term "homes" to include one and two-family dwellings, duplexes, manufactured homes, apartments, tenements, flats, townhouses, and condominiums. In addition, it was also alleged that room and portable air-conditioner's power supply cords might be subjected to abuse from seasonal storage and recurring installations as this equipment is specifically designed for residential use, ease of installation, and removal by an average homeowner. The statistical data, when looked at closely, does not appear to identify packaged terminal equipment. Packaged terminal equipment is generally used in small commercial buildings and is permanently mounted and designed for installation and removal by trained, qualified installers and service technicians.

UL 484, *Standard for Safety, "Room Air Conditioners"*, covers equipment intended for installation in accordance with NFPA 70. After the 2002 edition of NFPA 70 was released, UL staff who revised UL 484 to incorporate section 440.65 interpreted it to apply to all single-phase cord and plug connected packaged terminal equipment. While the standard was undergoing public review, the Air-Conditioning & Refrigeration Institute (ARI) commented to UL that it should exclude packaged terminal equipment from section 440.65. UL staff rejected ARI's request on the basis that NFPA 70 does not specifically address packaged terminal equipment; therefore, UL staff incorrectly asserted that packaged terminal equipment is the same as room air-conditioning equipment - - contrary to federal law.

ARI submitted a formal interpretation request of NFPA 70 to clarify the industry's position that section 440.65 does not apply to packaged terminal equipment. NFPA staff responded that the request would be rejected under section 6-1.4 of the Regulations Governing Committee Projects.

The only way to resolve the issue is to specifically define packaged terminal equipment in NFPA 70. As indicated above, UL believes that NFPA 70's definition of room air-conditioner in section 440.60 inadvertently includes package terminal equipment. This is contrary to federal law and accepted industry standards. The National Appliance Energy Conservation Act of 1987, defines room air-conditioner as "a consumer product, other than a packaged terminal air conditioner, which is powered by a single phase electric current and which is an encased assembly designed as a unit for mounting in a window or through a wall for the purpose of providing delivery of conditioned air to an enclosed space. (10 CFR ss 430.2). The Federal Energy Policy Act of 1992 defines PT equipment as a commercial product with "a wall sleeve and a separate unencased combination of heating and cooling assemblies specified by the builder and intended for mounting through the wall. It includes a prime source of refrigeration, separable outdoor louvers, forced ventilation, and heating availability energy. (10 CFR s 430.2).

In addition, the American Society for Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 90.1-1999, a commercial building energy code referenced in NFPA 5000, specifically excludes "single-family houses, multi-family structures of three stories or fewer above grade, manufactured houses (mobile homes), and manufactured houses (modular)." While ASHRAE 90.1 excludes residential equipment, it specifically covers packaged terminal equipment.

In order to correct the inadvertent and unjustified inclusion of package terminal air-conditioners and heat pumps under NFPA 70, Section VII Provisions for Room Air Conditioners, NFPA 70 should revise section 440.2 to include a definition for room air-conditioner in conformance with federal law and include a definition for both packaged terminal air-conditioner and packaged terminal heat pump.

Panel Meeting Action: Reject

Panel Statement:

References to packaged terminal air conditioners (PTAC) and packaged terminal heat pumps (PTHP) are not presently found in the text of Article 440, and therefore it is not appropriate to define the terms. Insufficient substantiation was provided for the removal of the

of Article 440, and therefore it is not appropriate to define the terms." Insufficient substantiation was provided for the removal of the text from 440.60 including the statement "equipment shall be permitted to be cord and attachment plug connected." Insufficient substantiation was provided for the removal of requirements from Part VII, including restrictions on supply cords and LCDI or AFCI protection for PTAC and PTHP.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

BUNCH: The arguments previously presented for the requirements in 440.65 were all targeted at window air conditioners which are often removed during the off season. This should not apply to PTAC equipment. We tried to separate this by properly defining the terms as defined by regulatory agencies and industry standards with cited references for those definitions. We still need to properly define these terms. We also need to exclude PTACs from 440.65 as there is not data to support the requirement on that product. Upon review, we could simply add the definitions as needed in 440.2, and not make any other changes to 440 VII except add an exception to 440.65 that this section does not apply to Packaged Terminal Air-Conditioner or Packaged Terminal Heat Pump as would be defined in 440.2.

This would get the products correctly defined and address the issue of the rest of section VII still applying to PTAC equipment less 440.65.

11-94 Log #3362 NEC-P11 **Final Action: Reject**

(440-4)

Submitter: Mike Weitzel, City of Wenatchee, WA

Recommendation:

Add new text to read as follows:

A hermetic refrigerant motor compressor shall be provided with a nameplate that shall indicate the manufacturer's name, trademark, or symbol; identifying designation; phase; voltage; and frequency**:** that is accurate for the intended use for that specific installation.

Substantiation:

HVAC installations by code are required to have the nameplate visible, but most often there may be a number of different combinations of motors, compressors installed deleted in the specific unit that I'm inspecting, and it is difficult to determine whether or not the circuit or feeder to the unit is properly sized per the code. This will also harmonize with the Uniform Mechanical Code.

Panel Meeting Action: Reject

Panel Statement:

The submitter's concerns are covered in 440.4(B).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-95 Log #3320 NEC-P11Meeting Action: Accept in Principle **Final Action: Reject**
(440-4(B) Exception (New))

TCC Action: Reject

It was the action of the Technical Correlating Committee that this Proposal be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

Submitter: Brannon Wiltse Tampa, FL

Recommendation:

Revise 440.4(B) as follows:

(B) Multimotor and Combination-Load Equipment. Multimotor and combination-load equipment shall be provided with a visible nameplate marked with the maker's name, the rating in volts, frequency and number of phases, minimum supply circuit conductor ampacity, ~~and~~ the maximum rating of the branch-circuit short-circuit and ground-fault protective device, and the short circuit current rating. The ampacity shall be calculated by using Part IV and counting all the motors and other loads that will be operated at the same time. The branch-circuit short-circuit and ground-fault protective device rating shall not exceed the value calculated by using Part III. Multimotor or combination-load equipment for use on two or more circuits shall be marked with the above information for each circuit.

Substantiation:

HVAC equipment installed in commercial, industrial, and multifamily dwellings, is subject to significant amounts of available short circuit current. Not only must the overcurrent protective devices(s) have an adequate interrupting rating, but the other electrical components must also have an adequate short circuit current rating. Therefore, the equipment must be marked with the amount of short circuit current with which it has been found acceptable. Without this marking, the installer is unable to determine if the equipment being supplied is suitable for the application. Fortunately, the new UL 508A, Industrial Control Panels, now provides a means to mark this short circuit current rating on this type of equipment.

Panel Meeting Action: Accept in Principle

In the submitter's recommendation, in the first sentence, add the words: "of the control panel." after the phrase "and the short-circuit current rating."

Panel Statement:

It is the panel's intent to limit this new requirement to commercial and industrial equipment that utilizes a control panel that is an intregal part of the equipment.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 7 Negative: 7

Explanation of Negative:

BRIED: The panel action should have been to reject. The "short circuit rating" of the control panel is dependent on the upstream protective device type and its protective setting or size. It would be more appropriate to replace the underlined section of the proposal with "..., and the maximum permitted short circuit current at the connection point (or points) of the equipment to the power system." This change would assure that protective devices within the equipment are applied within short circuit ratings.

BUNCH: There continues to be no evidence of a problem which substantiates the need for this on this type equipment. This would require literally thousands of products to be tested from water coolers, commercial refrigeration and residential air conditioning to roof top and chiller units. This is impractical and unnecessary. This can be better addressed through product standards as required.

CLOSSON: The submitter has not presented any evidence that there is a problem.

It appears that the submitter may be confusing control panels and end products, such as an air conditioner. Control panels that control power to equipment beyond the confines of the control panel enclosure are currently required to be marked with the short circuit current rating. Listed end products rely on the installer to provide appropriate short circuit and overcurrent protection to protect the conductors to the end product. In the event a short circuit occurs in the listed end product and the short circuit protection provided by the installer does not open before component failure occurs, the enclosure will contain the results of the failure. The end product may be damaged, but the shock and fire hazard will be contained within the end product enclosure. Therefore, the installer has no need to know the short circuit current rating of the end product for a safe installation.

As for a control panel, it controls and protects the circuit(s) and equipment beyond the confines of the enclosure, necessitating the need for the installer to know the controller short circuit current rating to enable proper selection of equipment for the available fault current from the power supply source.

If the concern is damage to the end product, this is a performance issue and not a safety concern.

COX: The panel should have rejected this proposal. The term "short circuit rating" is not defined in the NEC. A location for the "short circuit" in the control panel circuitry is required before any type of current withstand rating can be determined and be meaningful.

GOETZ: The proposed revision to 440.4(B) applies to all air conditioning and refrigeration equipment without exception. The submitter's substantiation cites a concern for equipment when "significant amounts of available short circuit current" are present, however, no specific value is given to define what is considered to be significant and the revision to 440.4(B) would apply to equipment even when installed on a circuit where an insignificant amount of short circuit current is available. The substantiation cites UL508A as a means of providing a short circuit rating for equipment, however, UL508A is not an end-product equipment safety standard. While some air conditioning and refrigeration equipment may include an industrial control panel evaluated to UL508A, the applicable product safety standards, such as UL484, Room Air Conditioners, and UL1995, Heating and Cooling Equipment, do not currently require compliance with UL508A. The proposal does not state what method or methods are acceptable for determining and satisfying the short circuit current rating requirement and is not coordinated with proposed revisions to the applicable product safety standard requirements.

UL disagrees with the panel's action to include the phrase "of the control panel" because it is vague and does not reflect the stated intent of the panel, that is, to apply to commercial and industrial equipment, as noted in the panel statement. The proposal as revised by the panel does not define what it considers to be the "control panel" and gives no relief from the requirement for residential type equipment or for cord connected air conditioning and refrigeration equipment of a commercial and/or industrial nature. Residential and cord-connected equipment is not likely to be connected to a high capacity circuit and the installation in many cases will not be reviewed by an authority having jurisdiction or even installed by an electrician.

If the submitter's intent was to require short circuit current ratings on motor controllers or a control panel (containing motor controllers and other circuit protective devices), a proposal to change 440.5 "Marking on Controllers" similar to a proposal of the same submitter as 11-19 (Log #3348) and exceptions similar to panel action on 11-19 based on intended use, equipment ratings, and/or available short

circuit current is advised. Such a proposal would be consistent with action taken in Article 430 and provide a better definition of the scope and intent of the requirement.

HAAS: This proposal should have been rejected. Both the submitter and the panel have missed the mark with this proposal. 110.10 does state that component short-circuit current ratings shall be used in circuit design. This was intended for MCCs, switchgear, busways, and other apparatus containing busbars and similar conductors subject to violent magnetic forces, which would tend to destroy such equipment in the event of a short circuit. Typical wiring design using conduit or cable in trays and raceways is designed and installed without the need to assess the fault current which might flow. Similarly, multi-motor equipment (regardless of whether it contains a control panel) would not be expected to self-destruct as a result of high current flow if it is built in accordance with NEMA practices and the other provisions of this Code. Motors are not apparatus that would typically have a short-circuit rating. The submitter has not provided any technical substantiation supporting this added marking.

WRIGHT: The Panel's action added the words "control panel" to the requirement for short-circuit current ratings. The addition of Article 409 by Proposal 11-5 addresses the issue of short-circuit current ratings on control panels, and is more specific to the type of equipment that the Panel intended to be addressed by 440-4(B).

Comment on Affirmative:

GARVEY: The panel action to accept the proposal is an important first step. The control panels for commercial and industrial refrigeration equipment should be evaluated and marked with a short circuit current rating. This facilitates the inspection and approval process. Inspectors need this information to ensure that 110.10 is met. The potential hazard exists where higher fault currents are available. This is not the case for a typical residential cooling unit serving an individual dwelling unit. The substantiation addressed commercial, industrial and multi-family applications. An exception should be made for units serving one- and two-family dwellings.

SAPORITA: The provisions of this proposal are congruent with the UL 508A product safety standards requirements.

11-96 Log #747 NEC-P11 **Final Action: Reject**
(440-12(A)(1) Exception (B) (2))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise exception for (A)(1) as follows: A listed nonfusible ~~nonfused~~ motor circuit switch having a horsepower rating not less than the equivalent horsepower determined in accordance with 440.12(A)(2), or a listed nonfusible molded case switch shall be permitted to have an ampere rating less than 115 percent of the specified current. Revise exception for (B)(2): A listed nonfusible ~~nonfused~~ motor circuit switch having a horsepower rating not permitted to have an ampere rating not less than the equivalent horsepower determined by 44.12(B), or a listed nonfusable moulded case switch shall be petmitted to have an ampere rating less than 115 percent of the sum of all currents.

Substantiation:

"Nonfusible" may be technically more accurate; the UL "white book" uses the phrase "without fuse holders". Nonfusible molded case switches are rated for continuous load at their rating and are permitted as motor controllers and disconnecting means.

Panel Meeting Action: Reject

Panel Statement:

The word "nonfused" has been used throughout the NEC for many editions. Sufficient evidence has not been provided to change the existing wording and will not add clarity.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-97 Log #720 NEC-P11 **Final Action: Accept in Part**
(440-12(D))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:

(D) Every ~~SWITCH~~ Disconnecting Means. Every disconnecting means in the motor-compressor circuit between the point of attachment to the feeder and the point of connection to the refrigerant motor-compressor shall be of a type described in 430.109 and shall comply with the applicable provisions ~~requirements~~ of 430.109.

Delete (E).

Substantiation:

"Every switch" in the heading doesn't correlate with "every disconnecting means" which includes circuit breakers and plug/receptacle connections. Though requirements similar to Article 430 are specified, the type of disconnecting means is not, and only infers horsepower rated switches are required.

The proposed reference to 430.109 makes subsection (E) superfluous.

All of 440.12 does not consist of requirements, per se, some provisions are permissive.

Panel Meeting Action: Accept in Part

The panel accepts replacing "switch" in the heading to "disconnecting means". The panel rejects replacing "requirements" with "provisions."

Panel Statement:

"Requirements" is the preferred term for clarity and is mandatory in nature. Reference to 430.109 is not in compliance with Section 4.1 of the style manual.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-98 Log #1361 NEC-P11 **Final Action: Reject**
(440-14 (New))

Submitter: Robert Wagner, Wagner Electric

Recommendation:

Add a new section to read as follows:
440.14 Location. Disconnecting means shall be located within sight from and readily accessible from the air-conditioning or refrigerating equipment. The disconnecting means shall be permitted to be installed on or within the air-conditioning or refrigerating equipment. Where the disconnect is not installed within the air-conditioning or refrigerating equipment, a designated location/s shall be provided on the equipment for locating the disconnect. The disconnecting means shall not be located on panels that are designed to allow access to the air-conditioning or refrigeration equipment.

Substantiation:

The action of the Panel in the 2002 cycle to prohibit a disconnecting to be located on panels that are designed to allow access was an excellent change. However, in many cases all of the panels are removable and the inspector will not allow a disconnect to be mounted on any panel because they are all removable. The manufacturer could mark panels capable of mounting a disconnect to solve this problem. The manufacturer would know which panels a disconnect could be mounted on without creating an access problem. This additional proposed language is needed to solve field problems in locating disconnects.
We have for many years been involved primarily in the HVAC business. The HVAC industry is not limited to new construction on wide open rooftops with ample space for locating a disconnecting means. Any available space is used for this type of equipment and mounting a disconnect "within sight" sometimes gives both the installer and inspector nightmares. The addition of this text to 440.14 will not be an unnecessary burden on the manufacturer; it will however make for efficient, safe installations of all HVAC equipment.

Panel Meeting Action: Reject

Panel Statement:

The proposed text is at odds with the first sentence in Section 440.14. The disconnecting means is not required to be installed on or within the unit.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-99 Log #1679 NEC-P11 **Final Action: Reject**
(440-14)

Submitter: Rick A. Zehner, McKinstry

Recommendation:

Revise text as follows:
Disconnect means shall be located within sight from and readily accessible from the air conditioning or refrigerating equipment. The disconnecting means shall be permitted to be installed ~~on~~ adjacent to or within the air conditioning or refrigerating equipment.

Substantiation:

The electrical Authority Having Jurisdiction approves disconnecting means and then a correction notice is issued by the mechanical Authority Having Jurisdiction. This proposal will bring both codes into line with each other. This will save wasted time and money to customers, contractors and Authorities Having Jurisdiction.

Panel Meeting Action: Reject

Panel Statement:

The submitter has failed to show sufficient technical substantiation that a conflict exists between the NEC and mechanical codes. Existing wording already covers "adjacent" under the "within sight" requirement. The proposal would also put into question the practice of mounting the disconnecting means "on" the unit.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-100 Log #2816 NEC-P11 **Final Action: Accept in Part**
(440-14 Exception No. 1)

Submitter: Michael I. Callanan, NJATC / Rep. IBEW

Recommendation:

Revise Exception No. 1 to 440.14 to read as follows:
Exception No. 1: Where the disconnecting means provided in accordance with 430.102(A) is capable of being locked in the open position, and the refrigerating or air-conditioning equipment is essential to an industrial process in a facility with written safety procedures, and where the conditions of maintenance and supervision ensure that only qualified persons service the equipment, a disconnecting means within sight from the equipment shall not be required. The provision for locking or adding a lock to the disconnecting means shall be permanently installed on or at the switch or circuit breaker used as the disconnecting means. The locking means shall not be capable of being defeated by the removal of a cover.

Substantiation:

This proposal is intended to extend the revisions made by CMP-11 during the 2002 code cycle in Article 430 for motors, to Article 440. It really makes little difference whether the disconnecting means is for a motor or for a component of an electric motor-driven air-conditioning and refrigerating equipment, the requirement should apply because the same hazard exists. During the last code cycle CMP-11 received data that indicated the problems associated with the proper lockout of motor disconnecting means. The addition of a permanent means on or at the switch or circuit breaker ensures that the lockout can be successfully performed without the fear of the lock being inadvertently removed. It should be noted that OSHA is presently citing employers for the use of many of the plastic type, non-listed, snap-on circuit breaker and switch lockout devices. The proposal also includes two other provisions. The first adds another condition, i.e., written safety procedures, which was also present in 430.102(B) in order to apply the exception. Facilities that chose to omit the local disconnecting means must have written safety procedures in place that address the proper lockout/tagout procedures and secondly, a new last sentence has been added. This revision is merely an attempt to clarify the application of the requirement put in place during the last code cycle for the application of 430.102(B) Exception. The need for this additional sentence is based on the fact that on some panelboards or distribution centers the locking means is rendered ineffective when the dead front or cover is removed. This can cause an unsafe condition for persons working on the equipment and was not the intent of the original proposal to permit this by-passing of the new requirement. This additional sentence is also being proposed as a companion proposal to 430.102(B) Exception.
This proposal represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Accept in Part

The panel accepts the proposal, except for the last sentence: "The locking means shall not be capable of being defeated by the removal of a cover."

Panel Statement:

Insufficient evidence has been submitted to indicate that a problem with removing covers after lockout/tagout has been accomplished.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

D'AMICO: See my Explanation of Negative on 11-66. The last sentence of the proposal should be kept in the text.
SAPORITA: The last sentence of the Proposer's text should be retained. See my Explanation of Negative on Proposal 11-66.

11-101 Log #3460 NEC-P11 **Final Action: Reject**
(440-14 Exception No. 1)

Submitter: Charles M. Trout, Maron Electric Co. Inc.

Recommendation:

Delete the exception in its entirety.

Substantiation:

The National Electrical Code is prescriptive code. To say "where the conditions of maintenance and supervision ensure that only qualified persons service the installation," is a performance requirement. Without prescriptive requirements indicating whether this qualified person is an employee of the owner of the premises or is a separately contracted person and the Authority Having Jurisdiction has a means of verification of the continued employment of the qualified person and whether the qualified person has been verified by the authority having jurisdiction as meeting the definition of a qualified person as shown in the definitions of this Code no prescriptive requirements have been followed.
To permit relaxation of the safety requirements of this Code without establishing a positive guarantee that the safety of persons and property is indisputably assured is a reprehensible act.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided sufficient technical substantiation to support the recommended change. The exception as it exists now is in alignment with 430.102(B), Exception (b). The phrase "where the conditions of maintenance and supervision ensure that only qualified persons service the installation" is presently used in many locations in the NEC and it is accepted.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-102 Log #1490 NEC-P11 **Final Action: Reject**
(440-22)

Submitter: Dann Strube Lanesville, IN

Recommendation:

Revise to read as follows:
~~The~~ A motor-compressor branch-circuit short-circuit and ground-fault device shall be ~~capable of carrying the starting current of the motor~~. provided for each motor.

Substantiation:

Section 90.1 is clear that the purpose of the code is safety. However, Section 90.1 does not promise that the installation will be efficient, convenient or adequate for good service. If the protective device is undersized, the equipment will not run. To be sure, that is not adequate for good service but it is in no way unsafe. This change brings this section into compliance with the intent of Section 90.1.

Panel Meeting Action: Reject

Panel Statement:

The submitter has provided no substantiation that a problem exists.
Subjecting a protective device to locked rotor current in excess of its ratings would violate 110.9.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-103 Log #1416 NEC-P11 **Final Action: Accept in Principle**
(440-32)

Submitter: Jamie McNamara Hastings, MN

Recommendation:

Add underlined text as follows:
440.32 Single Motor-Compressor. Branch-circuit conductors supplying a single motor-compressor shall have an ampacity not less than 125 percent of either the motor-compressor rated-load current or the branch-circuit selection current, whichever is greater.
For a wye-start, delta-run connected motor-compressor, the selection of branch-circuit conductors between the controller and the motor-compressor shall be permitted to be based on not less than 125 percent of 58 percent of either the motor-compressor rated-load current or the branch-circuit selection current, whichever is greater.

Substantiation:

To make it clear the 58 percent is to be taken at 125 percent.

Panel Meeting Action: Accept in Principle

Panel Statement:

See the panel action and statement on Proposal 11-105.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-104 Log #1417 NEC-P11 **Final Action: Reject**
(440-32)

Submitter: Jamie McNamara Hastings, MN

Recommendation:

Add underlined and delete strikethrough text as follows:
440.32 Single Motor-Compressor. Branch-circuit conductors supplying a single motor-compressor shall have an ampacity not less than 125 percent of either the motor-compressor rated-load current or the branch-circuit selection current, whichever is greater.
For a wye-start, delta-run connected motor-compressor, the selection of branch-circuit conductors between the controller and the motor-compressor shall be permitted to be based on 62.5 ~~58~~ percent of either the motor-compressor rated-load current or the branch-circuit selection current, whichever is greater.

Substantiation:

To make it clear the 62.5 percent is needed to provide conductors at 125 percent.

Panel Meeting Action: Reject

Panel Statement:

The proposed multiplier "62.5" is incorrect. See panel statement on Proposal 11-105.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-105 Log #1418 NEC-P11 **Final Action: Accept in Principle**
(440-32)

Submitter: Jamie McNamara Hastings, MN

Recommendation:

Add underlined and delete strikethrough text as follows:
Single Motor-Compressor. Branch-circuit conductors supplying a single motor-compressor shall have an ampacity not less than 125 percent of either the motor-compressor rated-load current or the branch-circuit selection current, whichever is greater.
For a wye-start, delta-run connected motor-compressor, the selection of branch-circuit conductors between the controller and the motor-compressor shall be permitted to be based on 72.5 ~~58~~ percent of either the motor-compressor rated-load current or the branch-circuit selection current, whichever is greater.

Substantiation:

To make it clear the 58 percent is to be taken at 125 percent or 72.5 percent.

Panel Meeting Action: Accept in Principle

Revise text as follows: Change "72.5" in the second paragraph to "72". Add fine print note to read as follows: FPN: The multiplier 72% is obtained by multiplying 58% x 125%.

Panel Statement:

This change meets the submitter's intent and adds clarity.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-106 Log #1323 NEC-P11 **Final Action: Accept**
(440-34)

Submitter: National Electrical Code Technical Correlating Committee

Recommendation:

Replace the term "computed" with the term "calculated" in the following sections:
440.34

Substantiation:

This proposal is the result of an effort by the NEC Usability Task Group to standardize the language throughout the NEC relative to the use of the terms computed and calculated. After analyzing the usage, the group agreed that the term "calculated" was the best term for use throughout the NEC. This is one in a series of proposals to standardize on the term calculated.
The term "calculate" and its derivatives is presently used in the article title, section titles, and throughout portions of the existing article. Other Articles of the NEC such as for calculating conductor ampacties (under engineering supervision), calculating the size of enclosures, and in Annex D use the term calculate. Additionally, the term "calculate" is more commonly used in other NFPA codes and standards e.g. NFPA 70E, arc flash calculation. Adversely, the term "computation" has a connotation of using a computer, although "load calculations" are frequently determined using a calculator. It appears that the term "computation" was used more frequently beginning with the 1975 NEC based on an editorial revision project.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-107 Log #773 NEC-P11 **Final Action: Accept in Principle**
(440-63(2))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise latter portion:
(2) An approved manually operable switch or circuit breaker that disconnects the receptacle is installed in a readily accessible location within sight from the room air conditioner.

Substantiation:

Edit. Although a circuit breaker may be used as a switch the Code generally indicates they are different devices. The proposal is intended to clarify that a circuit breaker may be used, and specify (not infer) the function of the switch.

Panel Meeting Action: Accept in Principle

Revise 440.63(2) to read as follows:
(2) An approved manually operable disconnecting means is installed in a readily accessible location within sight from the room air conditioner.

Panel Statement:

Circuit breakers are one of the many types of disconnecting means. This revision meets the submitter's intent and provides clarity.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-108 Log #2579 NEC-P11 (440-64) **Final Action: Accept**

Submitter: William Keezer, WJ Keezer Associates / Rep. Association o f Home Appliance Manufacturers (AHAM)

Recommendation:

Revise 440.64 as noted:

440.64 Supply Cords. Where a flexible cord is used to supply a room air conditioner the following conditions shall be met:

(A) Length of Cord. The length of such cord shall not exceed 3.0 m (10 ft) for a nominal, 120 volt rating or 1.8 m (6 ft) for a nominal, 208- or 240-volt rating.

(B) Cord Types. The cord shall be listed or approved for hard usage or extra hard usage as specified in Table 400.4.

Substantiation:

Problem: There is a perception that room air conditioner power cords require improved resistance to mechanical damage due to the number of installation and storage cycles to which some units are likely to be subjected in the course of the product's life. This proposal specifically requires adoption of more robust cord construction than is currently permitted by *UL 484 Room Air Conditioners.*

Substantiation: Paragraph 1.2.4 of UL 484 tabulates all permitted cord types. Many of these are categorized as suitable for hard usage or extra hard usage. Currently, SP-3, SPE-3, and SPT-3 are the types most commonly used but their use is "limited to use in general-use cord sets that are not likely to be subjected to frequent flexing." (UL-817, Table 44.1). This proposed change in the requirements would prohibit the continued use of those cordage types. By adoption of the proposal, all permitted cord types would be of jacketed construction -–providing two layers of mechanical protection for all electrical conductors. The cord types that would no longer be acceptable use a single layer of material, serving as both insulator and mechanical protection. *AHAM* believes this change represents a significant increase in the required mechanical integrity of home air conditioner cordage, but does not prohibit the use of even more robust cordage (extra hard usage) when the particular application, as determined by the manufacturer and UL, requires it. The practical result of this change is to prohibit the use of non-jacketed cords.

AHAM further contends that this proposal achieves the intent of 440.65 without the attendant complexity, lack of field experience, and concerns for reliability and safety. *AHAM* recommends the concurrent adoption of a proposal to delete paragraph 440.65, which has been submitted by the same submitter.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 11 Negative: 3

Explanation of Negative:

BUNCH: This was submitted so that the Panel could accept this more robust cord and eliminate the requirement of 440.65, i.e., LCDI or AFCI in the cord. Accepting this only and maintaining 440.65 actually makes even more of an unknown than it is today. Product evaluation with existing, although limited, LCDI technology is being done with the present cords in use. Changing to these new cords and maintaining 440.65 is virtually starting over in the design process and would be irresponsible for the Panel to expect of manufacturers at this point. There could well be problems created by this change which would be worse than the present perceived situation. Therefore, if the Panel continues to vote that 440.65 is needed, this proposal should now be rejected as not addressing the submitter's original intent and potentially making the product less safe than it now is.

CLOSSON: I agree with the comments made in Mr. Haas' Explanation of Negative Vote.

HAAS: The integrity of the electrical safety system is anchored in the systematic integration of the NEC, product safety standards, installation inspection and product testing. Any activity to weaken one component will weaken the entire process. If product safety issues were usurped by the Code, the product safety standard process would be weakened resulting in the entire process being weakened.

EEI's position is that the requirements for listed appliance cords, lamp cords, and extension cords, that are not installed as part of the permanent premises wiring system, are best covered by the appropriate product standard. It is not the Code's intent or scope to require supplemental overcurrent protection, AFCI, or LCDI, to be provided as part of a listed lamp or appliance cord or listed extension cord sets that would typically be purchased by the after market consumer. EEI supports the entire electrical safety system that integrates product standards, installation standards, product testing and evaluation, electrical inspection, manufacturer's products, qualified electrical installation, electric supply system characteristics and owner's use and operation. Covering product standards in the installation standard such as the NEC could negate the responsibility of the appropriate product standard and adversely impact the entire process.

Comment on Affirmative:

BRIED: Within the proposal's substantiation, a statement is included that a companion proposal (11-110) be adopted and suggested a concurrent adoption of that proposal. The committee rejected Proposal 11-110 and acceptance of this proposal does not imply acceptance of Proposal 11-110.

11-109 Log #2580 NEC-P11 (440-65) **Final Action: Reject**

Submitter: William Keezer, WJ Keezer Associates / Rep. Association o f Home Appliance Manufacturers (AHAM)

Recommendation:

Revise Paragraph 440.65 as follows:

440.65 Leakage Current Detection and Interruption (LCDI) and Arc Fault Circuit Interrupter (AFCI). Branch circuits supplying single-phase cord-and-plug-connected room air conditioners shall be provided with ~~factory-installed~~ LCDI or AFCI protection. ~~The LCDI or AFCI protection shall be an integral part of the attachment plug or be located in the power supply cord within 300 mm (12 in.) of the attachment plug.~~ The LCDI or AFCI shall also meet the requirements of 440.62 of this Article.

Substantiation:

Problem: *AHAM* supports legitimate concern for the safety of circuits and cordage used for room air conditioners, but it believes that those concerns are better addressed using currently available and proven technology. It further believes that there are reasons to expect a substantial safety and reliability risk if room air conditioners are designed to accommodate devices such as those required by this Section. We also believe a significant reduction in fire incidents attributed to room air conditioners can be achieved if the entire branch circuit is protected; an achievement not possible with the current Code requirement.

Substantiation:

1) There are no devices such as those required in this Section that have been produced in numbers adequate to insure their long-term reliability or safety in this application. We are concerned that the incorporation of a device with an unproven record of reliability can actually decrease the inherent safety of a room air conditioner. At this time, there is no manufacturer of an attachment plug or integral cord mounted LCDI or AFCI that can provide documented reliability statistics for these devices in this application. It is well known in the field of statistical failure analysis that the failure rate of any device is significantly increased as a result of the cumulative failure rate of each component. A standard power cord head has 4 components (3 conductors and 1 molded casing). A typical LCDI power cord head consists of more than 25 parts. Even without detailed component failure data (which is currently unavailable), it should be obvious that a complex electro-mechanical device is inherently more prone to failure than a power cord.

2) Protection of the entire branch circuit is a better way to insure against hazards due to circuit faults than by restricting the protective device to the cordset. **Annex A** (a supporting document submitted with this proposal) has been prepared by a thorough and objective analysis of consumer injury and fire incident databases. It shows that very few fires attributed to room air conditioners are initiated in unmodified power cords and plugs. The vast majority arise through the use of unsuitable extension cords, in cords subject to unauthorized modification by the user, in the receptacle or even within the branch circuit. Better protection from such incidents is provided through protection of the entire branch circuit. Indeed, the majority of fires initially attributed to "room air conditioners" in the Annex A data were, in fact, attributable to branch circuit outlets, receptacles, and wiring, not cords and plugs. In the sub-category of cords and plugs, the two greatest causes of cord and plug fires were cords spliced by the unit owner and the use of extension cords. There is evidence that when these splices were made, it was to extend the length of the cord, not necessarily to repair a damaged one. See **Exhibit 4 of Annex A**.

3) If a device as currently required trips as the result of a legitimate cord fault, through some power supply anomaly, or because it is defective, a trip indication and reset feature must be provided. If the device will not reset, the owner cannot confirm whether the fault is within the power cord, the air conditioner, or the protective device. By way of example only, currently available GFCIs (receptacle and panel mounted) and panel mounted AFCIs can both be tested by removing the suspect load and resetting the device. A device integral to the power cord does not allow such a test. *AHAM* is concerned that substituting a replacement cord for the protective device will be performed on such equipment as a substitute for proper diagnosis and repair. Further investigation of the fire incident data contained in Annex A indicates a number of power cords were altered by users, and that spliced cords were the ultimate cause of those fires. It is a significant concern of *AHAM's* that when an air conditioner is too valuable to throw out, and too expensive or inconvenient to professionally repair, the power cord will be subject to hazardous alteration.

Solution: Panel mounted AFCI's are a proven technology, but most importantly they are readily available as branch circuit protection devices thanks to the requirements of Section 210.12(B). At this time, the requirements of Section 210.12(B) address 120 volt, 15 and 20 ampere branch circuits, which have caused 120 volt AFCI's to become a familiar installation item for electricians.

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

Panel Meeting Action: Reject

Panel Statement:

The panel does not accept the premise that those individuals who purchase room air conditioners will then also install an AFCI or LCDI. Since these installations are not normally inspected by the AHJ after purchase of a room air conditioner, there would be no means to ensure compliance with the intent of 440.65. The panel repeats its desire to reduce the number of fires caused by room air conditioner cords and believes that the existing requirements are the best way to achieve that goal.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

BUNCH: There are several reasons this proposal should be accepted, some are as follows:

1. AHAM presented a documented study which refutes the need for 440.65. The opposing arguments are less reliable, such as newspaper articles without clear analysis of causation.
2. Present product development of LCDI and AFCI for this use in question.
3. Use of some options offered could lead to more problems than might presently exist such as misuse and the end user modifying the product in an unsafe manner.
4. Lastly, if such a need is proven, it is best addressed in product standards and not the Code. There are far too many design issues for Panel Members to be trying to dictate through Code language. It's not reasonable to expect Panel Members to be able to do this, nor manufacturers expected to be held accountable for product design features managed through the Code process. This is a function best done through the product standards process.

Comment on Affirmative:

HAAS: Branch circuit protection should have been referred to CMPs 2 and 10 for consideration.

SAUNDERS: We support the idea of AFCI circuit breakers feeding these circuits HOWEVER; we do not believe eliminating the cord

requirement is the right answer at this time. The problem is that most residential room A/C units will be used in older probably lower income homes. While the AFCI may provide protection for the A/C unit and certainly better protection for the entire circuit they will probably never get installed in the older lower income homes where we have the greatest concern. Requiring the cords on the A/C units will at least provide this protection as A/C units are replaced. A fault within the unit in many cases cannot trip the non-AFCI breaker feeding the unit and the cord eventually creates the ignition source. A major industrial firm has documented a number of A/C unit failures due to a faulty motor connection within the units. The investigation of one such failure found that the event led to a fire in a communications building where the internal fault was insufficient to trip the feeder breakers allowing the cord to ignite and start the fire. In this case, the cord eventually fused and the breaker never tripped.

11-110 Log #2581 NEC-P11 **Final Action: Reject**
(440-65)

Submitter: William Keezer, WJ Keezer Associates / Rep. Association o f Home Appliance Manufacturers (AHAM)

Recommendation:

Delete Paragraph 440.65 as follows:

~~**440.65 Leakage-Current Detection and Interruption (LCDI) and Arc-Fault Circuit Interrupter (AFCI).** Single-phase cord-and-plug-connected room air conditioners shall be provided with factory-installed LCDI or AFCI protection. The LCDI or AFCI protection shall be an integral part of the attachment plug or be located in the power supply cord within 300 mm (12 in.) of the attachment plug.~~

Substantiation:

Problems: There is a perception that room air conditioner power cords require improved resistance to mechanical damage due to the number of installation and storage cycles to which some units are likely to be subjected in the course of the product's life. This proposal recognizes that if a companion proposal provided by this submitter is adopted which revises the cord requirements for room air conditioners in Section 440.64, then the protective measures required by this section are unnecessary.

A second problem is caused by the fact that, without a sufficiently advanced effectiveness date, AHJs are already red-tagging new air conditioner installations, while the air conditioner industry has yet to be supplied with sufficient reliability data to insure that air conditioner safety won't be compromised by incorporation of these proposed devices in new products.

A third problem is that as of this date, 208/240-volt devices of either configuration don't exist, except as prototypes. None have achieved production status, nor are any listed.

A fourth problem is that as of this date the cord required for the function of the LCDI is not a type covered in Table 400.4 of the NEC. Additionally there are no cord type AFCI devices available in the marketplace.

Substantiation:

1) *AHAM* has submitted to this committee a proposal to restrict the acceptable cord types for room air conditioners to constructions suitable for hard usage or extra hard usage. We believe adoption of this proposal makes the continued existence of 440.65 unnecessary. Paragraph 1.2.4 of UL 484 tabulates all permitted cord types. Many of these are categorized as suitable for hard usage or extra hard usage. Currently, SP-3, SPE-3, and SPT-3 are the types most commonly used but their use is "limited to use in general-use cord sets that are not likely to be subjected to frequent flexing." (UL-817, Table 44.1). This proposed change in the requirements would prohibit the continued use of those cordage types. By adoption of the proposal, all permitted cord types would be of jacketed construction -–providing two layers of mechanical protection for all electrical conductors. The cord types that would no longer be acceptable use a single layer of material, serving as both insulator and mechanical protection. *AHAM* believes this change represents a significant increase in the required mechanical integrity of home air conditioner cordage, but does not prohibit the use of even more robust cordage (extra hard usage) when the particular application, as determined by the manufacturer and UL, requires it. The practical result of this change is to prohibit the use of non-jacketed cords. *AHAM* believes this change to the Code and eventually to the UL Standard effectively addresses the original intent of this Section, which was to reduce the potential for fires initiated by damaged cordsets. It does so by utilizing cordage intended to survive hard use, without the addition of a complex and potentially unreliable device. See (2) below.

2) There are no devices such as those required in this Section that have been produced in numbers adequate to insure their long-term reliability or safety in this application. We are concerned that the incorporation of a device with an unproven record of reliability can actually decrease the inherent safety of a room air conditioner for the reasons addressed in (3) below. At this time, there is no manufacturer of an attachment plug or integral cord mounted LCDI or AFCI that can provide documented reliability statistics for these devices in this application. The failure rate of any device is significantly increased as a result of the cumulative failure rate of each component. A standard power cord head has 4 components (3 conductors and 1 molded casing). A typical LCDI power cord head consists of more than 25 parts. Even without detailed failure data (which is currently unavailable), it should be obvious that a complex electro-mechanical device is inherently more prone to failure than a power cord.

3) If a device as currently required trips as the result of a legitimate cord fault, through some power supply anomaly, or because it is defective, a trip indication and reset feature must be provided. If the device will not reset, the owner cannot confirm whether the fault is within the power cord, the air conditioner, or the protective device. By way of example only, please note that currently available GFCIs (receptacle and panel mounted) and panel mounted AFCIs can both be tested by removing the suspect load and resetting the device, then reconnecting the load. A device integral to the power cord does not allow such a test. *AHAM* is concerned that substitution of a replacement cord for the protective device will be performed on such equipment as a substitute for proper diagnosis and repair. Investigation of the fire incident data contained in **Annex A** indicates users altered a number of power cords and that spliced cords were the ultimate cause of those fires. It is a significant concern of *AHAM* that when an air conditioner is too valuable to throw out, and too expensive or inconvenient to professionally repair, the power cord will be subject to hazardous alteration. The high incidence of "spliced cords" resulting in fires is adequate evidence of the willingness of the public to attempt cord alteration, and to ignore the hazards that may result. Every cord-integral LCDI or AFCI that fails to reset creates a candidate for cord alteration.

4) Devices currently on the market will not detect arcing or current faults in a circuit preceding the device. By way of example, extension cords located in the circuit before the LCDI will continue to be identified as a fire cause for air conditioner cords. Replacement cords will continue to be identified as a fire cause for air conditioner cords.

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

Panel Meeting Action: Reject

Panel Statement:

The panel repeats its desire to reduce the number of fires caused by room air conditioner cords and the existing requirements are the best way to achieve that goal. The technical substantiation, Annex A, was based on incident reports for residential room air conditioners. Section 440.65 also applies to other types of room air conditioners such as packaged terminal air conditioners (PTAC) and packaged terminal heat pumps (PTHP).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 10 Negative: 4

Explanation of Negative:

BUNCH: This is the same topic and reasons for negative vote as I listed in my comments on 11-109.

GLOSSON: As a result of Underwriters response to the addition of 440.65 to the 2002 NEC, the requirement stated in 440.65 is now

CLOSSON: As a result of Underwriters response to the addition of 440-65 to the 2002 NEC, the requirement stated in 440-65 is now redundant. UL's Standard, Room Air Conditioners, UL 484, Paragraph 11.2.1.1, now contains the requirement for, cord connected, single phase, room air conditioners to be provided with LCDI or AFCI protective devices. All cord connected room air conditioners listed to UL 484, effective August 1, 2004 will have these devices.

In addition to adding this requirement to the end product standard, UL established a date for manufacurers to comply. This gives the manufacturers time to prepare to meet this new requirement, which is not contained in the current NEC. This has created a problem for the installers and Authority Having Jurisdiction inspectors in the field as room air conditioners in the distribution sytem may not comply with the current NEC requirement.

Acceptance of this proposal to remove 440-65 from the NEC will have no impact on the end product. Changes to UL 484 to modify this requirement will fall into the hands of the Standards Technical Panel (STP), which operates very similar to the NFPA NEC Code Panels. Therefore, the requirement will not be changed without first obtaining a consensus from the representatives making up the STP.

COX: The Panel should have accepted this proposal.

This requirement is a product standard issue. The NEC added this section in the 2002 edition, but one can still purchase listed room air conditioners today without the 440.65 requirements. The manufacturers only began to be concerned with this requirement when it went into the product standard and the product listing agency has set the compliance date for sometime in the future. Neither of these actions were determined by the NEC being adopted into law by a legal authority.

HAAS: See my Explanation of Negative on Proposal 11-108.

13-4a Log #CP1300 NEC-P13 (445-3) **Final Action: Accept**

Submitter: Code-Making Panel 13

Recommendation:

Delete Section 445.3.

Substantiation:

Chapters 5, 6, and 7 apply to any installations within their scope and can modify Chapters 1-4.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

13-4b Log #CP1301 NEC-P13 (445-10) **Final Action: Accept**

Submitter: Code-Making Panel 13

Recommendation:

Delete the last sentence of Section 445.10.

Substantiation:

Chapters 5, 6 and 7 already apply to any installation covered by their scope.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

13-5 Log #2923 NEC-P13 (445-11) **Final Action: Accept**

Submitter: Dorothy Kellogg, American Chemistry Council

Recommendation:

Reword 445.11 to include impedance on the nameplate as follows:

"Each generator shall be provided with a nameplate giving the manufacturer's name, the rated frequency, power factor, number of phases if of alternating current, the subtransient and transient impedances, the rating in kilowatts or kilovolt amperes, the normal volts and amperes corresponding to the rating, rated revolutions per minute, insulation system class and rated ambient temperature or rated temperature rise, and time rating".

Substantiation:

Revisions to 70E will require calculation of arc energy for electrical equipment. The generator impedance value will be needed for this calculation.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

13-6 Log #3200 NEC-P13 **Final Action: Reject**
(445-13)

Submitter: Truman C. Surbrook, Michigan State University

Recommendation:

Add the words or overcurrent device on the generator to the end of the first sentence. Also add a tap provision to the conductor rule that allows for use of portable generators at events and similar uses where special cables connect to the generator and frequently have a rating less than the rating of the overcurrent device on the generator. The sentence will read as follows:

The ampacity of the conductors from the generator terminals to the first distribution device(s) containing overcurrent protection shall not be less than 115 percent of the nameplate current rating of the generator or overcurrent device on the generator. The conductors shall be permitted to have an ampacity not less than one-third the rating of the overcurrent device on the generator where the tap conductors end in single overcurrent device that limits the current to the allowable ampacity of the conductors.

Substantiation:

The sizing of the conductors connecting to generators is extremely confusing to understand. It also does not deal with many of the temporary installations of generators. It would seem reasonable that the conductors in most permanent installations should be treated as a tap or the conductors should have an ampacity not less than the rating of the generator overcurrent device. Generator installations generally have an overcurrent device that limits the output current of the generator. Frequently there is insufficient information on the generator to determine the full-load current rating of the generator. Generators frequently do not have a nameplate current rating.

Panel Meeting Action: Reject

Panel Statement:

The sizing of the conductors between the generator terminals to the first distribution devices(s) containing overcurrent protection should be 115 percent. For some generators such as portable generators the first distribution device may be mounted on the generator frame. In these instances where the overcurrent device is installed on the generator the sizing of conductors from the overcurrent device to the load served would fall under the appropriate articles of the code. The provisions of 445.11 requires generator nameplates that contain the information that the submitter says may be frequently missing.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

13-7 Log #3004 NEC-P13 **Final Action: Accept in Principle**
(445-18)

Submitter: James R. Harvey, University of Michigan

Recommendation:

According to section 445.18, a generator "must be equipped with a disconnect by means...". I suggest this be changed to delete the "a", so it reads "must be equipped with disconnecting means...".

Substantiation:

If this were done then two or three circuit breakers, at the generator, feeding different transfer switches, could be installed. This would add needed flexibility in certain situations. It would also allow portions of the emergency system to be more easily maintained without the need to take the entire system out of service. And given the difficulty in getting needed shutdowns in facilities like hospitals and data centers, the overall reliability of those systems would be enhanced due to the (relative) ease in arranging needed shutdowns

Panel Meeting Action: Accept in Principle

Revise the first sentence of 445.18 as follows:

"Generators shall be equipped with disconnect(s) by means of which the generator and all protective devices and control apparatus are able to be disconnected entirely from the circuits supplied by the generator except where: ... "

Panel Statement:

This change accomplishes the submitter's intention and allows more than one disconnecting means at the generator. This proposal is accepted with the exception of changing "shall" to "must" and changing "disconnect" to "disconnecting means."

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

HORNBERGER: The present wording of 445.18 specifically requires "a disconnecting means at the generator." This implies that a single disconnect be installed at the generator to disconnect it from the power system for maintenance of the generator and its associated controls and protective devices. The submitter's proposal, and panel's revision, does not limit the maximum number of disconnects, location, nor distance of these disconnects from the generator. Generator maintenance personnel may not know where or how many disconnects to open to perform their work safely. The present code language does not prohibit the installation of additional disconnects to allow portions of the emergency system to be more easily maintained.

Comment on Affirmative:

KOVACIK: The panel statement should read, "This change accomplishes the submitter's intention and allows more than one disconnecting means at the generator. This proposal is accepted with the exception of changing "shall" to "must" and changing "~~disconnect to" to~~ disconnecting means," to "disconnect(s)".

13-8 Log #1580 NEC-P13 (445-19) **Final Action: Reject**

Submitter: Michael J. Johnston, Int'l Assn. of Electrical Inspectors

Recommendation:

Add a new Section 445.19 as follows:

445.19 Grounding

(A) General. Exposed non–current-carrying metal parts of generators and generator installations, including fences, guards, and so forth, shall be grounded where required under the conditions and in the manner specified for electric equipment and other exposed metal parts in Article 250.

(B) Generator Separately Derived System Grounding. Where associated generator transfer equipment disconnects the solidly interconnected service-supplied system grounded conductor (neutral) when normal service is interrupted, and the generator derived electrical system is required to be grounded as covered in 250.20(A) or (B), the system derived from the generator shall be grounded as specified in 250.30.

FPN No. 1: An alternate ac power source such as an on-site generator is not a separately derived system if the neutral is solidly interconnected to a service-supplied system neutral.

Substantiation:

There are no grounding requirements presently found in Article 445. The new section adds some general grounding requirements in 445.19(A) but also adds some language that is consistent with the information provided in the FPN to Section 250.20(D). The FPN that follows the new proposed section is identical to the FPN following Section 250.20(D). This new requirement should assist the user and provide clarification in the form of a Code rule and not just a FPN as to when the generator derived system has to be grounded in accordance with the rules for separately derived systems in Section 250.30.

Panel Meeting Action: Reject

Panel Statement:

Article 250 already applies and it is not apparent as to why this material should be added. It is not clear that the recommendation is modifying any of the requirements of Article 250. See panel proposal 13-18a (Log #CP1302).

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

9-127 Log #2541 NEC-P09 (450-2–Fire Resistance) **Final Action: Reject**

Submitter: Alan Manche, Schneider Electric/Square D

Recommendation:

Add the definition for fire resistance to 450.2.

Fire Resistance. A construction having a minimum fire rating of 1 hour.

Substantiation:

The definition for fire resistant construction as it pertains to transformer rooms and barriers in Article 450 is established in NEC 450.21(B). This definition should be moved to NEC 450.2 in accordance with the NEC Style manual to make it clear that this definition covers the definition of fire resistance for the entire Article 450.

Panel Meeting Action: Reject

Panel Statement:

The definition is needed in Part II of the article; it is not used in Part I. Furthermore, the defined term is not "Fire Resistance"; it is "Fire Resistant" instead. Note also that the existing definition allows for modifications elsewhere in the article. CMP 9 concludes that the term should remain where it is.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Sequence Number 9-128 is not used.

9-129 Log #3360 NEC-P09 **Final Action: Reject**
(450-3)

Submitter: Mike Weitzel, City of Wenatchee, WA

Recommendation:

Exchange locations of the two Tables, and numbering of the tables 450.3(A) and (B).

Substantiation:

Code uniformity is a worthwhile goal. It is confusing for the Code to place the "over 600 volts" text and table for overcurrent protection of transformer ahead of the "600 volts or less" table. In all other Code Articles, the "600 volts or less" text and table preceed the "over 600 volts".

Panel Meeting Action: Reject

Panel Statement:

The current organization of tables is clear and changing their numbers would not improve or add clarity. The tables are arranged in a logical manner stepping from primary (left) to secondary (right).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

KILLINGER: According to 2.3 of the style manual, the reason why the tables appear in this order is because "Tables and figures shall be referenced in the text and shall be designated by the number of the NEC rule in which they are referenced" not because of stepping from primary to secondary. The table numbers are like numbered in the same order to correlate with their first appearance in the text.

9-130 Log #1136 NEC-P09 **Final Action: Accept**
(Table 450-3(A))

Submitter: Ray C. Mullin, Ray C. Mullin / Rep. Ray C. Mullin Books

Recommendation:

Change heading in last column to read:
"600 Volts or Less"

Substantiation:

Present wording is 600 volts or lower. This wording is not consistent with other sections throughout the NEC where the preferred wording is "or Less."

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

HARTWELL: Actually, the present wording is "600 volts or below" which is even worse than that quoted in the proposal substantiation.

9-131 Log #2839 NEC-P09 **Final Action: Reject**
(Table 450-3(B))

Submitter: Steven E. Schroth, PE, H F. Lenz Company

Recommendation:

Revise "Not required" for both instances of secondary protection to read:
"Not required (See Note 4.)" Add Note 4 as follows:
"4. Not required only if transformer is 3 phase, delta-delta service. See 240.4(F)." Not required only if single phase, 2 wire.

Substantiation:

240.4(F) states the secondary protection is required unless the transformer (XFMR) is 3 phase, Δ - Δ x fmr. Table 450.3(B) says that secondary protection is not required. It does not reference 240.4(F). This table 450.3(B) is misleading to engineers; it might lead them to believe that secondary protection is never required.

Panel Meeting Action: Reject

Panel Statement:

The table is currently correct. Primary transformer protection is adequate to protect transformers as outlined in the table. The submitter is referencing 240.4(F), which is referring to protecting conductors on the secondary of transformers. In the design of a system both the transformers and the conductors must be protected and in some cases are done with a common overcurrent device but the rules are different and both the transformer and conductor rules must be considered to properly select an overcurrent device.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

HARTWELL: See 450.3 FPN No. 1. This note is in the Code to help prevent the practice cited in the substantiation, that is, the sizing of transformer protection without keeping the quite different rules for conductors constantly in mind.

9-132 Log #2542 NEC-P09 (450-5) **Final Action: Reject**

Submitter: Alan Manche, Schneider Electric/Square D

Recommendation:

Revise NEC 450.5 with the additions (underlined) and deletions (strike through) as shown. The entire text of 450.5 is shown for clarity, but only those changes shown underlined or strike through are part of this proposal.

450.5 Grounding Autotransformers. Grounding autotransformers covered in this section are zigzag or T-connected transformers connected to 3-phase, 3-wire ungrounded systems for the purpose of creating a 3-phase, 4-wire distribution system or providing a neutral reference for grounding purposes. Such transformers shall have a continuous per-phase current rating and a continuous neutral current rating. Zigzag connected transformers shall not be permitted on a 3-phase, 4-wire Wye system.

Substantiation:

The proposed wording prohibits the installation of a zigzag transformer on a 3-phase, 4-wire Wye system. Applying a zigzag connection on a 3-wire branch circuit of a 4-wire Wye system will result in any ground fault on the system sharing fault current through the zig-zag. Thus a fault anywhere on the system could not only interrupt the faulted circuit, but could also interrupt the branch on which the zig-zag is connected and likely damage the transformers.

Panel Meeting Action: Reject

Panel Statement:

Adding the revised text may add confusion to the installation purpose of some zig-zag transformers.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-133 Log #759 NEC-P09 (450-6) **Final Action: Accept in Principle in Part**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text as follows:

450.6 Secondary Ties. As used in this article a ~~A~~ secondary tie is a circuit operating at 600 volts, nominal, or less, between phases, that connects ~~two power sources or power supply points, such as~~ the secondaries of two transformers. The tie shall be permitted to consist of one or more conductors per phase or neutral. Conductors connecting the secondaries of transformers in accordance with 450.7 shall not be considered secondary ties.

(A) Tie Circuits. Tie circuits shall be provided with overcurrent protection at each ~~end~~ supply point as required in ~~Article~~ 240.4(A),(B) and (C).

Under conditions described in 450.6(A)(1) and 450.6(A)(2), the overcurrent protection shall be permitted in accordance with 450.6(A)(3).

(1) Loads at Transformer Supply Points Only. Where all loads are connected at the transformer supply points at each end of the tie and overcurrent protection is not provided in accordance with ~~Article 240~~ 450.6(A), the rated ampacity of the tie conductors shall not be less than 67 percent of the secondary current rating of the largest transformer ~~connected to~~ supplying the secondary tie system.

(2) Loads Connected Between Transformer Supply Points. Where load is connected to the tie at any point between transformer supply points and overcurrent protection is not provided in accordance with ~~Article 240~~ 450.6(A), the rated ampacity of the tie shall not be less than 100 percent of the rated secondary current of the ~~largest~~ highest kVA rated transformer ~~connected to~~ supplying the secondary tie system.

Exception: As otherwise provided in 450.6(A)(4).

(3) Tie Circuit Protection. Under the conditions described in 450.6(A)(1) and (A)(2), both supply ends of each ungrounded or grounded phase tie conductor shall be equipped with a protective device that will open at a predetermined temperature of the tie conductor under short-circuit conditions. This protection shall consist of one of the following: (1) a fusible link cable connector, terminal, or lug, commonly known as a limiter, each being of a size corresponding with that of the conductor and of construction and characteristics according to the operating voltage and type of insulation on the tie conductors, or (2) automatic circuit breakers having comparable time-current characteristics.

(4) Interconnection of Phase Conductors Between Transformer Supply Points. Where the tie consists of more than one conductor per phase or neutral, the conductors of each phase or neutral shall comply with one of the following provisions:

(a) Interconnected. The conductors shall be interconnected in order to establish a supply point and where overcurrent protection is not provided in accordance with (A) the ~~protection~~ protective device specified in 450.6(A)(3) shall be provided in each conductor at this point on both sides of the interconnection. The means of interconnection shall have an ampacity not less than the load to be served.

(b) Not interconnected. The loads shall be connected to one or more individual conductors of a paralleled conductor tie without interconnecting the conductors of each phase or neutral and without the ~~protection~~ protective device specified in 450.6(A)(3) at load connection points. Where this is done, the tie conductor of each phase shall have a combined ~~capacity~~ ampacity of not less than 133 percent of the rated secondary current of the ~~largest~~ highest kVA rated transformer ~~connected to~~ supplying the secondary tie system, the total load of such taps shall not exceed the rated secondary current of the ~~largest~~ highest kVA rated transformer, and the loads shall be equally divided on each phase and on the individual conductors of each phase as far as practical.

(5) Tie Circuit Control. Where the operating voltage exceeds 150 volts to ground, secondary ties provided with limiters shall have a switch at each supply end that, when open, will deenergize the tie conductors and limiters. The current rating of the switch shall not be less than the ~~rated current~~ ampacity of the tie conductors connected to the switch. It shall be capable of safely interrupting ~~opening~~ its rated current, and it shall be constructed so that it will not open under the magnetic forces resulting from short-circuit currents.

(B) Overcurrent Protection for Transformer Secondary Connections. Where secondary ties are ued, in overcurrent device rated or set at not more than 250 percent of the rated secondary current of the transformer shall be provided in the secondary connections of each transformer supplying the tie system. In addition, an automatic circuit breaker actuated by a reverse ~~current~~ power relay set to open the circuit at not more than the rated secondary current of the transformer shall be provided in the secondary connection of each transformer.

(C) Grounding. Where the secondary tie system is grounded, each transformer secondary supplying the tie system shall be grounded in accordance with the requirements of 250.30 for separately derived systems.

Substantiation:

1. The title of this article and the requirements relate to transformers, not "other" power sources or power supply points such as generators, batteries, solar photovoltaic systems, etc. or combinations of such sources used with or without transformer sources.
2. Though common transformer tie systems in the past may have been predominately 3-phase 3-wire ungrounded systems, provisions should address installations where grounded conductors are used.
3. The description in 450.6 also applies to transformers connected in parallel, which is apparently not the intent.
4. The "end" of tie conductors should be "supply point" where this is intended since a tie may have an end where it terminates at distribution equipment installed between transformer supply points.
5. Reference to Article 240 does not conform to the Style manual and includes many sections not suitable, such as tie conductor protection based on a delta-delta secondary (240.21(C)) and tap rules.
6. The phrase "connected to the secondary system" literally includes transformers which are supplied by the secondary tie system, while apparently intended to apply to transformers (connected to, but) supplying the tie system.
7. Since parallel conductors may be installed in separate busways or other raceways, any interconnection should have an ampacity requirement, which may be less than the tie conductors.
8. (B) is revised to clearly indicate transformer, not conductor, protection is intended, and "reverse power" appears to be more technically correct.
9. How to provide system grounding is not clear. If all transformers are solidly interconnected with a phase conductor or neutral grounded at one transformer, the other transformers are not separately derived systems, and, therefore, not covered by 250.30. Transformers may be of different capacity and if considered individually may require different sizes of grounding and bonding conductors. If only one transformer source is to be grounded, which one? One transformer ground serving other transformers which may be separated by a thousand feet of conductors can cause problems. Removal of the grounded transformer due to fire, replacement, maintenance, etc., could leave others without a grounded system, since they may have means of disconnection and isolation and continue to operate. Since this is a rather unique system, specific grounding requirements are warranted.

This proposal does not make substantial changes in the requirements, but is intended to provide clarification. For example,

250.24(A)(3) also uses the phrase "secondary tie" which would invoke the requirements of this section.

Panel Meeting Action: Accept in Principle in Part

Revise text as indicated below based on the modifying the original code text.

450.6 Secondary Ties.

As used in this article, a secondary tie is a circuit operating at 600 volts, nominal, or less between phases that connects two power sources or power supply points, such as the secondaries of two transformers. The tie shall be permitted to consist of one or more conductors per phase or neutral. Conductors connecting the secondaries of transformers in accordance with 450.7 shall not be considered secondary ties.

As used in this section, the word transformer means a transformer or a bank of transformers operating as a unit.

(A) Tie Circuits. Tie circuits shall be provided with overcurrent protection at each end as required in Parts I, II and VIII of Article 240.

Under the conditions described in 450.6(A)(1) and 450.6(A)(2), the overcurrent protection shall be permitted to be in accordance with 450.6(A)(3).

(1) Loads at Transformer Supply Points Only. Where all loads are connected at the transformer supply points at each end of the tie and overcurrent protection is not provided in accordance with Parts I , II and VIII of Article 240, the rated ampacity of the tie shall not be less than 67 percent of the rated secondary current of the largest highest rated transformer connected to supplying the secondary tie system.

(2) Loads Connected Between Transformer Supply Points. Where load is connected to the tie at any point between transformer supply points and overcurrent protection is not provided in accordance with Parts I, II and VIII of Article 240, the rated ampacity of the tie shall not be less than 100 percent of the rated secondary current of the largest highest rated transformer connected to supplying the secondary tie system.

Exception: Tie circuits comprised of multiple conductors per phase shall be permitted to be sized and protected in accordance with 450.6(A)(4).

(3) Tie Circuit Protection. Under the conditions described in 450.6(A)(1) and (A)(2), both supply ends of each ungrounded tie conductor shall be equipped with a protective device that opens at a predetermined temperature of the tie conductor under short-circuit conditions. This protection shall consist of one of the following: (1) a fusible link cable connector, terminal, or lug, commonly known as a limiter, each being of a size corresponding with that of the conductor and of construction and characteristics according to the operating voltage and the type of insulation on the tie conductors or (2) automatic circuit breakers actuated by devices having comparable time-current characteristics.

(4) Interconnection of Phase Conductors Between Transformer Supply Points. Where the tie consists of more than one conductor per phase or neutral, the conductors of each phase or neutral shall comply with one of the following provisions.

(a) Interconnected. The conductors shall be interconnected in order to establish a load supply point, and the protection protective device specified in 450.6(A)(3) shall be provided in each ungrounded tie conductor at this point on both sides of the interconnection. The means of interconnection shall have an ampacity not less than the load to be served.

(b) Not Interconnected. The loads shall be connected to one or more individual conductors of a paralleled conductor tie without interconnecting the conductors of each phase or neutral and without the protection specified in 450.6(A)(3) at load connection points. Where this is done, the tie conductors of each phase or neutral shall have a combined capacity ampacity of not less than 133 percent of the rated secondary current of the largest highest rated transformer connected to supplying the secondary tie system, the total load of such taps shall not exceed the rated secondary current of the largest highest rated transformer, and the loads

Panel Statement:

450.6

Accept the change referring to "as used in this article".

Do not accept the deletion of "two power sources or power supply points, such as" since this clause is talking about conductor protection rather than transformer protection .

Accept the addition of "or neutral" indicating the tie may include a neutral.

Accept the sentence clarifying that 450.7 is not considered as secondary ties.

450.6(A)

Reject the addition of 240.4(A), (B) and (C) since these do not necessarily apply because part (G) refers this application to 450.6. Reject the term "supply point."

Do add reference to "Part I ,II and VIII" to comply with the style manual clause 4.1.1 and indicating the proper reference.

450.6(A)(1)

Reject the change to 450.6(A) as the appropriate parts of Article 240 must be applied.

Do add reference to "Part I , II and VIII" to comply with the style manual clause 4.1.1 and indicating the proper reference.

Do add reference to "Part I , II and VIII" to comply with the style manual clause 4.1.1 and indicating the proper reference.
Accept the change from "connected to" to "supplying".
Change the word "largest" to "highest rated" to correspond with a change accepted in part 2 of this clause.

450.6(A)(2)

Reject the change to 450.6(A) as the appropriate parts of Article 240 must be applied.
Do add reference to "Part I, II and VIII" to comply with the style manual clause 4.1.1 and indicating the proper reference.
Accept the change from "connected to" to "supplying".
Accept the change to "highest rated"
Accept the change from "connected to" to "supplying".
To comply with the NEC Style Manual 3.1.4.1.

450.6(A)(3)

Accept the addition of the word supply.
Accept "ungrounded" but do not accept "or grounded phase". There is no justification to add overcurrent protection to grounded conductors in this application.
Changed the term "current-time" to "time-current" to correspond with typical industry terminology.

450.6(A)(4)

Accept the submitters text.

450.6(A)(4)(a)

Accept the change from "protection" to "protective device".
Accept the clarification of connection on both sides and the ampacity requirements.
Overcurrent protection is provided in ungrounded conductors rather than grounded or grounding conductors.

450.6(A)(4)(b)

Accept the change from "capacity" to "ampacity".
Accept the change from "largest" to "highest rated" in two places.
Accept the change from "connected to" to "supplying".
Accept the change "or neutral" in two places.

450.6(A)(5)

Accept the change from "rated current" to "ampacity.
Accept the change to "interrupting". Safely is implied by being part of the code which has the intent of safety.

450.6(B)

Reject the addition of the word Transformer in the title of (B). There is no need to add the word transformer, the opening paragraph of 450.6 describes the applications.
Accept the addition of the words "supplying the tie system".
Reject the term "reverse-power relay."

450.6(C)

Accept the addition of Part C.

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

9-134 Log #2711 NEC-P09 **Final Action: Reject**
(450-13(B))

Submitter: Donny Cook, Shelby County Development Services

Recommendation:

Revise to read as follows:
(B) Hollow Space Installations. Dry-type transformers 600 volts, nominal, or less shall be permitted in hollow space of building not permanently closed in by structure, provided they meet the ventilation requirements of 450.9 and separation from combustible materials requirement of 450.21(A).
Transformers so installed shall not be required to be readily accessible.

Substantiation:

This proposal deletes the 50 KVA limit for installation of dry-type transformers in hollow spaces. As long as the ventilation requirements are met and separation from combustible materials is provided, the size of the transformer does not change the shock or fire hazard associated with the installation.

Panel Meeting Action: Reject

Panel Statement:

Smaller transformers generate less heat and the substantiation is not adequate to support the elimination of a long-standing NEC distinction based on transformer size.

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

9-135 Log #2543 NEC-P09 **Final Action: Reject**
(450-21)

Submitter: Alan Manche, Schneider Electric/Square D

Recommendation:

Delete the last sentence of 450.21(B).
(B) Over 112 1/2 kVA. Individual dry-type transformers of more than 112 1/2 kVA rating shall be installed in a transformer room of fire-resistant construction. ~~Unless specified otherwise in this article, the term *fire-resistant* means a construction having a minimum fire rating of 1 hour.~~

Substantiation:

The definition for fire resistant construction as it pertains to transformer rooms and barriers in Article 450 is established in NEC 450.21(B). This definition should be moved to NEC 450.2 in accordance with the NEC Style manual to make it clear that this definition covers the definition of fire resistance for the entire Article 450. There is a companion proposal to add this definition to 450.2.

Panel Meeting Action: Reject

Panel Statement:

See the panel statement on Proposal 9-127 (Log #2541).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-136 Log #1635 NEC-P09 **Final Action: Reject**
(450-21(B))

Submitter: Gavin Hadley, Eli Lilly and Company

Recommendation:

Change wording of this paragraph to read as follows:
(B) Over 112 1/2 kVA. Individual dry-type transformers of more than 112 1/2 kVA rating shall be installed in a transformer room of fire-resistant construction. Transformer rooms provided with sprinkler coverage can have a minimum fire rating of 1 hour. Those rooms without sprinklers must have a minimum fire rating of 2 hours. Unless specified otherwise in this article, the term fire resistant means a construction having a minimum fire rating of 1 hour.

Substantiation:

450.21(B) does not clearly align with NFPA 13, 5-13.11.
5-13.11 Electrical Equipment.
Sprinkler protection shall be required in electrical equipment rooms. Hoods or shields installed to protect important electrical equipment from sprinkler discharge shall be noncombustible.
Exception: Sprinklers shall not be required where all of the following conditions are met:
(a) The room is dedicated to electrical equipment only.
(b) Only dry-type electrical equipment is used.
(c) Equipment is installed in a 2-hour fire-rated enclosure including protection for penetrations.
(d) No combustible storage is permitted to be stored in the room.

Panel Meeting Action: Reject

Panel Statement:

If a building uses an NFPA 13 compliant sprinkler system, then dry-type transformers in a room with only a one-hour rating will end up with sprinkler protection. If the owner chooses to avoid such protection, then the owner can improve the fire resistance of the room as noted in the substantiation. That is a design decision on the part of the owner. The substantiation does not support a change in the minimum electrical requirements, and there is no conflict with NFPA 13 provisions.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-137 Log #1721 NEC-P09 **Final Action: Reject**
(450-25)

Submitter: Juan M. Ramos APO , AE

Recommendation:

Add text to read as follows:
Askarel - insulated transformers shall not be used in new designs.
Askarel - insulated transformers currently in use should be replaced by other transformer types, i.e. silicon filled, or dry-type.

Substantiation:

Askarel or PCB is an insulating liquid hazardous to human health. The U. S. EPA and OSHA have issued strong standards for the use and disposal of askarel transformers.
Note: Supporting material is available for review at NFPA headquarters.

Panel Meeting Action: Reject

Panel Statement:

It is not the intent of the NEC to mandate the immediate removal of Askarel-insulated transformers. OSHA governs the testing & replacement of Askarel-insulated transformers whereas the EPA manages the handling, removal, transportation & disposal of this controlled material.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

HARTWELL: The NEC is not an environmental protection document. See 90.1.

9-138 Log #360 NEC-P09 **Final Action: Reject**
(450-29 (New))

Submitter: L. L. Buie, Jr., Pettit & Pettit, Consulting Engineers Inc.

Recommendation:

Add new 450.29 to read as follows:
450.29 Conduit Entrances to Enclosed Dry Type Transformers. Conduits shall enter lower sides of enclosed dry type transformers. Primary and secondary conductors shall not be routed inside the enclosure above the core and coils.

Substantiation:

A recent inspection of a new electrical installation revealed that the electrical contractor had installed the secondary conduits out the top of the enclosure and the conductors inside the enclosure was subjected to the heat rejection of the transformer.

Panel Meeting Action: Reject

Panel Statement:

This type of installation is covered in the manufacturer's installation instructions. See 110.3(B) of the NEC.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

13-9 Log #1941 NEC-P13 **Final Action: Reject**
(455-5)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
455.5 Equipment Grounding Connection. A means for attachment of an equipment ~~grounding~~ bonding conductor termination in accordance with 250.8 shall be provided.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 13-1.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

HORNBERGER: "Grounded" and "grounding" sound similar but are intended to describe two totally different concepts. However, these terms are often used interchangeably by users of the NEC. In fact, there are places in the NEC where these terms are used interchangeably. The words ground, grounded and grounding will apply to the concept of connecting an electrical system to the earth. While the words bond, bonded and bonding will apply to the concept of connecting together noncurrent carrying conductive parts likely to become energized so that they form an effective ground fault path back to the source. If the terms are not similar, the concepts can be more easily differentiated by the users. This change will greatly improve usability and understanding of the NEC. This issue needs to be brought forth through the Technical Correlating Committee and the use of the individual terms should be evaluated on their merit on a case-by-case basis.
For example, the term ground fault used in the above paragraph describes a particular type of electrical fault and is used appropriately in the above text.

13-10 Log #727 NEC-P13 **Final Action: Accept in Principle**
(455-7)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise second sentence as follows:
Where the required fuse rating or circuit breaker rating or possible setting does not correspond to a standard rating or setting, a higher rating or setting that does not exceed the next higher standard rating or setting shall be permitted.

Substantiation:

Higher intermediate values should be permitted up to the next higher standard rating. While most reasonable persons would accept this, literal wording only permits the next higher standard rating.
Similar wording is in Exception No. 1 for 430.52(C).

Panel Meeting Action: Accept in Principle

Panel Statement:

See panel action and statement on Proposal 13-11.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

13-11 Log #778 NEC-P13 **Final Action: Accept in Principle**
(455-7)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise last sentence:
Where the required fuse or nonadjustable circuit breaker rating, or possible settings of adjustable circuit breakers do not correspond to a standard rating or setting, a higher rating or possible setting that does not exceed the next higher standard rating shall be permitted.

Substantiation:

Present literal wording does not permit a higher intermediate rating that is less than the next higher standard rating. This is permitted in Exception No. 1 for 430.52.

Panel Meeting Action: Accept in Principle

Delete the term "possible" in two location in the recommendation.

Panel Statement:

The term possible is understood and better correlates with 430.52.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-111 Log #3443 NEC-P11 **Final Action: Reject**
(460-8(C) Exception No. 2 (New))

Submitter: William F. Robertson, AMEC, Inc.

Recommendation:

Add Exception No. 2:
A separate disconnecting means shall not be required where a capacitor is connected on the load side of the contractor and the line side of the overload relay heater, or current sensor, of a motor controller.

Substantiation:

Currently, the "Exception" to Section 460.8(C) permits installations without a separate disconnecting means where a capacitor is connected on the load side of a motor controller (i.e., the load side of the overload relay). In the industrial sector, the preferred connection point for capacitors is the line side of overload heaters or current sensors. In fact, provisions for connecting capacitors between the contactor and overload heater is a standard option with every major motor control center manufacturer in this country. The reason is simple: it permits motor overload heater selection based directly on motor nameplate full load current. Connecting capacitors on the load side of overload heaters requires subtracting, virtually, reactive current supplied by a capacitor from motor nameplate full load current, to correctly select an overload heater. This proposal would improve safety of equipment by making motor overload heater selection a direct process. Separate capacitor overcurrent protection would still be required.

Panel Meeting Action: Reject

Panel Statement:

The existing wording permits the capacitor to be connected on the load side of the controller. It does not require that the connection be made on the load side of any overload device. The definition of controller does not include overload devices, so the existing exception already permits the submitter's request.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-112 Log #2231 NEC-P11 **Final Action: Reject**
(460-27)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
460.27 Grounding. capacitor neutrals and cases, if grounded (earthed), shall be grounded in accordance with Article 250.
Exception: Where the capacitor units are supported on a structure that is designed to operate at other than ground.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided the necessary substantiation to make such a dramatic change to this well-established term. Evidence of the significant misunderstanding needs to be provided.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-113 Log #735 NEC-P11 **Final Action: Reject**
(470-18(C))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Resistors and reactors shall not be installed in close enough proximity to combustible material to constitute a fire hazard and shall have a clearance of not less than 305 mm (12 in.) from combustible material unless a thermal barrier is provided.

Substantiation:

A suitable thermal barrier which prevents heat transfer should maintain safety. This is permitted in 470.3 for 600 volt and under equipment, which may attain equal heat values.

Panel Meeting Action: Reject

Panel Statement:

Specific construction requirements for thermal barriers are needed but have not been provided for over 600 volt applications. The typical application of resistors for over 600 volts is a neutral grounding resistor where the temperatures could approach 600 to 800 degrees C during system ground-fault conditions.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

13-12 Log #2343 NEC-P13 **Final Action: Reject**
(480)

Submitter: Bryan Tyler Smith Lapeer, MI

Recommendation:

Ahead of the present 480.3 add the following title, Part I Battery Installation. Part I will include the present remainder of the article through 480.10.
Add a new Part II Equipment and Wiring to consist of the present Part VIII in Article 690 with the indicated changes.
480.21 will include text of 690.71. In 690.71(A) change ~~photovoltaic~~ system to alternate dc power system, and ~~photovoltaic~~ power source to power source.
In 690.71 FPN change solar ~~photovoltaic~~ systems to alternate dc power systems.
In the last sentence of 690.71(C) modify the sentence as follows: For solar photovoltaic power systems, the installation of current-limiting fuses shall comply with 690.16.
In the next to last sentence of 690.71(F) strike the word ~~photovoltaic~~.
In the first sentence of 690.71(G), delete the word ~~photovoltaic~~. In paragraph (1) delete the word "the" as follows: ~~The~~ Photovoltaic array source and output circuits shall comply with 690.41.
480.72 will include text of 690.72. In the third line of 690.71(A) change ~~photovoltaic~~ source circuit to alternate system power source circuit.
In the first sentence of 690.72(B)(1) delete the word photovoltaic.
Change the last sentence of 690.72(B)(3) to read as follows: These circuits, used in several modes, shall be sized and protected as required i~~n 690.8~~ for the type of power system.
480.73 will include text of 690.74.

Substantiation:

Most alternate power systems will employ batteries, charge controllers and possibly inverters as a part of the system. These subjects are not covered elsewhere in the Code except they are covered quite well in Article 690. But 690 only applies to solar photovoltaic power systems. This same material should be put in a location of the Code where it is available to use wherever appropriate. I have made suggested changes to remove the specific references to photovoltaic systems where the rules should apply to all alternate power systems. There is considerable interest in installation of alternate renewable power systems and the NEC needs to address the wiring problems associated with their installation.

Panel Meeting Action: Reject

Panel Statement:

This article is intended for stationary installations of storage batteries and is not intended for the equipment attached to the batteries or battery system with the exception of 480.4. Wiring from stationary batteries to the equipment is covered in Chapter 2 of the NEC. References of equipment installations such as those proposed in 480.21(A) to Article 690 is confusing and should not be part of Article 480. Racks and battery cases are already covered under Article 480. The provisions of Article 690 may apply to solar photovotaic systems but may not necessarily apply to other types of installations including dwellings. The submitter did not supply adequate documentation that the provisions of Article 690 would be or is appropriate for all other types of installations covered by Article 480.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

13-13 Log #1325 NEC-P13 (480-2) **Final Action: Accept**

Submitter: National Electrical Code Technical Correlating Committee

Recommendation:

Replace the term "computed" with the term "calculated" in the following sections:
480.2

Substantiation:

This proposal is the result of an effort by the NEC Usability Task Group to standardize the language throughout the NEC relative to the use of the terms computed and calculated. After analyzing the usage, the group agreed that the term "calculated" was the best term for use throughout the NEC. This is one in a series of proposals to standardize on the term calculated.

The term "calculate" and its derivatives is presently used in the article title, section titles, and throughout portions of the existing article. Other Articles of the NEC such as for calculating conductor ampacties (under engineering supervision), calculating the size of enclosures, and in Annex D use the term calculate. Additionally, the term "calculate" is more commonly used in other NFPA codes and standards e.g. NFPA 70E, arc flash calculation. Adversely, the term "computation" has a connotation of using a computer, although "load calculations" are frequently determined using a calculator. It appears that the term "computation" was used more frequently beginning with the 1975 NEC based on an editorial revision project.

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

13-14 Log #723 NEC-P13 (480-3) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text:
Wiring and equipment supplied from storage batteries shall be subject to the applicable provisions ~~requirements~~ of this Code applying to wiring and equipment operating at the same voltage, unless otherwise permitted by 480.4.

Substantiation:

To clarify that applicable provisions which are not requirements, but simply permitted, also apply.

Panel Meeting Action: Reject
Panel Statement:

See panel action and statement on Proposal 13-15.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

13-15 Log #728 NEC-P13 (480-3) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Wiring and equipment supplied from storage batteries shall be subject to the provisions ~~requirements~~ of this Code applying to wiring and equipment operating at the same voltage.

Substantiation:

Edit. The Code contains requirements (rules) which are mandatory and provisions which are permitted, not mandatory, which should be specifically permitted, if applicable. Similar wording elsewhere in the Code includes mandatory and permissive rules.

Panel Meeting Action: Reject
Panel Statement:

The change is not needed. Other articles do apply unless not permitted in Article 480. See Section 90.5.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

13-16 Log #308 NEC-P13 **Final Action: Reject**
(480-4)

Submitter: Jerry D. Cain, Lodestar Energy Inc.

Recommendation:

Revise text to read as follows:
480.4 Overcurrent Protection for Prime Movers. Overcurrent protection shall not be required for conductors from a battery bank rated less than 50 volts if the battery provides power for starting ignition, or control of prime movers. 300.3 shall not apply to these conductors.

Substantiation:

The singular use of the word battery could be misinterpreted to mean each battery would have to be 50 volts or more. The intent appears to be where multiple batteries are connected in series, to achieve a higher voltage than one battery can supply inserting the word "bank" would resolve this conflict.

Panel Meeting Action: Reject

Panel Statement:

Section 480.2 already defines a battery as multiple cells. These cells can be in individual cases or in multiple cell cases. The total of all of the cells comprises the battery and establishes the battery voltage. Therefore, the addition of the word "bank" is unnecessary.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

13-17 Log #736 NEC-P13 **Final Action: Reject**
(480-5)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
The provisions ~~requirements~~ of Article 250 shall apply.

Substantiation:

Edit. The Code contains requirements (rules) which are mandatory and provisions which are permitted but not mandatory, and which should be specifically permitted. Similar wording elsewhere in the Code includes mandatory and permissive rules.

Panel Meeting Action: Reject

Panel Statement:

See panel Proposal 13-18a (Log #CP1302).

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

13-18 Log #776 NEC-P13 **Final Action: Reject**
(480-5)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
Grounding. The applicable provisions ~~requirements~~ of Article 250 shall apply.

Substantiation:

To clarify that applicable provisions which are not requirements also apply.

Panel Meeting Action: Reject

Panel Statement:

See panel Proposal 13-18a (Log #CP1302).

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

13-18a Log #CP1302 NEC-P13 **Final Action: Accept**
(480-5)

Submitter: Code-Making Panel 13

Recommendation:

Delete Section 480.5.

Substantiation:

Article 250 already applies generally.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

13-19 Log #248 NEC-P13 (480-11) **Final Action: Reject**

TCC Action:

Submitter: Daniel Gasper Millington, MI

Recommendation:

Revise 690.71(B) and move to become Section 480.11. Add the new section title "Dwelling Storage Battery Installations" with the following new first paragraph:

Storage batteries for dwelling applications shall be installed in accordance with (1) and (2).

Delete the words "~~for dwellings~~" in paragraphs (1) and (2) as they are no longer needed.

Delete the reference to "~~690.7~~" in the exception and replace with the reference "system operating voltage" so it will apply to similar systems not just photovoltaic systems. Leave the Fine Print Note as a part of 690.71.

The new section will then read as follows:

480.11 Dwelling Storage Battery Installations. Storage batteries for dwelling applications shall be installed in accordance with (1) and (2).

(1) Operating Voltage. Storage batteries ~~for dwellings~~ shall have the cells connected so as to operate at less than 50 volts, nominal.

Exception: Where live parts are not accessible during routine battery maintenance, a battery system voltage in accordance with ~~690.7~~ system operating voltage shall be permitted.

(2) Guarding of Live Parts. Live parts of battery systems ~~for dwellings~~ shall be guarded to prevent accidental contact by persons or objects, regardless of voltage or battery type.

Substantiation:

Storage batteries are installed for dwelling applications other than use with photovoltaic power systems and this rule should apply to all installations. Storage batteries may be installed as a stand-alone system and recharged automatically with a small generator, they may be a part of a small water turbine system or a wind generator system. They may also be a part of a fuel cell system or other power generation system. Presently, this rule only applies to dwelling storage batteries that are a part of a photovoltaic power system.

Panel Meeting Action: Reject

Panel Statement:

Article 690.7(B) covers those batteries installed in dwelling applications that are associated with photovoltaic power systems. All other battery installations including dwelling units would now fall under the provisions and requirement of Article 480. The limitations and provisions placed on batteries associated with photovoltaic power systems are not required for other types of battery installations that may be installed in dwelling units. The submitter is suggesting that the provisions of 690.7(B) should be applicable to all other installations. This is not the case. The provisions of Article 480 are adequate and now provide adequate safeguards for battery installations in dwelling units.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Sequence Number 13-20 is not used.

9-139 Log #546 NEC-P09 (490-2) **Final Action: Reject**

Submitter: James M. Daly, General Cable

Recommendation:

Change "600 volts" to "2000 volts".

Substantiation:

High voltage does not include 2000 volts.

Panel Meeting Action: Reject

Panel Statement:

High voltage for the purposes of the NEC is "over 600 volts" and this is consistent throughout the NEC.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

HARTWELL: This proposal could force a wholesale reevaluation of all requirements in Article 490. A previous attempt to align the NEC with voltage classification schemes that apply the term "low voltage" up to 2000 volts proved unsuccessful in the 1990 cycle. There is neither any substantiation nor a coordinated set of proposals that would be required to repeat that effort at this time.

9-140 Log #3194 NEC-P09 (490-35(A)) **Final Action: Reject**

Submitter: Joseph J. Andrews, Electric Safety Resources, Inc.

Recommendation:

Revise 490.35(A) High-Voltage Equipment to read:

Personnel entry doors that would provide unqualified persons access to high-voltage energized parts shall be locked. Electrical equipment compartment doors that would provide persons access to high-voltage energized parts shall be locked or bolted. All such doors shall be marked with a warning sign indicating that high-voltage is present within.

Substantiation:

A recent serious burn injury indicates a need to clarify where high-voltage warning signs are to be placed. An apprentice electrician opened a compartment door in a 5KV motor control center (MCC) to do some "cleaning". The MCC contained both high-voltage and low voltage compartments. Although it should have been, the center was not completely locked out. The apprentice was aware that there were some energized 120 volt components in the MCC. The compartment that the apprentice entered contained three 4160/120 volt potential transformers (PTs). Not recognizing the danger, the apprentice attempted to test the terminals of the transformer using a low-voltage voltmeter. Consequently, a flash occurred severely burning the apprentice. The PT compartment had no high-voltage sign on it. There were such signs on some other compartment doors, and there were voltmeters on the incoming line compartment voltmeters that indicated that high-voltage was present within the control center.

Panel Meeting Action: Reject

Panel Statement:

The live parts noted in the substantiation should only have been accessible to qualified persons, per 490.32. The apprentice was not a qualified person. There is no need to require warning signs on every high voltage compartment door.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-141 Log #3269 NEC-P09 **Final Action: Reject**
(490-46 (New))

Submitter: Barry N. Hornberger, PECO Energy Co.

Recommendation:

Add a new 490.46 to Section C of Article 490 to read as follows:
490.46 Metal Enclosed and Metalclad Service Equipment.
(A) General. Metal enclosed and metalclad switchgear installed as high voltage service equipment shall provide separation of service cables and terminations from service overcurrent protection equipment and feeder and branch circuit equipment. The high voltage service equipment shall provide the features in (B) and (C) below.
FPN: Local serving utilizes may have additional requirements for high-voltage service equipment. See ANSI/IEEE C2-2002 Sections 18 and 38 for further information.
(B) Service Conductor Termination Compartment. The service cables shall terminate in a separate compartment, isolated from service overcurrent devices, feeder, and or branch circuit equipment. In addition, the compartment shall include the following requirements in (1) through (7):
(1) A hinged door with provision for padlocking.
(2) A label identifying the service cable termination compartment and the service voltage.
FPN: For further information on hazard signs and labels see ANSI Z535.
(3) Service cable termination compartments with exposed, bare or insulated bus within the compartment shall have the following:
(a) A removable or hinged inner barrier marked with the nominal voltage(s) present
(b) A bare bus bar extension on each phase for voltage testing and application of safety grounds
(4) Service cable termination compartments incorporating the use of high voltage insulated separable connectors without exposed, bare or insulated bus within the compartment, shall have either of the following in (a) or (b):
(a) Provisions to disconnect and isolate the service cable connector from the service equipment
(b) Provisions to ground the service cable
(5) A ground bus extension for connection of service cable termination shields and a safety ground attachment.
(6) The following high-voltage equipment shall be permitted to be installed in this compartment: service conductors and terminations, surge arresters, metering transformers , insulators, bus and associated line side primary parts of the main disconnecting device, including current transformers and associated wiring for protective relaying.
(C) Service Overcurrent Protective Device. High voltage service overcurrent devices shall be designed or installed so that they are de-energized while being replaced or maintained. In addition, access to these devices shall not expose personnel to live parts connected to the service conductors. Barriers, rack-out mechanisms and interlocks with load break or isolating switches are recognized safeguards to provide this isolation.

Substantiation:

This proposal will establish minimum performance based requirements for service equipment operating above 600 volts. The proposal addresses two key areas of safety:
• Separation between service and feeder or branch circuit equipment
• Access to service terminations for testing, isolation, and or safety grounding for maintenance of the service conductors and equipment connected up to the service disconnect.
Standard industrial medium voltage switchgear designs do not provide sufficient separation between incoming and outgoing cables to be safely applied as service equipment. Isolation of the service cables, terminations, and associated service equipment from the service overcurrent protection, feeders, branch circuits and other "downstream" equipment is critical to safe operation and maintenance of a high voltage electrical installation. Despite volumes of written electric service requirements and service equipment specifications maintained by utilities, equipment is delivered which requires significant field modifications to provide these minimum safety requirements, impacting costs to manufacturers, contractors, consulting engineers, and users. In addition, these requirements will aid electrical inspectors in identifying equipment suitable for use as high voltage service equipment.
These requirements are not new to the industry. Many manufacturers have designs which meet or exceed these requirements.
Manufacturers, contractors, inspectors, and users will benefit from this minimum requirement which will establish a bench mark for listing and labeling service equipment operating over 600 volts.

Panel Meeting Action: Reject

Panel Statement:

These provisions are specific to one utility or geographic area of the country and are not representative of all utility requirements. Additionally the majority of the requirements are normally supplied in metal-clad switchgear but are not necessarily included in metal-enclosed switchgear. Those utilities accepting metal-enclosed type equipment are not requiring all these features and may not want to bear the additional costs associated with this proposal.
CMP-9 recommends that a task group be organized to review the requirements of this Proposal and coordinate technical requirements with representation from manufacturers, users, and utilities in different geographical areas.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

CROUSHORE: Article 490 does not currently contain minimum performance based requirements for service equipment operating above 600 volts. The proposal addresses specific safety concerns - separation between service and feeder/branch circuit wiring and equipment and access to service terminations for testing, isolation, and safety grounding for maintenance. It is essential to provide such separation and isolation for safe operation. The proposal's intent is to include general requirements, which are not exclusive to any one utility or region. It also limits the ancillary devices permitted within the compartment to those associated with the line side service cable and equipment. While we support the panel recommendation for a task group, the minimum requirements should be incorporated into the code now and they can be improved or modified at a later time to conform with the future recommendations of the task group.

Comment on Affirmative:

HARTWELL: I have no strong technical position on the merits of this proposal, but I am concerned that it will end up being around for a long time with no effective response from the NEC Committee. See, for example, Proposal 13-28 and Comment 13-8 in the previous

code cycle. Given the panel action and discussion it appears that effective action will now need to wait until the 2008 NEC, because an anticipated task group was never organized by former CMP 13. For the purposes of providing public review, and perhaps jump-starting the discussions, the following is an editorial refinement of the proposal worked out after discussions with the ELPG panel alternate, which also correlates actions with changes that would be required in 230.211:

I. Insert a new 490.46 as follows:

490.46 Metal Enclosed and Metalclad Service Equipment.

(A) General. Metal-enclosed and metalclad switchgear installed as high voltage service equipment shall consist of a substantial metal structure and a sheet metal enclosure. Where installed over a combustible floor, suitable protection thereto shall be provided. The metal enclosed and metalclad switchgear shall include a service conductor termination compartment that separates the service conductors and service conductor terminations from an isolating switch or linkages, if present, the service disconnecting means, and all wiring and equipment on the load side of the service disconnecting means.

FPN: Local serving utilities may have additional requirements for high-voltage service equipment. See ANSI/IEEE C2-2002 Sections 18 and 38 for further information.

(B) Service Conductor Termination Compartment. The service cables shall terminate in a separate compartment. The compartment shall comply with 490.46(B)(1) through (B)(6):

(1) Door. The compartment shall include a hinged door with provision for applying a separate lock in the field.

(2) Marking. The compartment shall be equipped with a label identifying its function and the service voltage.

(3) Busbars. Where service conductor termination compartments contain exposed busbars the compartment shall include:

(1) A removable or hinged inner barrier marked with the nominal voltage(s) present

(2) A bare bus bar extension on each phase for voltage testing and application of safety grounds

(4) Separable Connectors. Where service conductor termination compartments incorporate the use of high voltage insulated separable connectors without exposed, bare or insulated bus within the compartment, the compartment shall include either:

(1) Provisions to disconnect and isolate the service cable connector from the service equipment; or

(2) Provisions to facilitate the application of safety grounds to the service conductors

(5) Ground Bus. A ground bus shall be extended into the compartment for connection of service cable termination shields and to facilitate the attachment of a safety ground.

(6) Included Equipment. The service conductor termination compartment shall be dedicated to this use and shall be reserved for the equipment in 490.46(B)(6)(1) through 490.46(B)(6)(6).

(1) Service conductors and terminations

(2) Surge arresters

(3) Metering transformers

(4) Busbars and their supports, insulators, associated components

(5) Line-side components of the service disconnecting means

(6) Current transformers and associated wiring for protective relaying.

(C) Service Overcurrent Protective Devices. High voltage service overcurrent devices shall be designed or installed so they are de-energized while being replaced or maintained. Access to these devices shall not expose personnel to live parts connected to the service conductors.

FPN: Barriers, rack-out mechanisms, and interlocks with load break or isolating switches are recognized safeguards to provide this isolation.

II. In addition to the proposed additional section, amend 230.211 as follows:

Metal-enclosed switchgear shall comply with 490.46.~~consist of a substantial metal structure and a sheet metal enclosure. Where installed over a combustible floor, suitable protection thereto shall be provided.~~

9-142 Log #2232 NEC-P09 **Final Action: Reject**
(490-72)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
490.72 Branch-Circuit Requirements.
(A) Rating. Each boiler shall be supplied from an individual branch circuit rated not less than 100 percent of the total load.
(B) Common-Trip Fault-Interrupting Device. The circuit shall be protected by a 3-phase, common-trip fault interrupting device, which shall be permitted to automatically reclose the circuit upon removal of an overload condition but shall not reclose after a fault condition.
(C) Phase-Fault Protection. Phase-fault protection shall be provided in each phase, consisting of a separate phase overcurrent relay connected to a separate current transformer in the phase.
(D) Ground Current Detection. Means shall be provided for detection of the sum of the neutral and ground currents and shall trip the circuit-interrupting device if the sum of those currents exceeds the greater of 5 amperes of 7 1/2 percent of the boiler full-load current for 10 seconds or exceeds an instantaneous value of 25 percent of the boiler full-load current.
(E) ~~Grounded~~ Earth Neutral Conductor. The ~~grounded~~ earth neutral conductor shall be as follows:
(1) connected to the pressure vessel containing the electrodes
(2) Insulated for not less than 600 volts
(3) Have not less than the ampacity of the largest ungrounded branch-circuit conductor
(4) Installed with the ungrounded conductors in the same raceway, cable, or cable tray, or, where installed as open conductors, in close proximity to the ungrounded conductors
(5) Not used for any other circuit

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

See the panel statement on Proposal 9-1 (Log #2453i).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

14-5 Log #3526 NEC-P14 **Final Action: Accept in Part**
(500-1, FPN 2)

TCC Action:

The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee Accepts the Panel Action.

Submitter: Robert T. Ford, Safety Management Services, Inc.

Recommendation:

Add text to read as follows:
FPN No. 2: The unique hazards associated with propellant, explosives, pyrotechnics, and blasting agents are not addressed in this Article.

Substantiation:

The NFPA and NEC do not address the unique hazards pertaining to electrical equipment in proximity to propellants, explosives, pyrotechnics, and blasting agents. Application of NFPA 496, 497, 499 and NEC Article 500 to locations where these materials are present during normal or abnormal conditions may result in serious personal injury or death and/or facility damage or loss. Corresponding proposals have been submitted.

Panel Meeting Action: Accept in Part

Add a new fine print note to read:
FPN No. 1: The unique hazards associated with explosives, pyrotechnics, and blasting agents are not addressed in this article.
Renumber existing Fine Print Note to FPN No. 2.

Panel Statement:

While the panel concedes that the NEC Correlating Committee has jurisdiction over the scopes of the individual articles, CMP 14 recommends accepting this proposal to specifically state that the materials cited in the fine print note are beyond the scope of the NEC.
Propellants have been deleted because flammable gases are used as "propellants" for aerosol products. (See NFPA 30B.)

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-6 Log #1473 NEC-P14 **Final Action: Accept**
(500-2)

Submitter: Nicholas P. Ludlam, FM Approvals

Recommendation:

Add new text as follows:
Electrical and Electronic Equipment.
Materials, fittings, devices, appliances, and the like that are part of, or in connection with, an electrical installation.
FPN: Portable or transportable equipment having self-contained power supplies, such as battery-operated equipment, could potentially become an ignition source in hazardous (classified) locations. See ISA-RP12.12.03-2002. Portable Electronic Products suitable for Use in Class I and II, Division 2, Class I Zone 2 and Class III, Division 1 and 2 Hazardous (Classified) Locations.

Substantiation:

As stated the National Electrical Code does not cover portable battery powered electrical or electronic equipment. The referenced standard provides additional information and guidance to the user of such equipment.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-7 Log #1599 NEC-P14 **Final Action: Reject**
(500-2)

Submitter: Joseph A. Ross, Ross Seminars

Recommendation:

Change "Associated Nonincendive Field Wiring Apparatus" to "Nonincendive Field Wiring Apparatus, Associated" and relocate the definition alphabetically to follow "Nonincendive Field Wiring Apparatus."

Substantiation:

Editorial: To assemble "Nonincendive" definitions into one group as was done, e.g., with the definitions for "Accessible" in Article 100.

Panel Meeting Action: Reject

Panel Statement:

The present term is correct as used.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-8 Log #1678 NEC-P14 **Final Action: Accept**
(500-2)

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and clarify the intended action and handling of extracted text. The proposal indicates that the material is extracted from NFPA 496, but the text is not shown as an extract. This action will be considered by the panel as a public comment.

Submitter: David N. Bishop, David N. Bishop, Consultant

Recommendation:

Revise text as follows:
Purged and Pressurized. The process of (1) Purging, supplying an enclosure with a protective gas at a sufficient flow and positive pressure to reduce the concentration of any flammable gas or vapor initially present to an acceptable level and (2) Pressurization, supplying an enclosure with a protective gas with or without continuous flow at sufficient pressure to prevent the entrance of a flammable gas or vapor, a combustible dust, or an ignitable fiber.
FPN: For further information, see ANSI/NFPA 496-1998, *Purged and Pressurized Enclosures for Electrical Equipment*.

Substantiation:

The present paragraph contains only "half" the requirements of NFPA 496 - "Purging". To ensure safety, the requirements for "Pressurization" must also be included. Proposed additional words are extracted from NFPA 496.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

NEAGLE: The panel action was to accept text extracted from NFPA 496; however, the accepted definition is misquoted. The NEC Style Manual allows editing of extracted material only as required to meet the NEC Style Manual. We conclude that the definition of "pressurization" should be extracted verbatim from NFPA 496. Such action would change the final text as shown below.
(2) Pressurization. The process of supplying an enclosure with a protective gas with or without continuous flow at sufficient pressure to prevent the entrance of a flammable gas or vapor, a combustible dust, or an ignitible ~~ignitable~~ fiber.

14-9 Log #660 NEC-P14 **Final Action: Reject**
(500-3)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise to read as follows:
Except as modified in Articles 500 through 504, all other applicable provisions ~~rules~~ contained..." (remainder unchanged).

Substantiation:

Provisions of the Code which are not rules (mandatory) but permissive should also apply if applicable.

Panel Meeting Action: Reject

Panel Statement:

"Rules" can be either mandatory or permissive. See 90.5(A) and (B) of the NEC.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-10 Log #1675 NEC-P14 **Final Action: Accept in Principle**
(500-5)

Submitter: David N. Bishop, David N. Bishop, Consultant

Recommendation:

Add new text as follows:
500.5 Classifications of Locations - last paragraph. Experience has demonstrated the prudence of avoiding the installation of instrumentation or other electric equipment in these particular areas altogether or where it cannot be avoided because it is essential to t he process and other locations are not feasible [see 500.5(A), FPN] using electric equipment or instrumentation approved for the specific application or consisting of intrinsically safe systems as described in Article 504. [no change proposed]
FPN: For further information on the use of electronic products in hazardous (Classified) Locations, see ISA-12.12.03, Portable Electronic Products Suitable for Use in Class I and II, Division 2, Class I Zone 2 and Class III, Division 1 and 2 Hazardous (Classified) Locations.

Substantiation:

The proposal adds a Fine Print Note to reference a new standard applicable to the paragraph.

Panel Meeting Action: Accept in Principle

See Proposal 14-6.

Panel Statement:

The action on Proposal 14-6 meets the submitter's intent. CMP 14 believes the reference is more appropriately placed in 500.2.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-11 Log #1799 NEC-P14 **Final Action: Accept**
(500-5(C)(2)(1))

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and clarify if the conditions specified in items (1) and (2) are intended to apply as separate conditions or as two concurrent conditions. This action will be considered by the panel as a public comment.

Submitter: David Wechsler, The Dow Chemical Company

Recommendation:

Replace the current wording in (C)(2)(1) and (C)(2)(2) with the underlined wording as follows and retain both existing Fine Print Notes:
(1) Class II, Division 2. A Class II, Division 2 location is a location
~~(1) Where combustible dust is not normally in the air in quantities sufficient to produce explosive or ignitable mixtures, and dust accumulations are normally insufficient to interfere with the normal operation of electrical equipment or other apparatus, but combustible dust may be in suspension in the air as a result of infrequent malfunctioning of handling or processing equipment become suspended in the air; as a result of infrequent malfunctioning of handling or processing equipment and~~
~~(2) Where combustible dust accumulates on, in, or in the vicinity of the electrical equipment may be sufficient to interfere with the safe dissipation of heat from electrical equipment or may be ignitible by abnormal operation or failure of electrical equipment.~~
(1) In which combustible dust due to abnormal operations, may be present in the air in quantities sufficient to produce explosive or ignitable mixtures:
(2) Where combustible dust accumulations are present but are normally insufficient to interfere with the normal operation of electrical equipment or other apparatus, but could as a result of infrequent malfunctioning of handling or processing equipment become suspended in the air; or
(3) In which combustible dust accumulations on, in, or in the vicinity of the electrical equipment could be sufficient to interfere with the safe dissipation of heat from electrical equipment, or could be ignitable by abnormal operation or failure of electrical equipment.

Substantiation:

Past NEC codes have reflected the definition of a Class II, Division 2 location as a paragraph with fragments separated by commas and conjunctions. Despite numerous rewrites to Article 500, this text has only had minor corrections and yet still contained incorrect and unclear stated conditions for a Class II, Division 2 condition. Actions taken within NFPA 499 attempted to produce guidance to characterize a Class II, Division 2 condition. However, the current NEC definition was not modified. As such, for instance, under the current definition for a Class II, Division 2 locations, the text implies that one condition for a Class II,, Division 2 condition exists if two concurrent conditions exist:
1) The dust is not normally in the air (a cloud condition) AND (shown with caps for added emphasis)
2) The dust is normally insufficient to interfere with normal operation of equipment (a layered condition).
In fact, either of these could be a valid Class II, Division 2 classification justification if the combustible dust is present as defined.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

COOK: In the recommendation, change (1) to (2) Class II, Division 2. Class II, Division 1 is (1). Also, change spelling of " ignitable" to ignitible".

14-12 Log #1383 NEC-P14 **Final Action: Reject**
(500-6, 505.6, 511.3, 514.3, 514.11, 515.3 Table 515.3, 516.2, 516.3, 516.10)

Submitter: Richard Fransen, Daiken America, Inc.

Recommendation:

Delete "[NFPA 497, 1-3]", "NFPA 499, 1-3]", "[NFPA 88B, 3-1.1]", "[NFPA 30A, 8.1, 8.3]", "[NFPA 30A, 12.1, 12.4, 12.5]", "[NFPA 30A, 12.1, 12.4, 12.5]", "[NFPA 30A, 6.7.1]", "[NFPA 30A, 6.7.2]", "[NFPA 30, 5.9.5.1, 5.9.5.3]", "NFPA 30", "516.2", "NFPA 33", "NFPA 34", wherever used in mandatory code language.

Substantiation:

Paragraph 4.2 of the 2001 NEC Style Manual prohibits direct reference to another NFPA standard in mandatory code language.
"4.2 References to Other Standards. References to other standards shall not be in mandatory Code text. References to product standards shall be in an informative annex. References to other Standards shall be in the Fine Print Notes."

Panel Meeting Action: Reject

Panel Statement:

Section 4.3.2.3 of the NEC Style Manual requires that extracts be identified in this manner.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-13 Log #2975 NEC-P14 **Final Action: Accept in Principle**
(500-7(K))

Submitter: Mark Goodman, American Petroleum Insitute

Recommendation:

Add new text following the main text of this section:
The type of detection equipment, its approval, installation location(s), alarm and shutdown criteria, and calibration frequency shall be considered when combustible gas detectors are used as a protection technique.

Substantiation:

The section for the use of Combustible Gas Detection was included during the 2002 code cycle. In the directed rewrite (reorganization) of the new section by the TCC (ROC 14-51), the provision "Use of this technique for each of the applications above includes adherence to established industrial practices and requirements" was removed because the provisions of other standards cannot be dictated in the NEC.
There are a number of specific considerations such the type of detection equipment, its approval, installation location, alarm and shutdown criteria, and calibration frequency and procedures, which have been established for the proper and safe application of the Combustible Gas Detection protection technique. The proposed wording while not requiring adherence to other codes or standards, does require consideration of the important elements in the use of this technique.

Panel Meeting Action: Accept in Principle

Add a new sentence after the main text of this section to read as follows:
"The type of detection equipment, its listing, installation location(s), alarm and shutdown criteria, and calibration frequency shall be documented when combustible gas detectors are used as a protection technique."

Panel Statement:

CMP 14 believes that installation details should be "documented" and not just "considered". The word "approval" has been changed to "listing" to correlate with the text of the current requirement.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-14 Log #2965 NEC-P14 **Final Action: Accept**
(500-7(K), FPNs No. 1 thru 3)

Submitter: David Soffrin, American Petroleum Institute

Recommendation:

Relocate the Fine Print Notes to under the main text of section 500.7(K)
FPN No. 1: For further information, see ANSI/ISA-12.13.01, Performance Requirements, Combustible Gas Detectors.
FPN No. 2: For further information, see ANSI/API RP 500, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Division 1 or Division 2.
FPN No. 3: For further information, see ISA-RP12.13.02, Installation, Operation, and Maintenance of Combustible Gas Detection Instruments.

Substantiation:

The Fine Print Notes are more appropriately located under the main text. As presently located, they appear to only apply to item 500.7(3).

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-15 Log #1347 NEC-P14 (500-8(A)(2)) **Final Action: Accept in Principle in Part**

TCC Action:

The Technical Correlating Committee directs the panel to give further consideration to the comments in the voting. This action will be considered by the panel as a public comment.

Submitter: William G. Lawrence, Jr.

Recommendation:

Revise text to read as follows:

Equipment that has been identified for a Division 1 location shall be permitted in a Division 2 location of the same class, ~~and~~ group, and temperature class providing that is is installed in accordance with the requirements for Division 1 equipment.

FPN No. 1: Enclosures required to be explosionproof, that require the installation of conduit seals when installed in Division 1, have the same conduit sealing requirements when installed in Division 2.

FPN No. 2: Intrinsically safe apparatus whose control drawing requires the installation of associated apparatus when installed in Division 1, requires the same associated apparatus when installed in Division 2.

Substantiation:

The proposed revision adds "temperature class" to "class" and "group" as this third element was previously omitted and is required for proper application below the autoignition temperature of a gas or vapor.

The proposed revisions address a problem with the current wording where it can be interpreted that it is permitted to not provide a shunt diode safety barrier for IS apparatus installed in Division 2, even when the Control Drawing requires one, or to forego the installation of the conduit seals for explosionproof enclosures installed in Division 2. I believe it was the Panel's intent that Division 1 equipment could be used in Division 2, but had to be installed as it would be in Division 1.

If equipment has been specifically Listed or examined by the Authority Having Jurisdiction for its Division 2 suitability, this section would not apply as the equipment is already suitable for Division 2.

Panel Meeting Action: Accept in Principle in Part

Revise text to read as follows:

"Equipment that has been identified for a Division 1 location shall be permitted in a Division 2 location of the same class, ~~and~~ group, and temperature class. Intrinsically safe apparatus evaluated only for use in Division 1 and whose control drawing requires the installation of associated apparatus when installed in Division 1, shall incorporate that same associated apparatus if installed in Division 2."

Panel Statement:

Revision of the proposed text reflects the following:

(1) Unless the intrinsically safe apparatus has been separately evaluated for Division 2, it must use the same associated apparatus when installed in Division 2.

(2) Proposed FPN No. 1 is a duplicate of the requirements in 501.5(B)(1) and is deleted.

(3) The text following "temperature class" that was deleted from the proposal was unnecessary because of the conversion of proposed FPN No. 2 to mandatory text.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

NEAGLE: The second sentence of the panel action reads "intrinsically safe apparatus evaluated only for use in Division 1...". The text as proposed does not clearly identify who is responsible for 'evaluating' such intrinsically safe apparatus. 504.4 requires that all intrinsically safe apparatus "Listed", as it would be very difficult for the Authority Having Jurisdiction to evaluate this type of equipment in the field. The text of the panel action should be revised to state 'Intrinsically safe apparatus listed only for use in Division 1...'.

O'MEARA: In the panel action I recommend changing "...evaluated only for use in Division 1..." to "...evaluated for use only in Division 1...".

14-16 Log #2925 NEC-P14 (500-8(A)(4)) **Final Action: Reject**

TCC Action:

The Technical Correlating Committee notes that the panel proposal referenced in the comments on voting is not contained in the panel's agenda of actions.

Submitter: Dorothy Kellogg, American Chemistry Council

Recommendation:

Modify the current text by including the wording "except where exempted by a section in this code", so that this section reads:
"(4) Equipment, regardless of the classification of the location in which it is installed, that depends on a single compression seal, diaphragm, or tube to prevent flammable or combustible fluids from entering the equipment shall be identified for a Class I, Division 2 location. Equipment installed in a Class I, Division 1 location shall be identified for the Class I, Division 1 location."

Substantiation:

Within 501.2(A)(1) for example, permission has existed to install a transformer or capacitor within a Class I, Division 1 location that is not identified for a Class I, Division 1 location. The suggested text revision simply recognizes this fact.

Panel Meeting Action: Reject

Panel Statement:

The submitter has proposed no substantive change to the text.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

ENGLER: The Panel prepared a Panel Proposal to address the confusion brought forward by Proposal 14-16. The text of the Panel Proposal replaces all of 500.8(A)(4) and replaces the FPN as follows:
500.8(A)(4) Equipment, regardless of the classification of the location in which it is installed, that depends on a single compression seal, diaphragm, or tube to prevent flammable or combustible fluids from entering the equipment shall be identified for a Class I, Division 2 location, even if installed in an unclassified location. Equipment installed in a Class I, Division 1 location shall be identified for the Class I, Division 1 location.
FPN: Equipment, such as that for flow or pressure measurement, may include single compression seals, diaphragms, or tubes.
LAWRENCE: My records show that the panel prepared a Panel Proposal to address the confusion brought forward by Proposal 14-16. The text of the Panel Proposal replaces all of 500.8(A)(4) and replaces the FPN. According to my records, the text voted was as follows:
"500.8(A)(4) Equipment, regardless of the classification of the location in which it is installed, that depends on a single compression seal, diaphragm, or tube to prevent flammable or combustible fluids from entering the equipment shall be identified for a Class I, Division 2 location, even if installed in an unclassified location. Equipment installed in a Class I, Division 1 location shall be identified for the Class I, Division 1 location.
FPN: Equipment, such as that for flow or pressure measurement, may include single compression seals, diaphragms, or tubes."
WECHSLER: While the Panel action was correctly reported as being "Reject", the issue did cause the Panel to develop a Committee proposal to revise the existing text to provide better clarity, as follows:
(4) Equipment_, ~~regardless of the classification of the location in which it is installed~~ , that depends on a single compression seal, diaphragm, or tube to prevent flammable or combustible fluids from entering the equipment shall be identified for a Class I, Division 2 location, even if installed in an unclassified location. Equipment installed in a Class I , Division 1 location shall be identified for the Class I , Division 1 location.
FPN: Equipment, such as that for flow or pressure measurement, may include single compression seals, diaphragms, or tubes.

14-17 Log #994 NEC-P14 (500-8(B)) **Final Action: Accept in Principle**

Submitter: Noel Williams, Noel Williams Consulting

Recommendation:

Renumber Exception No. 5 as Exception No. 1 and renumber the other four Exceptions.

Substantiation:

Exception No. 5 is a mandatory Exception, and in accordance with the style manual, mandatory Exceptions should be listed first. The remaining Exceptions are permissive according to 90.5(B).

Panel Meeting Action: Accept in Principle

See panel Proposal 14-17A (Log #CP1402).

Panel Statement:

Panel Proposal 14-17A (Log #CP1402) incorporates this change.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-18 Log #1637 NEC-P14 **Final Action: Accept in Principle**
(500-8(B))

Submitter: Nicholas P. Ludlam, FM Approvals

Recommendation:

Revise text as follows:
(B) Marking. Equipment shall be marked to show the class, group, and operating temperature or temperature class referenced to a 40°C ambient.
Exception No. 1: Equipment of the non-heat-producing type, such as junction boxes, conduit, and fittings, and equipment of the heat-producing type having a maximum temperature not more than 100°C (212°F) shall not be required to have a marked operating temperature or temperature class.
Exception No. 2: Fixed luminaires (lighting fixtures) marked for use in Class 1, Division 2, or Class II, Division 2 locations only shall not be required to be marked to indicate the group.
Exception No. 3: Fixed general-purpose equipment in Class I locations, other than fixed luminaires (lighting fixtures), that is acceptable for use in Class I, Division 2 locations shall not be required to be marked with the class, group, division, or operating temperature.
Exception No. 4: Fixed dusttight equipment other than fixed luminaires (lighting fixtures) that is acceptable for use in Class II, Division 2 and Class III locations shall not be required to be marked with the class, group, division, or operating temperature.
Exception No. 5: Electric equipment suitable for ambient temperatures exceeding 40°C (104°F) shall be marked with both the maximum ambient temperature and the operating temperature or temperature class at the ambient temperature.
Exception No. 6: Simple apparatus as defined in 504.2 shall not be required to have a marked operating temperature or temperature class.

Substantiation:

This proposal is linked to that for the temperature evaluation of simple apparatus (504.10(B)). Simple apparatus is not required to be identified or to be listed (504.4 Exception).

Panel Meeting Action: Accept in Principle

See panel Proposal 14-17A (Log #CP1402).

Panel Statement:

Panel Proposal 14-17A (Log #CP1402) incorporates this change.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

COOK: See my Explanation of Negative on Proposal 14-67.

14-17a Log #CP1402 NEC-P14 (500-8(B)) **Final Action: Accept**

TCC Action:

The Technical Correlating Committee directs the panel to reconsider this proposal and reword the requirements so that the initial three exceptions follow a specifically stated rule. This action will be considered by the panel as a public comment.

Submitter: Code-Making Panel 14

Recommendation:

Revise 500-8(B) as follows:

(B) Marking. Equipment shall be marked with the following:

Exception No. 1: Fixed general-purpose equipment in Class I locations, other than fixed luminaires (lighting fixtures), that is acceptable for use in Class I, Division 2 locations shall not be required to be marked with the class, division, group, or temperature class.

Exception No. 2: Fixed dusttight equipment other than fixed luminaires (lighting fixtures) that is acceptable for use in Class II, Division 2 and Class III locations shall not be required to be marked with the class, division, group, or temperature class.

Exception No. 3: Associated intrinsically safe apparatus and associated nonincendive field wiring apparatus, which are not protected by an alternative type of protection, shall not be marked with the Class, Division, Group, and temperature class; but shall be marked with the applicable Class, Division, and Group to which they may be connected.

(1) Class

(2) Division

Exception: Equipment suitable for use in Division 1 need not be marked with the Division

FPN: Equipment not marked to indicate a division, or marked "Division 1" or "Div. 1," is suitable for both Division 1 and 2 locations, see 500.8(A)(2). Equipment marked "Division 2" or "Div. 2" is suitable for Division 2 locations only.

(3) Applicable gas classification groups in accordance with 500.6(A)

Exception: Fixed luminaires (lighting fixtures) marked for use in Class I, Division 2 or Class II, Division 2 locations only shall not be required to be marked to indicate the group.

(4) Temperature class or operating temperature at a 40°C ambient temperature

Exception No. 1: Equipment of the non-heat-producing type, such as junction boxes, conduit, and fittings, and equipment of the heat-producing type having a maximum temperature not more than 100°C (212°F) shall not be required to have a marked operating temperature or temperature class.

Exception No. 2: The temperature class or operating temperature of equipment rated and marked for an ambient temperature of greater than 40°C shall be determined at the higher marked ambient.

FPN: More than one marked temperature class or operating temperature, for gases and vapors, dusts, and different ambient temperatures, may appear.

Exception No. 3: Simple apparatus as defined in 504.2.

The temperature class, if provided, shall be indicated using the temperature class (T Codes) shown in Table 500.8(B). Equipment for Class I and Class II shall be marked with the maximum safe operating temperature, as determined by simultaneous exposure to the combinations of Class I and Class II conditions.

FPN: Since there is no consistent relationship between explosion properties and ignition temperature, the two are independent requirements.

Table 500.8(B) Classification of Maximum Surface Temperature

Maximum Temperature (T Code)		Temperature Class
°C	°F	
450	842	T1
300	572	T2
280	536	T2A
260	500	T2B
230	446	T2C
215	419	T2D
200	392	T3
180	356	T3A
165	329	T3B
160	320	T3C
135	275	T4
120	248	T4A
100	212	T5
85	185	T6

(5) Ambient temperature range, including either the symbol "Ta" or "Tamb" together with the special range of ambient temperatures

FPN: As an example, such a marking might be "-30°C Ta + 40°C.".

Exception: Equipment rated for an ambient temperature range of -25°C to +40°C.

Substantiation:

This proposal addresses the concerns raised by proposals 14-17, 14-18, & 14-19 and also includes an editorial reorganization of the material to improve clarity and align the various exceptions with the particular marking element to which it applies. A Fine Print Note was added to recognize the practice of providing temperature classes at more than one ambient temperature, and different Class I and Class II temperature classes in the product marking. The requirement for marking the ambient temperature was moved from an exception to mandatory text in accordance with the NEC Manual of Style.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

O'MEARA: In the proposed paragraph (B)(3) I recommend adding "...and/or dust classification group in accordance with 500.6(B) as appropriate" after the words "...in accordance with 500.6(A)." "Marking" in this section includes not only equipment suitable for Class I locations but also Class II and III locations.

14-19 Log #2077 NEC-P14 **Final Action: Accept in Principle**

(500-8(B) Exception No. 6 (New))

Submitter: Nicholas P. Ludlam, FM Approvals

Recommendation:

Add text to read as follows:

(B) Marking. Equipment shall be marked to show the class, group, and operating temperature or temperature class referenced to a 40°C ambient.

Exception No. 1: Equipment of the non-heat-producing type, such as junction boxes, conduit, and fittings, and equipment of the heat-producing type having a maximum temperature not more than 100°C (212°F) shall not be required to have a marked operating temperature or temperature class.

Exception No. 2: Fixed luminaires (lighting fixtures) marked for use in Class I, Division 2 or Class II, Division 2 locations only shall not be required to be marked to indicate the group.

Exception No. 3: Fixed general-purpose equipment in Class I locations, other than fixed luminaires (lighting fixtures), that is acceptable for use in Class I, Division 2 locations shall not be required to be marked with the class, group, division, or operating temperature.

Exception No. 4: Fixed dusttight equipment other than fixed luminaries (lighting fixtures) that is acceptable for use in Class II, Division 2 and Class III locations shall not be required to be marked with the class, group, division, or operating temperature.

Exception No. 5: Electric equipment suitable for ambient temperatures exceeding 40°C (104°F) shall be marked with both the maximum ambient temperature and the operating temperature or temperature class at that ambient temperature.

Exception No. 6: Associated intrinsically safe apparatus and associated nonincendive field wiring apparatus, which are not protected by an alternative type of protection, shall not be marked with the Class, Division, Group, and temperature class but which shall be marked with the applicable Class and Group to which they may be connected.

Substantiation:

500.10(C) correctly identifies the marking that can appear on associated intrinsically safe apparatus in that the Class and Zone are not marked because the associated apparatus cannot be installed in hazardous location unless it is protected by another protection technique. There is no similar requirement for associated intrinsically safe and associated nonicendive field wiring apparatus for Divisions. 500.8(B) as written requires a class and group to be marked which if followed would incorrectly imply that the associated apparatus can be installed in a hazardous location.

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

Panel Meeting Action: Accept in Principle

See panel Proposal 14-17A (Log #CP1402).

Panel Statement:

Panel Proposal 14-17A (Log #CP1402) incorporates this change.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-20 Log #3134 NEC-P14 (501) **Final Action: Accept in Principle**

Submitter: Donald Cook, Shelby County Development Services

Recommendation:

Revise text as follows:

[Text of Proposal 14-20 recommendation is shown on page 2355]

Substantiation:

This proposal was a cooperative effort of the membership of CMP-14, at the direction of the TCC, to provide a scope for Article 501. Although an official ballot was not taken on the proposal, consensus was reached in the development of the proposal. The following Issues are addressed:

• Proposal adds a scope for Article 501 providing compliance with Section 2.2.1 of the NEC Style Manual. This is the only new text in the proposal.

• Renumbering of text allows for section 1 to be used for the scope(Section 2.2.1 of NEC Style Manual); section 2 to be reserved for definitions(Section 2.2.2.2 of NEC Style Manual); provides three parts; grouping general text in one part, wiring requirements in another and equipment requirements in another (Section 2.1.4 of NEC Style Manual); provides parallel numbering for Articles 501, 502 and 503, see companion proposals for Articles 502 and 503 (Section 2.4.1 of NEC Style Manual); provides gaps in numbering to allow for future sections (Section 2.4.2 of NEC Style Manual).

• All other changes provide correlation for the renumbering.

Panel Meeting Action: Accept in Principle

See Panel Proposal 14-19A (Log #CP1406).

Panel Statement:

Panel Proposal 14-19A (Log #CP1406) incorporates this change.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-19a Log #CP1406 NEC-P14 (501) **Final Action: Accept**

TCC Action:

The Technical Correlating Committee notes to the reader of the Report on Proposals that this proposal renumbers Article 501. In addition, changes made by subsequent accepted proposals are integrated into this proposal, but the revision will be found in this proposal under its new section number.

The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee accepts the panel action.

The Technical Correlating Committee directs the panel to review the proposal and ensure that proper mandatory language is used. Examples of areas that need to be addressed are in 501.15(F)(3)(a) where the phrase "does not require" should be replaced with "shall not require", in 501.15(F)(3)(b) where the phrase "requires an additional" should be replaced with "shall be required to have" and the use of the term "when" instead of "where" in 501.15(F)(3)(a). This action will be considered by the panel as a public comment.

Submitter: Code-Making Panel 14

Recommendation:

Revise Article 501 as follows:

[Text of Proposal 14-19a recommendation is shown on page 2362]

Substantiation:

This incorporates both the reorganization proposed by Proposal 14-20 and all changes accepted by CMP 14 to Article 501.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

O'MEARA:

• In 501.15(B)(2), I recommend to retain the word "explosionproof" in the fourth sentence. It was deleted without substantiation.

• In 501.15(F)(3)(a), I recommend to add an apostrophe between "manufacturer" and "s".

• In 501.125(B), FPN No. 3, I recommend adding "I" between "Class" and "Division" in the first line.

• In 501.140(A)(1), I recommend deleting "A flexible cord shall be permitted" at the beginning of the sentence. Superfluous.

14-21 Log #2712 NEC-P14 **Final Action: Accept**
(501-1)

TCC Action:

The Technical Correlating Committee directs the panel to reconsider this proposal and consider the deletion of the first sentence of the recommendation and the associated exception since the requirement to comply with the general rules is already covered by 90.3. The NEC Manual of Style 4.1 states that references should not be used if already covered by 90.3. This action will be considered by the panel as a public comment.

Submitter: Donny Cook, Shelby County Development Services

Recommendation:

Revise text to read as follows:
501.1 General.
The general rules o this Code shall apply to the electric wiring and equipment in locations classified as Class 1 in 500.5.
Exception. As modified by this article.
Equipment listed and marked in accordance with 505.9(C)(2) for use in Class 1, Zone 0, 1, or 2 locations shall be permitted in Class 1, Division 2 locations for the same gas and with a suitable temperature class.

Substantiation:

The 1999 NEC includes two paragraphs for the text currently shown in a single paragraph in 501.1. I do not see any panel action in the ROP and/or ROC for the 2002 NEC that places the two different ideas included in the text into a single paragraph. This proposal separates the two ideas into two paragraphs. It also places the exception after the first paragraph, which appears to be the text that the exception applies to.
If the proposal for adding a scope to Article 501 and reorganizing the existing text is accepted, the second paragraph would more accurately go into a new section in Part III, Equipment.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-22 Log #2927 NEC-P14 **Final Action: Accept in Principle**
(501-3(B)(1) Exception (New))

Submitter: Dorothy Kellogg, American Chemistry Council

Recommendation:

Add a new exception as follows and renumber the exceptions with the new becoming (1) and the current (2):
Exception No. 1: Switches housed in Division 2 enclosures.
Exception No. 2: [former exception]

Substantiation:

Since there are now Division 2 enclosures for switches, there should not be a need to require these enclosures to be approved for Division 1.

Panel Meeting Action: Accept in Principle

In Section 501.3(B)(1), replace item (d) with the following:
"(d) Listed for Division 2."

Panel Statement:

This meets the submitter's intent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-23 Log #1942 NEC-P14 **Final Action: Reject**
(501-4(A)(1) Exception)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:

Exception: Rigid nonmetallic conduit complying with Article 352 shall be permitted where encased in a concrete envelope a minimum of 50 mm (2 in.) thick and provided with not less than 600 mm (24 in.) of cover measured from the top of the conduit to grade. The concrete encasement shall be permitted to be omitted where subject to the provisions of 511.4, Exception; 514.8, Exception No. 2; and 515.8(A). Threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (24 in.) of the underground run to emergence or to the point of connection to the aboveground raceway. An equipment ~~grounding~~ bonding conductor shall be included to provide for electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Introduction of this new term to substitute for the term currently used will confuse the user. CMP 14 notes that this change would have to be effected throughout the entire Code simultaneously, not just one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

O'MEARA: See my Explanation of Negative on Proposal 14-1.

14-24 Log #3328 NEC-P14 **Final Action: Reject**
(501-4(A)(1)(a))

Submitter: Jon Miller, Detector Electronics Corp.

Recommendation:

Revise text to read as follows:
"...threaded joints shall be made up with at least ~~five~~ three and one half threads fully engaged...".

Substantiation:

Explosion proof/flameproof enclosure threaded entries are required to conform with ANSI/ASME B1.20.1 (Pipe Threads, General Purpose Inch) with modified L1 gauging of +0.5 to +3.5 to ensure a minimum of five full threads engagement. This deeper tapped hole produces an unsafe condition on shouldered fittings when the shoulder is dimensioned at less than L4 producing a condition where the threads do not fully engage. There are currently no standard requirements to address this condition. In addition, this deeper tapped hole of a flameproof enclosure, which may be significantly thinner wall enclosure in comparison to an explosion proof enclosure, in combination with a threaded blanking element are not able to ensure five full threads engagement under worst case wrench tight conditions. For this reason the International Standard for Type of Protection "d" (IEC 60079-1) requires conformance to ANSI/ASME B1.20.1 (L1 gauging of +/- 1 to ensure a minimum of three and one half full threads engagement) for minimum thread engagement requirements on taper threaded joints. This requires US manufacturers producing a single product for international markets to conform with L1+0.5 to L1+1 for female taper threaded entries resulting in tight inspection requirements and high scrap potential.

Panel Meeting Action: Reject

Panel Statement:

This issue is considerably more complex than indicated by the proposal. Some of the factors involved include:
- thread gauging of both male and female parts;
- problems with shoulders on the male parts;
- concerns about misapplication during field installation.

The submitter still has not provided sufficient evidence that this reduction in the requirement will provide an equivalent degree of safety.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

ENGLER: ISA disagrees with the CMP 14 rejection of this proposal based on the following:

The reasons for rejecting the proposal involve issues that can be effectively addressed by the revisions shown below. As the IEC standards are definitely being revised to reflect the "US" NPT gauging practices included in ANSI B 1.20.1, manufacturers will be very negatively impacted if a compromise position cannot be found. Revise indicated sections as shown:

500.8(D) threading. All threaded conduit or fittings referred to herein shall be threaded with a National (American) Standard Pipe Taper (NPT) standard conduit cutting die that provides a taper of 1 in. 16 (3/4-in. taper per ft). Such conduit shall be made wrench tight to prevent sparking when fault current flows through the conduit system and to ensure the explosion proof ~~or flameproof~~ integrity of the conduit system where applicable. Equipment provided with threaded entries for field wiring connections shall be installed in accordance with 500.8(D)(1) or (D)(2). Threaded joints with field threaded NPT entries shall be made up with at least five threads fully engaged for entries into explosion proof equipment. Threaded joints with factory threaded NPT entries shall be made up with at least 4 1/2 threads fully engaged for entries into explosion proof equipment. Threaded joints with metric entries shall be made up with at least five threads fully engaged for entries into explosion proof equipment.

501.4(A) Class I, Division 1.

(1) General. In Class I, Division 1 locations, the wiring methods in (a) through (d) shall be permitted.

(a) Threaded rigid metal conduit or threaded steel intermediate metal conduit. ~~Threaded joints shall be made up with at lest five threads fully engaged.~~

505.9(E) Threading. All threaded conduit referred to herein shall be threaded with a National (American) Standard Pipe Taper (NPT) standard conduit cutting die that provides a taper of 1 in. 16 (3/4-in. taper per ft). Such conduit shall be made wrench tight to prevent sparking when fault current flows through the conduit system, and to ensure the explosion proof or flameproof integrity of the conduit system where applicable. Threaded joints with field threaded NPT entries shall be made up with at least five threads fully engaged for entries into flameproof or explosion proof equipment. Threaded joints with factory threaded NPT entries shall be made up with at least 4 1/2 threads fully engaged for entries into flameproof or explosion proof equipment. Threaded joints with metric entries shall be made up with at least five threads fully engaged for entries into explosion proof equipment.

Justification for changes to 500.8(D), 501.4(A) and 505.9(E):

The 5 thread engagement requirement specified within the NEC text should be changed to 4 1/2 thread engagement for alignment with IEC product standard gauging practices for factory NPT threaded joints. This change allows US manufacturer's to gauge NPT entries to a single internationally accepted gauging practice (0 to + 2 turns of L1) rather than the currently restrictive gauging practice (+1/2 to +1 turns of L1).

This comment addresses the issues in the panel statement as follows:

Panel Statement: Issue involves thread gauging of both male and female parts.

Response: Proposed revisions allow "reduced" thread engagement ONLY for joints that include factory threaded entries.

Panel Statement: Issue involves shoulders on male parts.

Response: ISA has submitted parallel proposals for U.S. and IEC product standards to address this issue. The revisions shown above ensure that when male parts with properly located shoulders are installed into factory threaded entries, at least 4 1/2 threads are fully engaged.

Panel Statement: Issue involves concerns about misapplication during field installation.

Response: Revisions above limit reduced engagement allowances to factory threaded entries.

Panel Statement: Submitter has not provided evidence that reduction in the requirement would provide an equivalent level of safety.

Response: It is widely recognized that when both male and female parts are threaded in the field that it is very typical to achieve significantly less than five fully engaged threads. The revisions above reduce the existing requirements by 1/2 threads only when the entry is factory threaded.

Note: Supporting Material available for review at NFPA headquarters.

14-25 Log #3461 NEC-P14 **Final Action: Reject**
(501-4(A)(1)(d))

Submitter: Charles M. Trout, Maron Electric Co. Inc.

Recommendation:

Delete the section in its entirety.

Substantiation:

The National Electrical Code is prescriptive code. To say "where the conditions of maintenance and supervision ensure that only qualified persons service the installation," is a performance requirement. Without prescriptive requirements indicating whether this qualified person is an employee of the owner of the premises or is a separately contracted person and the Authority Having Jurisdiction has a means of verification of the continued employment of the qualified person and whether the qualified person has been verified by the authority having jurisdiction as meeting the definition of a qualified person as shown in the definitions of this Code no prescriptive requirements have been followed.

To permit relaxation of the safety requirements of this Code without establishing a positive guarantee that the safety of persons and property is indisputably assured is a reprehensible act.

Panel Meeting Action: Reject

Panel Statement:

The text is appropriate as currently written. CMP 14 believes there are applications where there is limited public access along with company policies and procedures, minimum personnel requirements for maintenance workers, government certification requirements, required apprenticeship training, required continuing education requirements, and, in many cases, a combination of more than one of these items that can ensure that only qualified employees will service an installation. This does not occur in all geographic areas or in all types of occupancies. However, in areas where it occurs, it is justification for flexibility.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-26 Log #3130 NEC-P14 **Final Action: Accept in Principle in Part**
(501-4(A)(3))

Submitter: Jonathan R. Althouse, Twin Creeks Enterprises

Recommendation:

Delete the word "Joint" in the title of this paragraph and in the text of the paragraph and reword as follows:

(3) Boxes and Fittings. ~~and Joints.~~ Boxes, and fittings~~, and joints~~ shall not be required to be explosionproof except as required by 501.3(B)(1), 501.6(B)(1), and 501.14(B)(1).

Substantiation:

The term "joint" is ambiguous and means nothing to most electricians and inspectors and is not needed in the section. If the Panel feels the term is needed, then please define it so other will know what the Panel intends it to mean.

Panel Meeting Action: Accept in Principle in Part

Accept only the deletion of the word "joints" both in the section title and the text.

Make the same revision to 501.4(B)(4).

Panel Statement:

This meets the submitter's intent. A correlating change is made to 501.4(B)(4).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-27 Log #2996 NEC-P14 **Final Action: Accept in Principle**
(501-4(B)(1))

TCC Action:

It was the action of the Technical Correlating Committee that the panel reconsider this proposal and consider either deleting the new FPN because it is redundant or revise the FPN to create a complete reference to the Article and its title. This action will be considered by the panel as a public comment.

Submitter: Goran Haag, Champion Fiberglass, Inc.

Recommendation:

In section (1) General, item (2) add: "rigid nonmetallic conduit with an equipment grounding conductor".

Substantiation:

Addition of rigid nonmetallic conduit to Class I, Division 2 wiring methods.

This proposal provides the option of using a conduit system that is corrosion resistant and safe for Class I, Division 2 locations. Chemical plants, refineries, off shore drilling facilities, and other similar processes are highly corrosive and also have classified areas. Nonmetallic conduit provides a critical option in these locations. The NEC requirements for rigid nonmetallic conduit are found in Article 352. Rigid nonmetallic conduit is listed in the UL Information Directory, which describes the types of rigid nonmetallic conduit, and also in UL standard 1684.

Rigid nonmetallic conduit is permitted in Class III, Division 1 locations; as a buried raceway in Class I locations in commercial Garages, Article 511; in Bulk Storage Plants, Article 515; and in Class I, Division 1 locations when enclosed in concrete.

This proposal also requires an equipment grounding conductor with the nonmetallic conduit in Class I, Division 2 locations. Rigid nonmetallic conduit, nor other cabling or conduit systems, is not permitted where subject to physical damage unless identified for such use.

Panel Meeting Action: Accept in Principle

Add a new item (3) and a new associated F
fine print note to read as follows:

(3) Rigid nonmetallic conduit with an equipment grounding conductor.

FPN: See Article 352."

Renumber the following items accordingly.

Panel Statement:

CMP 14's rewording meets the intent of the submitter and reinforces the need to follow the appropriate installation rules in Article 352.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 11 Negative: 3

Explanation of Negative:

GOODMAN: There are a number of problems with the blanket approval of rigid nonmetallic in Division 2 locations.

1. Variety of products. There are several acceptable configurations and product types meeting the minimum requirements of RNC. There is no substantiation that all of the types will be suitable for Division 2 locations. The individual product standards need to be reviewed and demonstrated to have the necessary qualities before they are accepted. While some product types may, others may not.

2. Conduit connections. As a panel, we have consistently endorsed 5 engaged threads in conduit systems. While this is only specifically required in Division 1, it is commonly used as the criteria for conduit installations in Division 2 locations as well. With the "solvent wipe" and other connection types in RNC, there really are no means to verify that a good connection all around the conduit and fitting have been made.

3. Physical strength and integrity. In many installations where RNC has been used for the physical protection of grounding conductors, for example, they have been prone to being bent, dented, damaged, and broken. This is obviously a condition very undesirable for live conductors in any area, but especially in Classified Locations. The extremely subjective restriction of "not permitted where subject to physical damage..." is close to meaningless in practical applications. High temperature (bending) and low temperature (brittle and breaking) are additional physical limitations.

4. Fittings and Sealing. It is unclear how the necessary transitions will be made where sealing requirements apply. Combinations of RNC and metallic fittings pose additional problems that should be part of the proposal.

While it is acknowledged that certain installations, particularly in corrosive environments may benefit from alternatives to the wiring methods currently permitted in Division 2, it must also be stated that the practical application of RNC, with its multiple product types and limitations, must have additional restrictions for products and use to ensure that the wiring methods employed provide the level of integrity and safety necessary in a Classified Location.

KUCZKA: This proposal adds nonmetallic conduit to Class I, Division 2 locations without substantiation as to how this type of conduit would perform in these critical areas. Currently, nonmetallic conduit is permitted in Class I, Division 2 areas when encased in concrete. There is no such requirement in this proposal and the submitter has not provided any substantiation as to why this requirement should be removed for Division 2 locations. This same proposal was submitted last cycle and the Panel rejected it, citing concerns about mechanical strength and lack of specific information about the product that is desired to be used. Article 352 covers several types of nonmetallic conduit; this is a very broad term. When not encased in concrete, there are several issues to be concerned about with a nonmetallic material in Class I hazardous locations.

WELDON: Permitting the use of rigid nonmetallic conduit in class 1 division 2 locations is a diminution of our code standards. 352.10 FPN references the brittleness of RNC in extreme cold conditions.

The use of RNC introduces calculations of expansion and contractions, and the use of expansion fittings as required by 352.44 and 352.44 (A) or (B).

Empirically, I have often seen RNC in normal installed usage pulled apart from its connector's couplings and fittings for no apparent reasons, however, UV and high temperatures from solar sources are likely contributors.

In high temps it quickly sags or literally melts.

Comment on Affirmative:

COOK: I have some concerns related to installations of rigid nonmetallic conduit. These are based on the number of improper installations I have seen in unclassified areas. I realize that if the proposal is accepted, installations will occur that include a mix of

metal and nonmetallic parts. Installations may occur where metal seals, metal conduit bodies or metal fittings (which are usually grounded by metal raceways and may not include a means to attach an equipment grounding conductor) are installed in nonmetallic conduit runs. I also realize that any wiring method can be misapplied. I am voting affirmative because I believe that proper application of this wiring method in Class I, Division 2 locations can be used safely.

O'MEARA: Recommend changing "equipment grounding conductor" to "equipment bonding conductor". See my Explanation of Negative on Proposal 14-1.

14-28 Log #108 NEC-P14 (501-4(B)(1)5) **Final Action: Accept in Principle**

Submitter: James M. Daly, General Cable

Recommendation:

Revise 501.4(B)(1)(5) as follows:

(5) Type ITC cable in cable trays, in raceways, supported by messenger wire, ~~afforded~~ exposed with continuous mechanical protection ~~and run as open wiring,~~ or directly buried where the cable is listed for this use.

Substantiation:

This is one of a series of proposals to provide consistency throughout the code in the use of the terms "exposed", "open wiring", and "open runs" as applied to wiring methods.

"Exposed" is used 306 times throughout the code, "open runs" is used 7 times, and "open wiring" is used 29 times but only 10 of those instances do not refer to "open wiring on insulators".

Exposed is defined in Article 100 as shown below.

"Exposed (as applied to live parts). Capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to parts that are not suitably guarded, isolated or insulated."

"Exposed (as applied to wiring methods). On or attached to the surface or behind panels designed to allow access."

Open wiring on insulators is defined in 398.2 as "An exposed wiring method using cleats, knobs, tubes, and flexible tubing for the protection and support of single insulated conductors run in or on buildings."

"Open runs" is not defined in the code.

This series of proposals will limit the term "open wiring" to open wiring on insulators (Article 398) and have the term "exposed" apply to "open runs" and open wiring not on insulators.

Wire and cable that must be continuously supported and protected will be specifically addressed in the applicable section.

Panel Meeting Action: Accept in Principle

See Proposal 14-29.

Panel Statement:

The action on Proposal 14-29 meets the submitter's intent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-29 Log #2915 NEC-P14 **Final Action: Accept**
(501-4(B)(1)(5))

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and address the issue of the circular reference raised in the comment on voting. This action will be considered by the panel as a public comment. In addition, it was the action of the Technical Correlating Committee that this proposal be referred to Code-Making Panel 3 for information.

Submitter: Dorothy Kellogg, American Chemistry Council

Recommendation:

Replace the words "open wiring" with the permitted ITC wiring methods as provided for ITC in Article 727, as shown:
(5) Type ITC cable aspermitted in 727.4 ~~cable trays, in raceways, supported by messenger wire, afforded mechanical protection and run as open wiring, or directly buried where the cable is lsited for this use.~~

Substantiation:

The phrase "open wiring" appears more than 30 times in the current 2002 NEC, but it exists in two distinct formats: a) as the defined term "open wiring on insulators" by Article 398.2, or b) simply as the undefined term "open wiring'. With the defined term, open wiring makes reasonable sense. However when used as the undefined term "open wiring", especially when used to describe a cable that is required to have mechanical integrity and protection takes on an entirely different meaning. Clearly such an installation is not "open". Due to the significant difference in the use of the terms, this and associated other proposals if accepted would replace the undefined use of the term "open wiring" with more appropriate language that addresses the installation in 501.4(B)(1)(5), 501.5 Exception No. 2; 503.3(B); 504.30(A)(1); 505.15(C)(1)(c); 505.16(C)(1) Exception No. 2; 610.12(A); 725.61(D)(4); and 727.4(4)(5)(6), and use the full 398.2 defined term where the text suggests as in 300.16(A); 312.5(B); 314.17(B); 314.17(C). Again, individual proposals have been submitted to address each section mentioned. Since the concept of open wiring may also have permitted messenger supported wiring, with this change, this term has been added.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

NEAGLE: While it is agreed that making reference to 727.4 better addresses the use of type ITC cable in hazardous locations, referencing 727.4 creates a circular reference between 501-4(B)(1)(5) and 727-4(3). The intent of this proposal may be better met by "accepting in principle" and changing the words "open wiring" to "exposed" as shown in Proposal 14-28. Alternatively, this issue could be referred back to CMP-3 for action.

14-30 Log #2689 NEC-P14 (501-4(B)(2)) **Final Action: Accept in Principle in Part**

TCC Action:

The Technical Correlating Committee directs the panel to clarify the language in the opening paragraph to make it clear that the methods listed in items (1) through (5) are the only methods permitted for flexibility or that those methods are permitted in addition to the general wiring methods. This action will be considered by the panel as a public comment.

Submitter: Phil Simmons, Simmons Electrical Services / Rep. National Armored Cable Manufacturers Assn.

Recommendation:

Revise existing Section 501.4(B)(2) as follows:

(2) Flexible Connections. Where provision must be made for limited flexibility, one or more of the following wiring methods shall be used:

(1) flexible metal fittings
(2) flexible metal conduit with listed fittings
(3) liquidtight flexible metal conduit with listed fittings
(4) liquidtight flexible nonmetallic conduit with listed fittings
(5) Type MC cable with listed fittings
(6) Type AC cable containing an insulated equipment grounding conductor with listed fittings
(7) flexible cord listed for extra-hard usage and provided with listed bushed fittings ~~shall be used~~. An additional conductor for grounding shall be included in the flexible cord.

Substantiation:

Type AC and MC cables by construction are flexible and are suitable for the applications provided in this Section.
The proposal also intends to editorially modify the section into a list format which is more user friendly.

Panel Meeting Action: Accept in Principle in Part

Revise existing Section 501.4(B)(2) to read as follows:

(2) Flexible Connections. Where provision must be made for limited flexibility, one or more of the following wiring methods shall be permitted:

(1) flexible metal fittings
(2) flexible metal conduit with listed fittings
(3) liquidtight flexible metal conduit with listed fittings
(4) liquidtight flexible nonmetallic conduit with listed fittings
(5) flexible cord listed for extra-hard usage and provided with listed bushed fittings. An additional conductor for grounding shall be included in the flexible cord.

Retain the Fine Print Note.

Panel Statement:

CMP 14 has accepted the reorganization of this section to a list format and has made minor editorial changes. However, no technical justification has been provided to support addition of Type AC cable. The construction of Type AC cable is not as substantial as that of flexible metal conduit (which is permitted).

Type MC has been deleted from the list because it is already permitted under 501.4(B)(1)(6).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

GOODMAN: I support the panel action of reorganizing the section to a list format. It is important to note, however, that several of the wiring methods permitted under (1) General also provide for, and may be used to achieve, flexibility. The methods identified in (2) Flexible Connections permit additional acceptable wiring methods expressly for that purpose, but do not require their use as the only methods to provide for flexibility.

14-47 Log #2299 NEC-P14 **Final Action: Accept in Principle**
(501-4(B)(1)(6))

Submitter: H. R. Stewart, HRS Consulting

Recommendation:

Add after MV. (approved for the use. Single conductor Type MV cables must be shielded or metallic armored.)

Substantiation:

Problem # 1 - All MV cable constructions are not suitable for use as described "in cable tray systems". To be installed in a cable tray the cable should be listed and approved for the use. This requires a Flame Test and Sunlight Resistance test for general purpose use. The same requirement should apply for installation in a Class I, Division 2 location.

Problem # 2 - The Type MV cable designation covers single and multiconductor constructions as well as non-shielded and shielded constructions.

The use of a single conductor non-shielded MV cable in a Division 2 location should not be allowed.

The non-shielded cable will have a surface discharge from the cable surface to any ground plane (such as metal cable tray). This discharge is an ignition source that can cause an explosion in the event of gas or vapors being present.

The proposed wording would require the single conductor MV cable to have a shield or metallic armor to provide a ground plane. This ground plane will eliminate any external electrical discharge thus eliminating the ignition source and precluding any possibility of creating an explosion.

Panel Meeting Action: Accept in Principle

Revise 501.4(B)(1)(6) to read:

"Type MI, MC, MV, or TC cable with termination fittings, or in cable tray systems and installed in a manner to avoid tensile stress at the termination fittings. Single conductor Type MV cables shall be shielded or metallic-armored."

Due to reorganization of Section 501, this will appear as 501.10(B)(1)(7).

Panel Statement:

The panel action better meets the intent of the submitter.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-30a Log #CP1405 NEC-P14 **Final Action: Accept**
(501-5 (501.1 in 2002 Ed.))

Submitter: Code-Making Panel 14

Recommendation:

Add as new statement under 501.5, General (501.1 in 2002 edition):

"Equipment listed and marked in accordance with 505.9(C)(2) for use in Class I, Zone 0 locations shall be permitted in Class I, Division 1 or 2 locations for the same gas and with a suitable temperature class."

Substantiation:

This proposal allows the use of Zone 0 intrinsically safe apparatus in Class I, Division 1 and 2 locations.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-31 Log #3378 NEC-P14 **Final Action: Reject**
(501-5(B) (New))

Submitter: Dennis M. Darling, Ayres, Lewis, Norris and May, Inc.

Recommendation:

New Section B. Re-letter existing Sections B through F as Sections C through G.
(B) Conduit Seals, Outdoor Submersible Sewage Pumping Stations. At an outdoor submersible sewage pumping station conduits shall be allowed to extend from the wet well to an outdoor terminal box without a conduit seal. Pump and control cables may terminate in the outdoor terminal box. Conduit seals shall be installed on all other conduits entering the outdoor terminal box according to 501.5(C)(1) through 501.5(C)(6).

Substantiation:

The above described installation has been our company standard for as long as we have been designing outdoor submersible sewage pumping stations. However, some inspectors require a seal in the conduit from the wet well. It is important to be able to remove the pump cables in order to service the pumps and it is very difficult to remove the seal without damageing the pump cable. Most inspectors will allow the above described installations as long as the conduit is smaller than 2 inches. Large submersible pumps are now being installed with cables that are too large to fit in 1 1/2 in. conduit. This proposal would give the needed relief from unnecessary conduit seals. Please see the drawing I have provided.
Note: Supporting Material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided adequate justification for eliminating the boundary seal that is required between the wet well and the terminal box.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-32 Log #2907 NEC-P14 **Final Action: Reject**
(501-5(A)(4) Exception No. 2 (New))

Submitter: Dorothy Kellogg, American Chemistry Council

Recommendation:

Add new exception, as Exception No. 2 as shown. Renumber existing Exception No. 2 as Exception No. 3:
Exception No. 2: Conduit systems terminating at an unclassified location where a wiring method transition is made to cable tray, cablebus, ventilated busway, Type MI cable, or cable not installed in any cable tray or raceway system, shall not be required to be sealed where passing from the Class I, Division 1 location to the Division 2 location or into the Unclassified location. The unclassified location shall be outdoors or if the conduit system is all in one room, it shall be permitted to be indoors. The conduits shall not terminate at an enclosure containing an ignition source in normal operation.
Exception No. ~~2~~3 For underground conduit installed in accordance with 300.5 where the boundary is beneath the ground, the sealing fitting shall be permitted to be installed after the conduit leaves the ground, but there shall be no union, coupling, box, or fitting, other than listed explosion proof reducers at the sealing fitting, in the conduit between the sealing fitting and the point at which the conduit leaves the ground.

Substantiation:

As the termination is conditionally located where there is no driving pressure for the material to be transported, the lack of a potential safety hazard relieves the need for providing an explosion proof seal.

Panel Meeting Action: Reject

Panel Statement:

This exception could allow gases to pass down secondary wiring to an area where a source of ignition might be present.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

WECHSLER: The proposal suggests that a new exception be added to address an outdoor location or an indoor-same room area condition, in which a conduit system would terminate in an unclassified location to a wiring method. Since in either of these scenarios, the pressures would be atmospheric and thus be at the same, there is no driving force that would pressure a gas into a secondary wiring method. The conduit would be like an open-ended pipe at the transition point and for a gas to be driven through the secondary wiring method, there would have to be a driving mechanism. Again, since there is no driving mechanism, there would be no flow condition and as such there is no need to have an explosionproof seal at this point.

14-33 Log #2910 NEC-P14 **Final Action: Accept**
(501-5(B) Exception No. 2)

Submitter: Dorothy Kellogg, American Chemistry Council

Recommendation:

Revise as follows:

Exception No. 2: Conduit systems terminating at an unclassified location where a wiring method transition is made to cable tray, cablebus, ventilated busway, Type MI cable, or cable not installed in any cable tray or raceway system, ~~open wiring~~ shall not be required to be sealed where passing from the Class I, Division 2 location into the unclassified location. The unclassified location shall be outdoors or, if the conduit system is all in one room, it shall be permitted to be indoors. The conduits shall not terminate at an enclosure containing an ignition source in normal operation.

Substantiation:

The phrase "open wiring" appears more than 30 times in the current 2002 NEC, but it exists in two distinct formats: a) as the defined term "open wiring on insulators" by Article 398.2, or b) simply as the undefined term "open wiring'. With the defined term, open wiring makes reasonable sense. However when used as the undefined term "open wiring", especially when used to describe a cable that is required to have mechanical integrity and protection takes on an entirely different meaning. Clearly such an installation is not "open". Due to the significant difference in the use of the terms, this and associated other proposals if accepted would replace the undefined use of the term "open wiring" with more appropriate language that addresses the installation in 501.4(B)(1)(5), 501.5 Exception No. 2; 503.3(B); 504.30(A)(1); 505.15(C)(1)(c); 505.16(C)(1) Exception No. 2; 610.12(A); 725.61(D)(4); and 727.4(4)(5)(6), and use the full 398.2 defined term where the text suggests as in 300.16(A); 312.5(B); 314.17(B); 314.17(C). Again, individual proposals have been submitted to address each section mentioned.

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-34 Log #2937 NEC-P14 **Final Action: Accept in Principle**
(501-5(B)(2))

Submitter: Dorothy Kellogg, American Chemistry Council

Recommendation:

At the end of the requirement add a sentence to read:
Sealing fittings shall not be required to be explosion proof.

Substantiation:

Seals in conduits passing from Division 2 locations into unclassified locations are needed to prevent the passage of gases or vapors, not to contain explosions in the conduit system as is the case with Division 1 conduit systems. This proposal will allow same type seals as permitted in 504.70 for intrinsic safe installations. The existing text (501.5(B)(2)) eludes to this: "sealing fitting...shall be designed and installed so as to minimize the amount of gas or vapor within the Division 2 portion of the conduit from being communicated to the conduit beyond the seal". However, it is now common practice to require explosion proof seals. Explosion proof seals are expensive and make it difficult to modify wiring once installed. This proposal will make it clear that explosion proof seals are not required as boundary seals between Division 2 and unclassified locations.

Panel Meeting Action: Accept in Principle

Revise 501.5(B)(2) to read as follows:

"(2) Class I, Division 2 Boundary. In each conduit run passing from a Class I, Division 2 location into an unclassified location, the sealing fitting shall be permitted on either side of the boundary of such location within 3.05 m (10 ft) of the boundary ~~and shall be designed and installed so as to minimize the amount of gas or vapor within the Division 2 portion of the conduit from being communicated to the conduit beyond the seal~~. Rigid metal conduit or threaded steel intermediate metal conduit shall be used between the sealing fitting and the point at which the conduit leaves the Division 2 location, and a threaded connection shall be used at the sealing fitting. Except for listed explosionproof reducers at the conduit seal, there shall be no union, coupling, box, or fitting between the conduit seal and the point at which the conduit leaves the Division 2 location. Conduits shall be sealed to minimize passage of gases or vapors within the Division 2 portion of the conduit from being communicated to the conduit beyond the seal. Such seals shall not be required to be explosionproof."

Panel Statement:

CMP 14 agrees with the submitter but believes that the language used in 504.70 provides greater clarification.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

COOK: I agree with the first sentence of the submitter's substantiation. I do not agree with the proposed text or the referenced text in 504.70. The text provides no guidance for installers or inspectors as to what is an acceptable seal. Almost anything would have some affect on gas or vapor passing through a conduit; rags, caulk, silicone, wax, plumbers putty, a four bend saddle in the conduit with water collected like a plumbing trap, bubble gum, but which ones would "minimize" the passage of the gases? If paper towels are used, do you need one or two of them to minimize the passage of gas? If caulk or silicone is used, would the installer or inspector know the affect of the material on conductor insulation? Would conduits that depend on a single compression seal to prevent flammable liquids from entering the conduit system be safe with bubble gum as a boundary seal (see 501.5(B)(2), Exception No. 4)?

I believe the proposed text will result in inconsistent installations, inconsistent inspections and certainly inconsistent interpretations of the requirement. Until clear text is proposed, that is enforceable; I will not support this change. I agree that a Division 2 to unclassified location, boundary seal does not need to be explosionproof, but I am not aware of a seal that is manufactured and listed to minimize the passage of gas or vapor that is not also explosionproof.

Comment on Affirmative:

WECHSLER: In taking the action that likely will satisfy the proposal, the Panel should also consider making some other editorial revisions to eliminate the phrase following the subsection title so that a complete sentence exists. This phrase resulted from the revision that was made during the last code cycle, when this phrase was the lead-in for the paragraph. The following is offered for consideration:

Revise 501.5(B)(2) additionally to read as follows:

(2) Class I, Division 2 Boundary. So as to minimize the amount of gas or vapor within the Division 2 portion of the conduit from being communicated to the conduit beyond the seal, a sealing fitting shall be installed in ~~In~~ each conduit run passing from a Class I, Division 2 location into an unclassified location~~.~~, the ~~The~~ sealing fitting shall be permitted on either side of the boundary of such location within 3.05 m (10 ft) of the boundary. ~~and shall be designed and installed so as to minimize the amount of gas or vapor within the Division 2 portion of the conduit from being communicated to the conduit beyond the seal.~~ Rigid metal conduit or threaded steel intermediate metal conduit shall be used between the sealing fitting and the point at which the conduit leaves the Division 2 location, and a threaded connection shall be used at the sealing fitting. Except for listed explosionproof reducers at the conduit seal, there shall be no union, coupling, box, or fitting between the conduit seal and the point at which the conduit leaves the Division 2 location. ~~Conduits shall be sealed to minimize passage of gases or vapors within the Division 2 portion of the conduit from being communicated to the conduit beyond the seal.~~ Such seals shall not be required to be explosionproof.

14-35 Log #109 NEC-P14 **Final Action: Accept in Principle**
(501-5(B)(2) Exception No. 2)

Submitter: James M. Daly, General Cable

Recommendation:

In the fourth line, change "or open wiring" to "or exposed wiring".

Substantiation:

This is one of a series of proposals to provide consistency throughout the code in the use of the terms "exposed", "open wiring", and "open runs" as applied to wiring methods.

"Exposed" is used 306 times throughout the code, "open runs" is used 7 times, and "open wiring" is used 29 times but only 10 of those instances do not refer to "open wiring on insulators".

Exposed is defined in Article 100 as shown below.

"Exposed (as applied to live parts). Capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to parts that are not suitably guarded, isolated or insulated."

"Exposed (as applied to wiring methods). On or attached to the surface or behind panels designed to allow access."

Open wiring on insulators is defined in 398.2 as "An exposed wiring method using cleats, knobs, tubes, and flexible tubing for the protection and support of single insulated conductors run in or on buildings."

"Open runs" is not defined in the code.

This series of proposals will limit the term "open wiring" to open wiring on insulators (Article 398) and have the term "exposed" apply to "open runs" and open wiring not on insulators.

Wire and cable that must be continuously supported and protected will be specifically addressed in the applicable section.

Panel Meeting Action: Accept in Principle

See Proposal 14-33.

Panel Statement:

The action on Proposal 14-33 meets the submitter's intent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-36 Log #2936 NEC-P14 **Final Action: Reject**
(501-5(C))

Submitter: Dorothy Kellogg, American Chemistry Council

Recommendation:

Revise to read:

Where explosionproof sealing fittings are required in Class I, Division 1 and 2 locations, the fittings shall comply with 501.5(C)(1) through (C)(6).

Substantiation:

This is a companion proposal to coordinate with proposed change to 501.5(B)(2). This change is needed to indicate that not all sealing fittings in Class I, Division 1 and 2 locations are required to be explosionproof. See 504.70.

Panel Meeting Action: Reject

Panel Statement:

This proposal is not complete. It removes the technical requirements for seals without providing alternatives.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

WECHSLER: This proposal rather than removing the technical seal requirements, as suggested in the Panel comment for Rejection, actually strengthens the requirement by making it clear with the proposed addition of "explosionproof" that it is explosionproof seals that are required to be installed in compliance with the referenced sections. The prior wording left open the question as to the type of seal.

14-37 Log #993 NEC-P14 **Final Action: Accept**
(501-5(C)(3))

Submitter: Noel Williams, Noel Williams Consulting

Recommendation:

Revise this section to read:
"Except for listed cable sealing fittings, the thickness of the sealing compound in a completed seal shall not be less than the trade size of the sealing fitting in inches and, in no case, less than 16 mm (5/8 in.)."
Eliminate the Exception.

Substantiation:

With the conversion of trade sizes from inches to size numbers, this section has become meaningless. Trade sizes are no longer named by a dimension, nominal or otherwise. The metric designators are equal to the nominal interior diameter of rigid metal conduit in mm, but this size is larger than the trade size in inches, so basing the seal thickness on the metric designators will increase the required thickness with no justification.
This submitter is not particularly happy with this language, and invites the Code-Making Panel to revise the language if they can come up with better language that makes the section meaningful but does not significantly alter the requirement. Altering the requirement to a larger thickness may require redesign of many sealing fittings and make much of the existing stock useless.
The proposal to eliminate the Exception is consistent with ongoing efforts to make the code more user-friendly. The Exception does not add any other useful rule, and fixing the language to recognize that a trade size is no longer a dimension would likely make the Exception unnecessarily wordy and hard to understand.

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-38 Log #2112 NEC-P14 **Final Action: Reject**
(501-5(C)(6))

Submitter: Jeffrey Rochefort, Private Organization

Recommendation:

I have figured the numbers for a 25 percent fill column and suggest that a table be added in Article 501.

INSERT TABLE 501.5(c)(6) HERE

(Table shown on page 2739)

Substantiation:

There is no table for a 25 percent fill when sizing a seal in rigid metallic conduit.

Panel Meeting Action: Reject
Panel Statement:

The submitter has not substantiated that a problem exists nor that there is a problem in applying the 25 percent fill requirement.

Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-39 Log #3233 NEC-P14 **Final Action: Reject**
(501-5(C)(6))

Submitter: Scott Marshall Grand Blanc, MI

Recommendation:

Reword the existing section and add a new Table 501.5(C)(6) to read as follows:
(6) Conductor Fill. The cross-sectional area of the conductors permitted in a seal shall not exceed the allowable fill in Table 501.5(C)(6) ~~25 percent of the cross-sectional area of a rigid metal conduit of the same trade size~~ unless ~~it~~ the seal is specifically identified for a higher percentage of fill.

INSERT TABLE 501.5(C)(6) HERE

(Table shown on page 2739)

Substantiation:

There is no 25 percent column in Table 4 of Chapter 9 for Rigid Metal Conduit, nor is there room to add a 25 percent fill column. There needs to be a table that gives the maximum fill for seals. Since the maximum conductor fill is only based on the cross-sectional area of Rigid Metal Conduit, then it is a simple table to generate. The ideal location for such a table is near Section 501.5(C)(6). Proper installation of seals in Class I locations is a major safety issue and the maximum conductor fill requirement needs to stand out in the NEC where it will be seen by electricians and inspectors.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not substantiated that a problem exists nor that there is a problem in applying the 25 percent fill requirement.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-40 Log #1619 NEC-P14 (501-5(F)(3)) **Final Action: Accept in Principle in Part**

TCC Action:

It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.

Submitter: Vic Gournas, ISA-The Instrumentation, Systems and Automation Society

Recommendation:

Add new material to the end of the existing section:

Process connected equipment that is identified and marked "Single Seal" or "Dual Seal" does not require additional process sealing when used within the manufacturer's ratings.

FPN: For construction and testing requirements for single seal and dual seal process connected equipment, refer to ISA 12.27.01, Requirements for Process Sealing Between Electrical Systems and Potentially Flammable or Combustible Process Fluids.

Substantiation:

Existing NEC Section 501.5(F)(3) attempts to address the issue of process sealing of electrical equipment, but places the burden of ensuring reliable sealing primarily on the installer. It is widely recognized in the industry that there are very few reliable means of effecting a process seal in the field. Many installers assume that a standard poured conduit seal is sufficient but it is clear that these seals are typically not rated or suitable for process conditions, which typically involve aggressive materials at high pressures and temperatures.

The ISA SP12 Committee and ISA SP 12.27 Subcommittee have been working for years to address industry concerns related to the reliability of process seals that form part of electrical equipment. The result of this effort is ISA 12.27.01, Requirements for Process Sealing Between Electrical Systems and Potentially Flammable or Combustible Process Fluids which will be published by January of 2003.

The intent of this proposal is to off-load the responsibility for effecting an adequate process seal from the installer and place it on the manufacturer of the process-connected equipment as long as the equipment has been examined, identified, and marked in accordance with ISA 12.27.01.

ISA NOTE: The material contained in this proposal was reviewed and approved by the ISA SP12 Committee during its 04-October-2002 Meeting.

Panel Meeting Action: Accept in Principle in Part

Revise to read:

(3) Process Sealing. Electrical connections to equipment such as canned pumps or instruments for flow, pressure, or analysis measurement, shall be provided with sealing to prevent the process fluid from entering the raceway or cable system in accordance with (a) or (b).

(a) Equipment that is listed as and marked "Dual Seal" does not require additional process sealing when used within the manufacturer s ratings.

FPN: For additional information, reference ISA 12.27.01; Requirements for Process Sealing Between Electrical Systems and Flammable or Combustible Process Fluids.

(b) Equipment that depends on compression seals, diaphragms, or tubes to prevent flammable or combustible fluids from entering the electrical raceway or cable system capable of transmitting process fluids, requires an additional approved seal, barrier, or other means to prevent the process fluid from entering the raceway or cable system capable of transmitting process fluids beyond the additional seal, barrier or other means, in the event of primary seal failure. The additional approved seal, barrier, or other means along with the interconnecting enclosure shall meet the temperature and pressure conditions to which they will be subjected upon failure of the primary seal, unless other approved means are provided to accomplish the purpose above. Drains, vents, or other devices shall be provided so that primary seal leakage will be obvious.

FPN: See also the fine print notes to 501.15.

Panel Statement:

A single seal is not considered by CMP 14 to afford an acceptable level of safety.

CMP 14 recognizes that evaluation and verification of unlisted process seals is not easily accomplished in the field. Therefore, "identified" was changed to "listed" for dual seal equipment.

CMP 14 has reorganized the text of this section to better indicate the Panel's intent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

COOK: I assume the referenced standard, ISA 12.27.01, has been through some consensus review and that it would be better than no standard at all. However, the standard does not have ANSI approval and was not submitted for panel and public review (see Proposal 14-43). I am not comfortable voting for something that I was not given an opportunity to review. I agree with the panel action to change "identified" to "listed".

Comment on Affirmative:

ENGLER: To enhance the clarity of the new requirement, add an additional FPN to new section 501.15(F)(3)(b) as follows:

"FPN No. 1: Field-poured seals such as those described in 501.15(A) through (E) may not provide an adequate level of protection."

Adjust the numbering of the FPN already in the panel action: "FPN No. 2: See also the fine print notes to 501.15."

14-41 Log #1677 NEC-P14 **Final Action: Accept in Principle**
(501-5(F)(3))

Submitter: David N. Bishop, David N. Bishop, Consultant

Recommendation:

Add new text as follows:
501.5 Sealing and drainage, (F) Drainage (3) Canned Pumps, Process or Service Connections, etc. For canned pumps, process, or service connection for...that primary seal leakage will be obvious. [no change proposed]
FPN No. 1: See also the fine print notes to 501.5
FPN No. 2: For additional information, reference ISA-12.27.01, Requirements for Process Sealing Between Electrical Systems and Potentially Flammable Process Fluids.

Substantiation:

The proposed change adds a Fine Print Note referencing a new standard containing useful information on "process sealing" and renumbers the old Fine Print Note (FPN) as FPN No. 1.

Panel Meeting Action: Accept in Principle

See Proposal 14-40.

Panel Statement:

This recommendation has been incorporated into the action on Proposal 14-40.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

COOK: I assume the referenced standard, ISA 12.27.01, has been through some consensus review and that it would be better than no standard at all. However, the standard does not have ANSI approval and was not submitted for panel and public review (see Proposal 14-43). I am not comfortable voting for something that I was not given an opportunity to review. I agree with the panel action to change "identified" to "listed".

14-42 Log #3305 NEC-P14 **Final Action: Reject**
(501-6(B)(2))

Submitter: Nicholas T. Abbatiello

Recommendation:

Revise as follows:
Fused or unfused ~~disconnect and isolating~~ switches for transformers, ~~and~~ capacitor banks, and industrial machinery, that are ~~not~~ intended to ~~interrupt the current in the normal performance of the function for which they are installed~~ only isolate the equipment, shall be permitted to be installed in ~~general purpose~~ unclassified location equipment type enclosures.

Substantiation:

The above original text that is proposed for strike out already exists in the definition of "Switches, Isolating". Also, the paragraph is titled "Isolating Switches" so why repeat it over. The interrupt requirement is also part of the "definition" as well. The definition of "Unclassified Location" was added in the 2002 NEC and should be incorporated here to better define its meaning. Finally, the requirement should pertain to industrial machinery, where requirements other than the NEC, necessitate the need for energy isolation devices such as covered in NFPA 70E, NFPA 79, etc. During maintenance, the operations causing the hazardous classification are suspended or other procedures have been put in place to ensure that flammable vapors are not present during the maintenance period.
Industrial Machinery is proposed since this type of work is generally performed under engineering supervision.

Panel Meeting Action: Reject

Panel Statement:

There is no technical substantiation to allow such disconnects to be in general purpose enclosures.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-43 Log #1182 NEC-P14 **Final Action: Accept in Principle**
(501-8(B), FPN 3)

Submitter: Frederick Bried, Shell Pipeline

Recommendation:

Add new text to read as follows:
For further information on the application of electric motors in Class I, Division 2 hazardous (classified) locations, see IEEE Std. 1349-2001, IEEE Guide for the Application of Electric Motors in Class I, Division 2 Hazardous (Classified) Locations.

Substantiation:

There continues to be many questions on application of electric motors in Class I, Division 2 locations. IEEE Std. 1349 documents industry experience and established practices in the application of general purpose motors in Class I, Division 2 locations and provides guidance for applying them.
Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle

Add this text as Fine Print Note No. 3 to 501.8(B).

Panel Statement:

CMP 14 agrees with the submitter and has clarified where the text is to be placed.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-44 Log #305 NEC-P14 **Final Action: Reject**
(501-11)

Submitter: Bill Mina, EGS Electrical Group/Appleton

Recommendation:

Delete "for that portion of the circuit where the fixed wiring methods of 501.4(A)...and service the installation."

Substantiation:

To comply with 505.15 and 505.17.
IEC allow to use in line connectors for Zone 1 and 2 application when the product design to prevent disconnecting under the load and the cord supported by mechanical clamps.

Panel Meeting Action: Reject

Panel Statement:

This proposal would remove all of the necessary restrictions on the use of flexible cord in hazardous locations.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-45 Log #2665 NEC-P14 (501-11) **Final Action: Accept**

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the action on this proposal and clarify which text is to be used for item (A)(1) since the text in Proposal 14-19a, 501.140 contains different language. In addition, the panel is directed to clarify the wording in item (2) of the recommendation because the accepted wording is unclear. This action will be considered by the panel as a public comment.

Submitter: Phil Simmons, Simmons Electrical Services

Recommendation:

Revise existing Section 501.11 as follows:

501.11 Flexible Cords, Class I, Divisions 1 and 2.

(A) Permitted Uses. ~~A~~ Flexible cord shall be permitted:

(1) For connection between portable lighting equipment or other portable utilization equipment and the fixed portion of their supply circuit.

(2) In an industrial establishment where conditions of maintenance and engineering supervision ensure that only qualified persons install and service the installation, ~~Flexible cord shall also be permitted~~ for that portion of the circuit where the fixed wiring methods of 501.4(A) cannot provide the necessary degree of movement for fixed and mobile electrical utilization equipment, ~~in an industrial establishment where conditions of maintenance and engineering supervision ensure that only qualified persons install and service the installation,~~ and the flexible cord is protected by location or by a suitable guard from damage.

(3) For electric submersible pumps with means for removal without entering the wet-pit. The extension of the flexible cord within a suitable raceway between the wet-pit and the power source shall be permitted.

(4) For electric mixers intended for travel into and out of open-type mixing tanks or vats. ~~The length of the flexible cord shall be continuous.~~

(B) Installation. Where flexible cords are used, the cords shall ~~be as follows:~~

(1) Be of a type listed for extra-hard usage

(2) Contain, in addition to the conductors of the circuit, a an equipment grounding conductor complying with 400.23

(3) Be connected to terminals or to supply conductors in an approved manner

(4) Be supported by clamps or by other suitable means in such a manner that there is no tension on the terminal connections

(5) Be provided with suitable seals where the flexible cord enters boxes, fittings, or enclosures of the explosionproof type

Exception: Seals shall not be required as provided in 501.3(B)(6) and 501.4(B).

(6) Be of continuous length.

~~Electric submersible pumps with means for removal without entering the wet-pit shall be considered portable utilization equipment. The extension of the flexible cord within a suitable raceway between the wet-pit and the power source shall be permitted. Electric mixers intended for travel into and out of open-type mixing tanks or vats shall be considered portable utilization equipment.~~

FPN: See 501.13 for flexible cords exposed to liquids having a deleterious effect on the conductor insulation.

Substantiation:

This proposal intends to make editorial revisions to the existing text rather than introduce new or revised requirements. The list style seems to be easier to read and understand.

It also intends to correct the Exception to be a complete sentence as required by the NEC Style Manual.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

O'MEARA: Affirm all but the proposed words ("seals shall not be required") associated with the exception. The existing exception stated "As provided in 501.3(B)(6) and 501.4(B)." These paragraphs give additional provisions and means acceptable for installing flexible cords. Seals are not mentioned in these paragraphs. I recommend to change the proposed wording to "Flexible cords shall be permitted to be installed as provided in 501.3(B)(6) and 501.4(B)," and change the panel disposition to "Accept in Part".

14-46 Log #1138 NEC-P14 (501-11, FPN) **Final Action: Reject**

Submitter: Ray C. Mullin, Ray C. Mullin / Rep. Ray C. Mullin Books

Recommendation:

Revise as follows:

FPN: See 501.13 for flexible cords exposed to liquids having a ~~deleterious~~ damaging effect on the conductor insulation.

Substantiation:

The present FPN contains the word "deleterious." This word is totally confusing to the majority of electrical apprentices. Let's make the NEC easier for users by changing certain words to those understood by the majority of users.

Panel Meeting Action: Reject

Panel Statement:

The dictionary definition correctly conveys the intent of the Panel.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-47a Log #CP1404 NEC-P14 **Final Action: Accept**
(501-15, 502.15, 503.15, 505.19)

Submitter: Code-Making Panel 14

Recommendation:

1. Revise 501.15 to read:
501.15 Uninsulated Exposed Parts, Class I, Divisions 1 & 2. Uninsulated exposed parts, such as electric conductors, buses, terminals, or components, shall not present a risk of electrical shock and shall additionally be protected by a protection technique according to 500.7(E), 500.7(F), or 500.7(G) that is suitable for the location.
2. Revise 502.15 to read:
502.15 Uninsulated Exposed Parts, Class II, Divisions 1 & 2. Uninsulated exposed parts, such as electric conductors, buses, terminals, or components, shall not present a risk of electrical shock and shall additionally be protected by a protection technique according to 500.7(E), 500.7(F), or 500.7(G) that is suitable for the location.
3. Revise 503.15 to read:
503.15 Uninsulated Exposed Parts, Class III, Divisions 1 & 2. Uninsulated exposed parts, such as electric conductors, buses, terminals, or components, shall not present a risk of electrical shock and shall additionally be protected by a protection technique according to 500.7(E), 500.7(F), or 500.7(G) that is suitable for the location.
Exception: As provided in 503.13.
4. Revise 505.19 to read:
505.19 Uninsulated Exposed Parts. Uninsulated exposed parts, such as electric conductors, buses, terminals, or components, shall not present a risk of electrical shock and shall additionally be protected by type of protection ia, ib, or nA that is suitable for the location.

Substantiation:

The 2002 NEC changed the definition of "live part" from "electric conductors, buses, terminals, or components that are uninsulated or exposed and a shock hazard exists" to "energized conductive components". This definition change serves to prohibit the use of exposed low voltage / intrinsically safe circuits that are not a shock hazard or an ignition hazard. This change uses the wording of the original definition and also calls attention to the need for protection from ignition of combustible materials in addition to protection from electric shock.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-48 Log #1676 NEC-P14 **Final Action: Reject**
(501-16)

Submitter: David N. Bishop, David N. Bishop, Consultant

Recommendation:

Change the title of 501.16 as follows:
Grounding, Class I~~, Divisions 1 and 2~~

Substantiation:

The present title both violates the NFPA Style Manual and also causes confusion to readers of 501.16. "(A) Bonding" addresses both Division 1 and Division 2 locations, but "(B) Types of Equipment Grounding Conductors" is applicable ONLY to Division 2 locations. With the title indicating that everything included in 501.16 is applicable to both Division 1 and Division 2 locations, readers are erroneously led to believe that liquidtight flexible metal conduit is suitable for Division 1 locations. This problem has manifested itself in several recent Hazardous (Classified) Location short courses I recently provided. The Code Making Panel may wish to delete also ", Class I" since the entire Article 501 is applicable only to Class 1 locations.

Panel Meeting Action: Reject

Panel Statement:

The current text is clear.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-49 Log #2233 NEC-P14 **Final Action: Reject**
(501-16)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:

501.16 Grounding, Class I, Division 1 and 2. Wiring and equipment in Class I, Division 1 and 2 locations shall be ~~grounded~~ earthed ass specified in Article 250 and with the requirements in 501.16(A) and (B).

(A) Bonding. The locknut-bushing and double-locknut types of contacts shall not be depended on for bonding purposes, but bonding jumpers with proper fittings or other approved means of bonding shall be used. Such means of bonding shall apply to all intervening raceways, fittings, boxes, enclosures, and so forth between Class I locations and the point of grounding for service equipment or point of grounding of a separately derived system.

Exception: The specific bonding means shall only be required to the nearest point where the ~~grounded~~ earth circuit conductor and the grounding electrode are connected together on the line side of the building or structure disconnecting means as specified in 250.32(A), (B), and (C), provided the branch-circuit overcurrent protection is located on the load side of the disconnecting means.

FPN: See 250.100 for additional bonding requirements in hazardous (classified) locations.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

Introduction of this new term to replace the word "grounded", as currently used, will confuse the user. CMP 14 notes that this change would have to be made throughout the entire Code simultaneously, not just one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-50 Log #2926 NEC-P14 **Final Action: Accept**
(501-16)

Submitter: Dorothy Kellogg, American Chemistry Council

Recommendation:

Change the title of this section to "Grounding and Bonding", as shown, to better agree with the subject matter addressed within this section.

"501.16 Grounding and Bonding, Class I, Divisions 1 and 2. Wiring and equipment in Class I, Division 1 and 2 locations shall be grounded as specified in Article 250 and with the requirements in 501.16(A) and (B)."

Substantiation:

501.16 currently is titled "Grounding", yet the first item in this section addresses "Bonding" The title change merely provides information that both grounding and bonding are addressed in this section. Proposals have been similarly made to all these affected sections (501.16, 502.16 and 503.16).

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-51 Log #2544 NEC-P14 (501-17) **Final Action: Accept**

Submitter: Alan Manche, Schneider Electric/Square D

Recommendation:

501.17 Surge Protection.

(A) Class I, Division 1. ~~Surge arresters, including their installation and connection, shall comply with Article 280. The s~~Surge arresters, transient voltage surge suppressors (TVSS) and capacitors shall be installed in enclosures identified for Class I, Division 1 locations. Surge-protective capacitors shall be of a type designed for specific duty.

(B) Class I, Division 2. Surge arresters and TVSS shall be nonarcing, such as metal-oxide varistor (MOV), sealed type, and surge-protective capacitors shall be of a type designed for specific duty. ~~INSTALLATION AND CONNECTION SHALL COMPLY WITH ARTICLE 280.~~ Enclosures shall be permitted to be of the general-purpose type. Surge protection of types other than described above shall be installed in enclosures identified for Class I, Division 1 locations.

Substantiation:

The inclusion of Article 285 in the 2002 NEC now recognizes the TVSS as a surge protection device. Article 501 currently recognizes arresters and surge-capacitors but does not recognize TVSS as a device that can be used in an NEC 501 application. This proposal simply adds TVSS as a permitted device in an NEC 501 Class I Location application. The strike through text is unnecessary in accordance with the NEC style manual since the arrester and TVSS must already be installed in accordance with Chapter 2.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-52 Log #3132 NEC-P14 (502) **Final Action: Accept in Principle**

Submitter: Donald Cook, Shelby County Development Services

Recommendation:

Revise text as follows:

[Text of Proposal 14-52 recommendation is shown on page 2370]

Substantiation:

This proposal was a cooperative effort of the membership of CMP-14, at the direction of the TCC, to provide a scope for Article 502. Although an official ballot was not taken on the proposal, consensus was reached in the development of the proposal. The following Issues are addressed:

- Proposal provides scope for Article 502 providing compliance with Section 2.2.1 of the NEC Style Manual. This is the only new text in the proposal.
- Renumbering of text allows for section 1 to be used for the scope(Section 2.2.1 of NEC Style Manual); section 2 to be reserved for definitions(Section 2.2.2.2 of NEC Style Manual); provides three parts; grouping general text in one part, wiring requirements in another and equipment requirements in another (Section 2.1.4 of NEC Style Manual); provides parallel numbering for Articles 501, 502 and 503, see companion proposals for Articles 501 and 503 (Section 2.4.1 of NEC Style Manual); provides gaps in numbering to allow for future sections (Section 2.4.2 of NEC Style Manual).
- All other changes provide correlation for the renumbering.

Panel Meeting Action: Accept in Principle

See Panel Proposal 14-51a (Log #CP1407).

Panel Statement:

Panel Proposal 14-51a (Log #CP1407) incorporates this change.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-51a Log #CP1407 NEC-P14 (502) **Final Action: Accept**

TCC Action:

The Technical Correlating Committee notes to the reader of the ROP that this proposal renumbers Article 502. In addition, changes made by subsequent accepted proposals are integrated into this proposal, but the revision will be found in this proposal under its new section number.

The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee Accepts the Panel Action.

The Technical Correlating Committee directs that the reference to 502.12 in 502.10(A)(2)(d) be changed to 502.140 to be consistent with the renumbering.

Submitter: Code-Making Panel 14

Recommendation:

Revise Article 502 as follows:

[Text of Proposal 14-51a recommendation is shown on page 2374]

Substantiation:

This incorporates both the reorganization proposed by Proposal 14-52 and all changes accepted by CMP 14 to Article 502.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-53 Log #3463 NEC-P14 (502-4(A)(1)(c)) **Final Action: Reject**

Submitter: Charles M. Trout, Maron Electric Co. Inc.

Recommendation:

Delete the section in its entirety.

Substantiation:

The National Electrical Code is prescriptive code. To say "where the conditions of maintenance and supervision ensure that only qualified persons service the installation," is a performance requirement. Without prescriptive requirements indicating whether this qualified person is an employee of the owner of the premises or is a separately contracted person and the Authority Having Jurisdiction has a means of verification of the continued employment of the qualified person and whether the qualified person has been verified by the authority having jurisdiction as meeting the definition of a qualified person as shown in the definitions of this Code no prescriptive requirements have been followed.

To permit relaxation of the safety requirements of this Code without establishing a positive guarantee that the safety of persons and property is indisputably assured is a reprehensible act.

Panel Meeting Action: Reject

Panel Statement:

The text is appropriate as currently written. CMP 14 believes there are applications where there is limited public access along with company policies and procedures, minimum personnel requirements for maintenance workers, government certification requirements, required apprenticeship training, required continuing education requirements, and, in many cases, a combination of more than one of these items that can ensure that only qualified employees will service an installation. This does not occur in all geographic areas or in all types of occupancies. However, in areas where it occurs, it is justification for flexibility.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-54 Log #3356 NEC-P14 **Final Action: Reject**
(502-4(A)(1)(d) , 503-3(A)(1))

Submitter: Steven J. Blais, EGS Electrical Group

Recommendation:

502.4(A)(1)(d): Revise wording accordingly: (Also see companion proposals for 502.4(B)(4) and 503.3(A)(1)).
(d) Fittings and boxes shall be provided with threaded bosses for connection to conduit or cable terminations. ~~and shall be dusttight~~. All additional joints shall be of the gasketed or threaded type. Fittings and boxes in which taps, joints, or terminal connections are made, or that are used in group E locations, shall be identified for Class II locations.

Substantiation:

The Code Panel revised this section for the 2002 NEC to correlate with the preexisting requirements (1999 NEC) in 503-3(a)(1) that required all boxes and fittings shall be dusttight. 503-3(a)(1) was revised in 1984 to make the requirement less subjective. It had indicated "...shall have close-fitting covers, and shall have no openings...". It seems harmless to require boxes and fittings be "dusttight" since "dusttight wireways" are identified as being suitable. The problem with this rationale is dusttight wireways are self-evident to identify. Fittings and boxes however, form the joints with the wireways and by requiring these to be dusttight remains subjective to the Authority Having Jurisdiction. This proposal objectively prescribes the method in fulfilling the original intent "to minimize the entrance of dust".

Panel Meeting Action: Reject

Panel Statement:

Requiring an installation to be dusttight should not be left to the discretion of the authority having jurisdiction.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-55 Log #2690 NEC-P14 **Final Action: Accept in Principle in Part**
(502-4(A)(1)(e))

TCC Action:

The Technical Correlating Committee directs the panel to clarify the language in the opening paragraph to make it clear that the methods listed in items (1) through (5) are the only methods permitted for flexibility or that those methods are permitted in addition to the general wiring methods. This action will be considered by the panel as a public comment.

Submitter: Phil Simmons, Simmons Electrical Services / Rep. National Armored Cable Manufacturers Assn.

Recommendation:

Revise existing Section 502.4(A)(1)(e) as follows:
(e) Where necessary to employ flexible connections, one or more of the following wiring methods shall be used:
(1) dusttight flexible connectors
(2) liquidtight flexible metal conduit with listed fittings
(3) liquidtight flexible nonmetallic conduit with listed fittings
(4) Type MC cable having an impervious outer nonmetallic covering with listed fittings
(5) flexible cord listed for extra-hard usage and provided with bushed fittings shall be used. Where flexible cords are used, they shall comply with 502.12.
Where flexible connections are subject to oil or other corrosive conditions, the insulation of the conductors shall be of a type listed for the condition or shall be protected by means of a suitable sheath.

Substantiation:

Type MC cables by construction are flexible and, with an impervious outer jacket are suitable for the applications provided in this Section.
The proposal also intends to editorially modify the section into a list format which is more user friendly.

Panel Meeting Action: Accept in Principle in Part

Replace existing Section 502.4(A)(1)(e) with a new Section 502.4(A)(2) as follows:
(2) Flexible Connections. Where necessary to employ flexible connections, one or more of the following wiring methods shall be permitted:
(a) dusttight flexible connectors
(b) liquidtight flexible metal conduit with listed fittings
(c) liquidtight flexible nonmetallic conduit with listed fittings
(d) flexible cord listed for extra-hard usage and provided with bushed fittings shall be used. Where flexible cords are used, they shall comply with 502.12.
Retain the Fine Print Note.

Panel Statement:

CMP 14 has accepted the reorganization of this section to a list format and has made minor editorial changes. The last sentence has been deleted as the topic is already addressed in Section 110.11.
The type of MC cable that is acceptable for use is already permitted under 502.4(A)(1)(c).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

GOODMAN: I support the panel action of reorganizing the section to a list format. It is important to note, however, that several of the wiring methods permitted under (1) General also provide for, and may be used to achieve, flexibility. The methods identified in (2) Flexible Connections permit additional acceptable wiring methods expressly for that purpose, but do not require their use as the only methods to provide for flexibility.

14-56 Log #3036 NEC-P14 **Final Action: Reject**
(502-4(B)(4))

Submitter: Steven Blais, EGS Electrical Group

Recommendation:

502.4(B)(4): Revise wording accordingly: (Also see companion proposals for 502.4(A)(1)(d) and 503.3(A)(1)).
(4) Boxes and Fittings. All boxes and fittings shall ~~be dusttight~~ have gasketed or threaded joints.

Substantiation:

The Code Panel revised this section for the 2002 NEC to correlate with the preexisting requirements (1999 NEC) in 503-3(a)(1) that required all boxes and fittings shall be dusttight. Section 503-3(a)(1) was revised in 1984 to make the requirement less subjective. It had indicated "...shall have close-fitting covers, and shall have no openings... ". It seems harmless to require boxes and fittings be "dusttight" since "dusttight wireways" are identified as being suitable. The problem with this rationale is dusttight wireways are self evident to identify. Fittings and boxes, however, form the joints with the wireways and by requiring these to be dusttight remains subjective to the Authority Having Jurisdiction. This proposal objectively prescribes the method in fulfilling the original intent "to minimize the entrance of dust".

Panel Meeting Action: Reject

Panel Statement:

Requiring an installation to be dusttight should not be left to the discretion of the authority having jurisdiction.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-57 Log #1013 NEC-P14 **Final Action: Reject**
(502-5(4))

Submitter: Noel Williams, Noel Williams Consulting

Recommendation:

Add an item (4) to the list to read as follows:
(4) A raceway installed in a manner equivalent to (2) or (3) that extends only horizontally and downward from the dust-ignitionproof enclosures."

Substantiation:

Many installations require conduits to be installed other than directly down or horizontally from the dust-ignitionproof enclosure because of obstructions of various kinds (including other parts of the electrical installation). For example, a conduit may run 5 ft. horizontally and then turn downward for 5 ft. or more. Such an installation provides for equal or better prevention of dust migration into an enclosure yet it would not be recognized as effective under the present literal wording because it is not 10 ft. in the horizontal run and extends horizontally rather than downward from the enclosure itself. A reasonable interpretation may allow such an installation, but many interpretations rely only on the literal wording and not on the performance of the installation. Many other examples could be provided, but this one example should be adequate to illustrate the point.

Panel Meeting Action: Reject

Panel Statement:

The existing requirements are clear.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-58 Log #2234 NEC-P14 (502-16) **Final Action: Reject**

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:

502.16 Grounding, Class II, Divisions 1 and 2. Wiring and equipment in Class II, Divisions 1 and 2 locations shall be grounded as specified in Article 250 and with the requirements in 502.16(A) and (B).

(A) Bonding. the locknut-bushing and double-locknut types of contact shall not be depended on for bonding purposes, but bonding jumpers with proper fittings or other approved means of bonding shall be used. Such means of bonding shall apply to all intervening raceways, fittings, boxes, enclosures, and so forth, between Class II locations and the point of grounding for service equipment or point of grounding of a separately derived system.

Exception: The specific bonding means shall only be required to the nearest point where the ~~grounded~~ earth circuit conductor and the grounding electrode conductor are connected together on the line side of the building or structure disconnecting means as specified in 250.32(A), (B), and (C), if the branch-circuit overcurrent protection is located on the load side of the disconnecting means.

FPN: See 250.100 for additional bonding requirements in hazardous (classified) locations.

(B) Types of Equipment Grounding Conductors. Where flexible conduit is used as permitted in 502.4, it shall be installed with internal or external bonding jumpers in parallel with each conduit and complying with 250.102.

Exception: In Class II, Division 2 locations, the bonding jumper shall be permitted to be deleted where all the following conditions are met:

(a) Listed liquidtight flexible metal conduit 1.8 m (6 ft.) or less in length, with fittings listed for grounding, is used.
(b) Overcurrent protection in the circuit is limited to 10 amperes or less.
(c) The load is not a power utilization load.

Surface temperatures under operating conditions shall not exceed 165°C (329°F) for equipment that is not subject to overloading, and 120°C (248°F) for equipment (such as motors or power transformers) that may be overloaded.

FPN: For electric trucks, see NFPA 505-1999, Fire Safety Standard for Powered Industrial Trucks Including Type Designations, Areas of Use, Conversions, Maintenance, and Operation.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

Introduction of this new term to replace the word "grounded", as currently used, will confuse the user. CMP 14 notes that this change would have to be made throughout the entire Code simultaneously, not just one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-59 Log #2928 NEC-P14 (502-16) **Final Action: Accept**

Submitter: Dorothy Kellogg, American Chemistry Council

Recommendation:

Change the title of this section to "Grounding <u>and Bonding"</u> as indicated below, to better agree with the subject matter addressed within this section.

502.16 Grounding <u>and Bonding,</u> Class II, Divisions 1 and 2. Wiring and equipment in Class II, Divisions 1 and 2 locations shall be grounded as specified in Article 250 and with the requirements in 502.16(A) and (B).

Substantiation:

502.16 currently is titled "Grounding", yet the first item in this section addresses "Bonding". The title change merely provides information that both grounding and bonding are addressed in this section. Proposals have been similarly made to all these affected sections (501.16, 502.16, and 503.16).

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-60 Log #2545 NEC-P14 (502-17) **Final Action: Accept**

Submitter: Alan Manche, Schneider Electric/Square D

Recommendation:

502.17 Surge Protection — Class II, Divisions 1 and 2. ~~Surge arresters, including their installation and connection, shall comply with Article 280. In addition, s~~Surge arresters~~, if~~ and, transient voltage surge suppressors (TVSS) installed in a Class II, Division 1 location, shall be in suitable enclosures. Surge-protective capacitors shall be of a type designed for specific duty.

Substantiation:

The inclusion of Article 285 in the 2002 NEC now recognizes the TVSS as a surge protection device. Article 502 currently recognizes arresters and surge-capacitors but does not recognize TVSS as a device that can be used in an NEC 502 application. This proposal simply adds TVSS as a permitted device in an NEC 502 Class II Location application. The strike through text is unnecessary in accordance with the NEC style manual since the arrester and TVSS must already be installed in accordance with Chapter 2.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-61 Log #3133 NEC-P14 (503) **Final Action: Accept in Principle**

Submitter: Donald Cook, Shelby County Development Services

Recommendation:

Revise text as follows:

[Text of Proposal 14-61 recommendation is shown on page 2379]

Substantiation:

This proposal was a cooperative effort of the membership of CMP-14, at the direction of the TCC, to provide a scope for Article 503. Although an official ballot was not taken on the proposal, consensus was reached in the development of the proposal. The following Issues are addressed:

• Proposal provides scope for Article 503 providing compliance with Section 2.2.1 of the NEC Style Manual. This is the only new text in the proposal.

• Renumbering of text allows for section 1 to be used for the scope(Section 2.2.1 of NEC Style Manual); section 2 to be reserved for definitions(Section 2.2.2.2 of NEC Style Manual); provides three parts; grouping general text in one part, wiring requirements in another and equipment requirements in another (Section 2.1.4 of NEC Style Manual); provides parallel numbering for Articles 501, 502 and 503, see companion proposals for Articles 501 and 502 (Section 2.4.1 of NEC Style Manual); provides gaps in numbering to allow for future sections (Section 2.4.2 of NEC Style Manual).

• All other changes provide correlation for the renumbering.

Panel Meeting Action: Accept in Principle

See Proposal 14-60a (Log #CP1408).

Panel Statement:

Panel Proposal 14-60a (Log #CP1408) incorporates this change.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-60a Log #CP1408 NEC-P14 (503) **Final Action: Accept**

TCC Action:

The Technical Correlating Committee notes to the reader of the Report on Proposals that this proposal renumbers Article 501. In addition, changes made by subsequent accepted proposals are integrated into this proposal, but the revision will be found in this proposal under its new section number.

The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee Accepts the Panel Action.

Submitter: Code-Making Panel 14

Recommendation:

Revise Article 503 as follows:

[Text of Proposal 14-60a substantiation is shown on page 2381]

Substantiation:

This incorporates both the reorganization proposed by Proposal 14-61 and all changes accepted by CMP 14 to Article 503.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-62 Log #3357 NEC-P14 (503-3(A)(1) , 502.4(B)(4)) **Final Action: Reject**

Submitter: Steven J. Blais, EGS Electrical Group

Recommendation:

503.3(A)(1): Revise wording accordingly: (Also see companion proposals for Sections 502.4(A)(1)(d) and 502.4(B)(4)).
(4) Boxes and Fittings. All boxes and fittings shall ~~be dusttight~~ have gasketed or threaded joints.

Substantiation:

Section 503-3(a)(1) rule was revised in 1984 to make the requirement less subjective. It had indictated "...shall have close-fitting covers, and shall have no openings...". It seems harmless to require boxes and fittings be "dusttight" since "dusttight wireways" are identified as being suitable. The problem with this rationale is dusttight wireways are self-evident to identify. Fittings and boxes, however, form the joints with the wireways and by requiring these to be dusttight remains to subjective to the Authority Having Jurisdiction. This proposal objectively prescribes the method in fulfilling the original intent "to minimize the entrance of fibers or flyings".

Panel Meeting Action: Reject

Panel Statement:

Requiring an installation to be dusttight should not be left to the discretion of the authority having jurisdiction.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-63 Log #1474 NEC-P14 **Final Action: Accept**
(503-3(A)(3) (New))

Submitter: Nicholas P. Ludlam, FM Approvals

Recommendation:

Add new text as follows:
503.3 Wiring Methods.
Wiring methods shall comply with 503.3(A) or (B).
(A) Class III, Division 1. In Class III, Division 1 locations, the wiring method shall be rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, electrical metallic tubing, dusttight wireways, or Type MC or MI cable with listed termination fittings.
(1) Boxes and Fittings. All boxes and fittings shall be dusttight.
(2) Flexible Connections. Where necessary to employ flexible connections, dusttight flexible connectors, liquidtight flexible metal conduit with listed fittings, liquidtight nonmetallic conduit with listed fittings, or flexible cord in conformance with 503.10 shall be used.
FPN: See 503.16(B) for grounding requirements where flexible conduit is used.
(3) Nonincendive Field Wiring. Nonincendive field wiring shall be permitted using any of the wiring methods permitted for unclassified locations. Nonincendive field wiring systems shall be installed in accordance with the control drawings(s). Simple apparatus, not shown on the control drawing shall be permitted in a nonincendive field wiring circuit provided the simple apparatus does not interconnect the nonincendive field wiring circuit to any other circuit.
FPN: Simple apparatus is defined in 504.2.
Separate nonincendive field wiring circuits shall be installed in accordance with one of the following:
(1) In separate cables
(2) In multiconductor cables where the conductors of each circuit are within a grounded metal shield
(3) In multiconductor cables, where the conductors of each circuit have insulation with a minimum thickness of 0.25 mm (0.01 in.).

Substantiation:

The requirements for nonincendive field wiring for Class I and Class II were modified and expanded in the 2002 code cycle, but no similar requirements were included for Class III.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-64 Log #674 NEC-P14 **Final Action: Accept**
(503-13(A))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise new text to read as follows:
(A) Power Supply. Power supply to contact conductors shall be electrically isolated from all other systems, ungrounded, and shall be equipped..." (remainder unchanged).

Substantiation:

The proposal clarifies that the intent is to require an electrically, not physically, isolated system, and one that is ungrounded. Present literal wording does not preclude a grounded power supply isolated by location. Sections 668.20(B) and 668.21(A), for example, make it clear that isolated power means electrically isolated and ungrounded. Parallel construction per 3.3.5 of the Style Manual is beneficial to Code users.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-65 Log #2235 NEC-P14 **Final Action: Reject**
(503-16)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:

503.16 Grounding — Class III, Divisions 1 and 2. Wiring and equipment in Class III, Divisions 1 and 2 locations shall be grounded as specified in Article 250 and with the following additional requirements in 503.16(A) and (B).

(A) Bonding. The locknut-bushing and double-locknut types of contacts shall not be depended on for bonding purposes, but bonding jumpers with proper fittings or other approved means of bonding shall be used. Such means of bonding shall apply to all intervening raceways, fittings, boxes, enclosures, and so forth, between Class III locations and the point of grounding for service equipment or point of grounding of a separately derived system.

Exception: the specific bonding means shall only be required to the nearest point where the ~~grounded~~ earth circuit conductor and the grounding electrode conductor are connected together on the line side of the building or structure disconnecting means as specified in 250.32(A), (B), and (C), if the branch-circuit overcurrent protection is located on the load side of the disconnecting means.

FPN: See 250.100 for additional bonding requirements in hazardous (classified) locations.

(B) Types of Equipment Grounding Conductors. Where flexible conduit is used as permitted in 503.3, it shall be installed with internal or external bonding jumpers in parallel with each conduit and complying with 250.102.

Exception: In Class III, Division 1 and 2 locations, the bonding jumper shall be permitted to be deleted where all the following conditions are met:

(a) Listed liquidtight flexible metal 1.8 m (6 ft) or less in length, with fittings listed for grounding, is used.
(b) Overcurrent protection in the circuit is limited to 10 amperes or less.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

Introduction of this new term to replace the word "grounded", as currently used, will confuse the user. CMP 14 notes that this change would have to be made throughout the entire Code simultaneously, not just one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-66 Log #2917 NEC-P14 **Final Action: Accept**
(503-16)

Submitter: Dorothy Kellogg, American Chemistry Council

Recommendation:

Change the title of this section to "Grounding and Bonding" as indicated by the underlined text below, to better agree with the subject matter addressed within this section.

503.16 "Grounding and Bonding — Class III, Divisions 1 and 2. Wiring and equipment in Class III, Divisions 1 and 2 locations shall be grounded as specified in Article 250 and with the following additional requirements in 503.16(A) and (B).

Substantiation:

503.16 currently is titled "Grounding', yet the first item in this section address "Bonding'. the title change merely provides information that both grounding and bonding are addressed in this section. Proposals have been similarly made to all these affected sections (501.16; 502.16 and 503.16).

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-66a Log #CP1401 NEC-P14 **Final Action: Accept**
(504-1 and 504.50, FPN, FPN)

TCC Action:

The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee Accepts the Panel Action.

Submitter: Code-Making Panel 14

Recommendation:

Revise the Fine Print Notes in 504.1 and 504.50(A) to read as follows:
504.1 Scope.
FPN: For further information, see ANSI/ISA RP 12.06.01-2002, Wiring Methods for Hazardous (Classified) Locations Instrumentation - Part 1: Intrinsic Safety.
504.50 Grounding.
FPN: Supplementary bonding to the grounding electrode may be needed for some associated apparatus, for example, zener diode barriers, if specified in the control drawing. See ANSI/ISA RP 12.06.01-2002, Wiring Methods for Hazardous (Classified) Locations Instrumentation Part 1: Intrinsic Safety.

Substantiation:

Update referenced document.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-67 Log #1636 NEC-P14 (504-10(B)) **Final Action: Accept**

Submitter: Nicholas P. Ludlam, FM Approvals

Recommendation:

Revise text as follows:

(B) Location.

Intrinsically safe apparatus shall be permitted to be installed in any hazardous (classified) location for which it has been identified. General-purpose enclosures shall be permitted for intrinsically safe apparatus.

Associated apparatus shall be permitted to be installed in any hazardous (classified) location for which it has been identified or, if protected by other means, permitted by Articles 501 through 503 and Article 505.

Simple apparatus shall be permitted to be installed in any hazardous classified location in which the maximum surface temperature of the simple apparatus does not exceed the ignition temperature of the flammable gases or vapors, flammable liquids, combustible dusts, or ignitable fibers or flyings present.

For simple apparatus, the maximum surface temperature can be determined from the values of the output power from the associated apparatus or apparatus to which it is connected to obtain the temperature class. The temperature class can be determined by:

(1) reference to Table 504.2

(2) calculation using the formula:

$T = PoRth + Tamb$

Where:

T is the surface temperature

Po is the output power marked on the associated apparatus or intrinsically safe apparatus

Rth is the thermal resistance of the simple apparatus

Tamb is the ambient temperature (normally 40°C) and reference Table 500.8(B)

In addition, components with a surface area smaller than 10 cm^2 (excluding lead wires) may be classified as T5 if their surface temperature does not exceed 150°C.

Insert Table 504.2 here

(Table shown on page 2739)

FPN: The following apparatus are examples of simple apparatus:

(a) passive components; for example, switches, junction boxes, resistance temperature devices, and simple semiconductor devices such as LEDs.

(b) Sources of generated energy, for example, thermocouples and photocells, which do not generate more than 1.5V, 100 mA, and 25 mW.

Substantiation:

As with all electrical equipment "simple apparatus" will also get warmer as it dissipates power. As simple apparatus is not required to be listed, the potential exists for it to dissipate enough power to exceed the auto-ignition temperature of the gas or vapor present. The proposed text provides information and guidance for the user to help in determining if a problem exists.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

COOK: I have never agreed with the CMP-14 position that "simple apparatus" does not need to be listed and I believe this proposal provides justification for my concerns. I believe that equipment that is listed for use in ordinary (unclassified) locations would be acceptable as simple apparatus. This proposal describes conditions where this "simple" apparatus requires a relatively complex evaluation to determine if it will operate safely. I do not believe average electricians; working for average contractors will be able to determine surface temperatures. I do not believe average inspectors will be able to determine in the field, if surface temperatures of simple apparatus are within an acceptable range. How many field electricians and field electrical inspectors will be able to determine the thermal resistance of the simple apparatus? The ambient temperature is described as normally being 40°C. What are the abnormal conditions where that number will need to be adjusted and how many field electricians and field electrical inspectors do we expect to be able to make that determination? I believe this type of analysis being made in the field will result in extreme inconsistencies. How simple is this apparatus, if it takes this much analysis to determine it is safe?

14-68 Log #110 NEC-P14 (504-30(A)(1)) **Final Action: Accept in Principle**

Submitter: James M. Daly, General Cable

Recommendation:

Change "(1) Open Wiring." to "(1) Exposed Wiring".

Substantiation:

This is one of a series of proposals to provide consistency throughout the code in the use of the terms "exposed", "open wiring", and "open runs" as applied to wiring methods.

"Exposed" is used 306 times throughout the code, "open runs" is used 7 times, and "open wiring" is used 29 times but only 10 of those instances do not refer to "open wiring on insulators".

Exposed is defined in Article 100 as shown below.

"Exposed (as applied to live parts). Capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to parts that are not suitably guarded, isolated or insulated."

"Exposed (as applied to wiring methods). On or attached to the surface or behind panels designed to allow access."

Open wiring on insulators is defined in 398.2 as "An exposed wiring method using cleats, knobs, tubes, and flexible tubing for the protection and support of single insulated conductors run in or on buildings."

"Open runs" is not defined in the code.

This series of proposals will limit the term "open wiring" to open wiring on insulators (Article 398) and have the term "exposed" apply to "open runs" and open wiring not on insulators.

Wire and cable that must be continuously supported and protected will be specifically addressed in the applicable section.

Panel Meeting Action: Accept in Principle

Replace the term "open wiring" in former item (1) title with "Other (Not in Raceway or Cable Tray Systems)". Make former item (2), (1); former item (3), (2); and former item (1), (3). Revise the text of new item (3) by deleting "not in raceways or cable trays" and replacing this with "other than raceway or cable tray systems,".

The new text will read as follows:

504.30(A)(1) In Raceways, Cable Trays, and Cables. Conductors of intrinsically safe circuits shall not be placed in any raceway, cable tray, or cable with conductors of any nonintrinsically safe circuit.

Exception No. 1: Where conductors of intrinsically safe circuits are separated from conductors of nonintrinsically safe circuits by a distance of at least 50 mm (2 in.) and secured, or by a grounded metal partition or an approved insulating partition.

FPN: No. 20 gauge sheet metal partitions 0.91 mm (0.0359 in.) or thicker are generally considered acceptable.

Exception No. 2: Where either (1) all of the intrinsically safe circuit conductors or (2) all of the nonintrinsically safe circuit conductors are in grounded metal-sheathed or metal-clad cables where the sheathing or cladding is capable of carrying fault current to ground.

FPN: Cables meeting the requirements of Articles 330 and 332 are typical of those considered acceptable.

(2) Within Enclosures.

(a) Conductors of intrinsically safe circuits shall be separated at least 50 mm (2 in.) from conductors of any nonintrinsically safe circuits, or as specified in 504.30(A)(2).

(b) All conductors shall be secured so that any conductor that might come loose from a terminal cannot come in contact with another terminal.

FPN No. 1: The use of separate wiring compartments for the intrinsically safe and nonintrinsically safe terminals is the preferred method of complying with this requirement.

FPN No. 2: Physical barriers such as grounded metal partitions or approved insulating partitions or approved restricted access wiring ducts separated from other such ducts by at least 19 mm (ı in.) can be used to help ensure the required separation of the wiring.

(3) Other (Not in raceway or cable tray systems). Conductors and cables of intrinsically safe circuits run in other than raceway or cable tray systems shall be separated by at least 50 mm (2 in.) and secured from conductors and cables of any nonintrinsically safe circuits.

Exception: Where either (1) all of the intrinsically safe circuit conductors are in Type MI or MC cables or (2) all of the nonintrinsically safe circuit conductors are in raceways or Type MI or MC cables where the sheathing or cladding is capable of carrying fault current to ground.

Panel Statement:

CMP 14 supports the elimination of the term "open wiring" and, for correlation purposes, adopts the language used in other sections as appropriate. The order in this section was changed for purposes of clarity. No other substantive changes have been made.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-68a Log #CP1411 NEC-P14 (504-30(B)) **Final Action: Accept**

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal to comply with 3.2.2 of the NEC Style Manual and to clarify the language of the recommendation to specifically indicate what alternative is permitted by the control drawing. This action will be considered by the Panel as a public comment.

Submitter: Code-Making Panel 14

Recommendation:

Add the following to the existing section:
"(3) The clearance between two terminals for connection of field wiring of different intrinsically safe circuits shall be at least 6 mm (0.25 in.) unless permitted by the control drawing."

Substantiation:

This requirement is currently included in ANSI/ISA RP 12.06.01 but should be made mandatory through inclusion in the NEC.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-69 Log #1722 NEC-P14 (504-50(B)) **Final Action: Accept**

Submitter: Michael J. Johnston, Int'l Assn. of Electrical Inspectors

Recommendation:

Revise Section 504.50(B) as follows:

504.50 Grounding.

(A) Intrinsically Safe Apparatus, Associated Apparatus, and Raceways. Intrinsically safe apparatus, associated apparatus, cable shields, enclosures, and raceways, if of metal, shall be grounded.

FPN: Supplementary bonding to the grounding electrode may be needed for some associated apparatus, for example, zener diode barriers, if specified in the control drawing. See ANSI/ISA RP 12.6-1995, Wiring Practices for Hazardous (Classified) Locations Instrumentation Part 1: Intrinsic Safety.

(B) Connection to Grounding Electrodes. Where connection to a grounding electrode is required, the grounding electrode shall be as specified in 250.52(A)(1), (2), (3), and (4) and shall comply with 250.30(A)(4). ~~(3)~~. Section 250.52(A)(5), (6) and (7) shall not be used if electrodes specified in 250.52(A)(1), (2), (3) or (4) are available.

Substantiation:

This appears to be errata that was not picked up to correlate with the changes to Section 250.30(A)(2) and (3) in the 2002 Code cycle. The reference should be to 250.30(A)(4) because the section deals with which electrode is required to be used for the intrinsically safe system. The provisions for which electrode is required to be used for separately derived systems are contained in 2002 NEC Section 250.30(A)(4).

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-70 Log #2706 NEC-P14 (504-70) **Final Action: Accept**

Submitter: Donny Cook, Shelby County Development Services

Recommendation:

Revise to read as follows:
504.70 Sealing. Conduits and cables that are required to be sealed by 501.5, 502.5, and 505.16 shall be sealed to minimize the passage of gases, vapors, or dusts. Such seals shall not be required to be explosionproof or flameproof.

Substantiation:

The reference to 505.16 should obviously be included since the text talks about flameproof as well as explosionproof.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Sequence Number 14-71 is not used.

14-72 Log #3181 NEC-P14 (505) **Final Action: Reject**

Submitter: Eric Stromberg, The Dow Chemical Company

Recommendation:

Remove "Class I" from all locations within this article.

Substantiation:

The definitions of Zone 0, 1, and 2 in the IEC are already defined as Flammable gases or vapors. To say "Class I, Zone 1" is redundant. Zone 20, 21, and 22 are for environments with flammable dust.

Panel Meeting Action: Reject

Panel Statement:

National Electrical Code requirements are not the same as IEC requirements. Zone 20, 21, and 22 designations have not yet been accepted into the NEC.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-73 Log #3139 NEC-P14 (505-2) **Final Action: Accept in Principle**

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the action on this proposal relative to the references to IEC standards. The Technical Correlating Committee understands that the UL references updated in this proposal are the IEC 60079 standards with appropriate US differences included to make the standard compatible in the US.

The action on this comment provides for references to UL standards that are different than the IEC standards referenced. As such, it would appear that the panel should delete the IEC standards references and rely on the more complete UL references since the UL references contain the appropriate differences. Maintaining the IEC standard reference is misleading to users of the NEC, since it does not contain all of the appropriate differences established by the ANSI/UL standard. This action will be considered by the panel as a public comment.

Submitter: Michael A. Slowinske, Underwriters Laboratories Inc.

Recommendation:

Revise text as follows:

505.2 Definitions. For purposes of this article, the following definitions apply.

Combustible Gas Detection System. A protection technique utilizing stationary gas detectors in industrial establishments.

Electrical and Electronic Equipment. Materials, fittings, devices, appliances, and the like that are part of, or in connection with, an electrical installation.

FPN: Portable or transportable equipment having self-contained power supplies, such as battery-operated equipment, could potentially become an ignition source in hazardous (classified) locations.

Encapsulation "m". Type of protection where electrical parts that could ignite an explosive atmosphere by either sparking or heating are enclosed in a compound in such a way that this explosive atmosphere cannot be ignited.

FPN: See ISA 12.23.01-1998, *Electrical Apparatus for Use in Class I, Zone 1 Hazardous (Classified) Locations, Type of Protection - Encapsulation "m";* IEC 60079-18-1992, *Electrical Apparatus for Explosive Gas Atmospheres - Part 18: Encapsulation "m";* and ~~ANSI/UL 2279-1997 (Part 18), *Electrical Equipment for Use in Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations*~~ ANSI/UL 60079-18, *Electrical apparatus for explosive gas atmospheres - Part 18: Encapsulation "m".*

Flameproof "d". Type of protection where the enclosure will withstand an internal explosion of a flammable mixture that has penetrated into the interior, without suffering damage and without causing ignition through any joints or structural openings in the enclosure, of an external explosive gas atmosphere consisting of one or more of the gases or vapors for which it is designed.

FPN: See ISA 12.22.01-1998, *Electrical Apparatus for Use in Class I, Zone 1 and 2 Hazardous (Classified) Locations, Type of Protection - Flameproof "d";* IEC 60079-1-2000, *Electrical Apparatus for Explosive Gas Atmospheres, Part 1 - Construction and Verification Test of Flameproof Enclosures of Electrical Apparatus;* ~~ANSI/UL 2279-1997, (Part 1), *Electrical Equipment for Use in Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations*~~ ANSI/UL 60079-1, *Electrical apparatus for explosive gas atmospheres - Part 1: Flameproof enclosures "d".*

Increased Safety "e". Type of protection applied to electrical equipment that does not produce arcs or sparks in normal service and under specified abnormal conditions, in which additional measures are applied so as to give increased security against the possibility of excessive temperatures and of the occurrence of arcs and sparks.

FPN: See ISA - 12.16.01-1998, *Electrical Apparatus for Use in Class I, Zone 1 Hazardous (Classified) Locations, Type of Protection - Increased Safety "e"*, IEC 60079-7-1990, *Electrical Apparatus for Explosive Gas Atmospheres, Part 7: - Increased Safety "e"*, Amendment No. 1 (1991) and Amendment No. 2 (1993); and ~~ANSI/UL 2279-1997 (Part 7), *Electrical Equipment for Use in Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations*~~ ANSI/UL 60079-7, *Electrical apparatus for explosive gas atmospheres - Part 7: Increased Safety "e".*

Intrinsic Safety "i". Type of protection where any spark or thermal effect is incapable of causing ignition of a mixture of flammable or combustible material in air under prescribed test conditions.

FPN No. 1: See ANSI/UL 913-1997, *Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Hazardous Locations;* ISA- 12.02.01-1999, *Electrical Apparatus for Use in Class I, Zones 0, 1 and 2 Hazardous (Classified) Locations - Intrinsic Safety "i";* IEC 60079-11-1999, *Electrical Apparatus for Explosive Gas Atmospheres - Part II; Intrinsic Safety "i"'* and ~~ANSI/UL 2279-1997 (Part II). *Electrical Equipment for Use in Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations*~~ ANSI/UL 60079-11, *Electrical apparatus for explosive gas atmospheres - Part II: Intrinsic safety "i".*

FPN No. 2: Intrinsic safety is designated type of protection "ia" for use in Zone 0 locations. Intrinsic safety is designated type of protection "ib" for use in Zone 1 locations.

FPN No. 3: Intrinsically safe associated apparatus, designated by [ia] or [ib], is connected to intrinsically safe apparatus ("ia" or "ib," respectively) but is located outside the hazardous (classified) locations unless also protected by another type of protection (such as flameproof).

Oil Immersion "o". Type of protection where electrical equipment is immersed in a protective liquid in such as way that an explosive atmosphere that may be above the liquid or outside the enclosure cannot be ignited.

FPN: See ISA 12.26.01-1998, *Electrical Apparatus for Use in Class I, Zone 1 Hazardous (Classified) Locations, Type of Protection - Oil-Immersion "o";* IEC 60079-6-1995, *Electrical Apparatus for Explosive Gas Atmospheres, Part 6 - Oil-Immersion "o";* and ~~ANSI/UL 2279-1997 (Part 6), *Electrical Equipment for Use in Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations*~~ ANSI/UL 60079-6, *Electrical apparatus for explosive gas atmospheres - Part 6: Oil-immersion "o".*

Powder Filling "q". Type of protection where electrical parts capable of igniting an explosive atmosphere are fixed in position and completely surrounded by filling material (glass or quartz powder) to prevent the ignition of an external explosive atmosphere.

FPN: See ISA-12.25.01-1996, *Electrical Apparatus for Use in Class I, Zone 1 Hazardous (Classified) Locations Type of Protection - Powder Filling "q";* IEC 60079-5-1996, *Electrical Apparatus for Explosive Gas Atmospheres - Part 5: Powder Filling, Type of Protection "q";* and ~~ANSI/UL 2279-1997 (Part 5), *Electrical Equipment for Use in Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations*~~ ANSI/UL 60079-5, *Electrical apparatus for explosive gas atmospheres - Part 5: Powder filling "q".*

Purged and Pressurized. Type of protection for electrical equipment that uses the technique of guarding against the ingress of the external atmosphere, which may be explosive, into an enclosure by maintaining a protective gas therein at a pressure above that of the external atmosphere.

FPN No. 1: See NFPA 496-1998, *Standard for Purged and Pressurized Enclosures for Electrical Equipment.*

~~FPN No. 1: See NFPA 496-1998, *Standard for Purged and Pressurized Enclosures for Electrical Equipment.*~~

FPN No. 2: See IEC 60079-2-2000, *Electrical Apparatus for Explosive Gas Atmospheres - Part 2: Electrical Apparatus, Type of Protection "p";* and IEC 60079-13-1982, *Electrical Apparatus for Explosive Gas Atmospheres - Part 13: Construction and Use of Rooms or Buildings Protected by Pressurization.*

Type of Protection "n". Type of protection where electrical equipment, in normal operation, is not capable of igniting a surrounding explosive gas atmosphere and a fault capable of causing ignition is not likely to occur.

FPN: See IEC 60079-15-2000, *Electrical Apparatus for Explosive Gas Atmospheres, Part 15 - Electrical Apparatus with Type of Protection "n";* and ~~ANSI/UL 2279-1997 (Part 15), *Electrical Equipment for Use in Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations*~~ ANSI/UL 60079-15, *Electrical apparatus for explosive gas atmospheres- Part 15: Type of protection "n".*

Unclassified Locations. Locations determined to be neither Class I, Division 1; Class I, Division 2: Class I, Zone 0; Class I, Zone 1; Class 1, Zone 2; Class II, Division 1; Class II, Division 2; Class III, Division 1; Class III, Division 2; or any combination thereof.

Substantiation:

UL is changing the title and structure of its standard for Class I, Zone 0, 1, and 2 equipment. Instead of one document, ANSI/UL 2279, there will be eight documents that will reflect the IEC numbering, e.g. ANSI/UL 60079-0. These documents will also be co-published with ISA.

Panel Meeting Action: Accept in Principle

Accept as recommended, but revise the references to ISA publications to reflect ANSI status (ANSI/ISA) and to use the correct issue date of 2002.

Panel Statement:

CMP 14 has updated references.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-73a Log #CP1400 NEC-P14 **Final Action: Accept**
(505-2, FPN)

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the action on this proposal relative to the references to IEC standards. The Technical Correlating Committee understands that the UL references updated in this proposal are the IEC 60079 standards with appropriate US differences included to make the standard compatible in the US. The action on this comment provides for references to UL standards that are different than the IEC standards referenced. As such, it would appear that the panel should delete the IEC standards references and rely on the more complete UL references since the UL references contain the appropriate differences. Maintaining the IEC standard reference is misleading to users of the NEC since it does not contain all of the appropriate differences established by the ANSI/UL standard. This action shall be considered by the panel as a public comment.

Submitter: Code-Making Panel 14

Recommendation:

Replace the existing fine print note with the following:

FPN: See IEC 60079-15-1987, Electrical Apparatus for Explosive Gas Atmospheres, Part 15 - Electrical Apparatus with Type of Protection "n" and ANSI/UL 60079-15-2002. Electrical apparatus for explosive gas atmospheres- Part 15: Type of protection "n" and ANSI/ISA 12.12.02-2003. Electrical apparatus for use in Class I, Zone 2 Hazardous (Classified) Locations: Type of protection "n".

Substantiation:

CMP 14 wishes to specifically reference the 1987 edition of the IEC document, rather than the current 2000 edition, as the UL and ISA documents are not based on the current 2000 edition of IEC 60079-15.

A reference to the ISA document has been added.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-74 Log #691 NEC-P14 **Final Action: Reject**
(505-3)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:

Other Articles. All other applicable ~~provisions~~ rules contained in this Code shall apply to electrical equipment and wiring installed in hazardous (classified) locations.

Substantiation:

Edit. To clarify that applicable provisions which are not rules (requirements) or exceptions thereto, but simply permitted, also apply.

Panel Meeting Action: Reject

Panel Statement:

The text already exists in the NEC. The submitter is referred to Proposal 14-9.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-75 Log #3140 NEC-P14 **Final Action: Accept in Principle**
(505-4(B), FPN 7)

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the action on this proposal relative to the references to IEC standards. The Technical Correlating Committee understands that the UL references updated in this proposal are the IEC 60079 standards with appropriate US differences included to make the standard compatible in the US.

The action on this comment provides for references to UL standards that are different than the IEC standards referenced. As such, it would appear that the panel should delete the IEC standards references and rely on the more complete UL references since the UL references contain the appropriatedifferences. Maintaining the IEC standard reference is misleading to users of the NEC since it does not contain all of the appropriate differences established by the ANSI/UL standard. This action shall be considered by the panel as a public comment.

Submitter: Michael A. Slowinske, Underwriters Laboratories Inc.

Recommendation:

Revise text as follows:

505.4 General.

(A) Documentation for Industrial Occupancies. All areas in industrial occupancies designated as hazardous (classified) locations shall be properly documented. This documentation shall be available to those authorized to design, install, inspect, maintain, or operate electrical equipment at the location.

FPN: For examples of area classification drawings, see ANSI/API RP 505-1997, *Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, or Zone 2;* ISA RP12.24.01-1998, *Recommended Practice for Classification of Locations for Electrical Installations Classified as Class I, Zone 0, Zone 1, or Zone 2;* IEC 60079-10-1995, *Electrical Apparatus for Explosive Gas Atmospheres, Classification of Hazardous Areas;* and *Model Code of Safe Practice in the Petroleum Industry, Part 15: Area Classification Code for Petroleum Installations,* IP 15, The Institute of Petroleum, London.

(B) Reference Standards. Important information relating to topics covered in Chapter 5 may be found in other publications.

FPN No. 1: It is important that the Authority Having Jurisdiction be familiar with recorded industrial experience as well as with standards of the National Fire Protection Association (NFPA), The American Petroleum Institute (API), the ISA - Instrumentation, Systems, and Automation Society (ISA), and the International Electrotechnical Commission (IEC) that may be of use in the classification of various locations, the determination of adequate ventilation and the protection against static electricity and lightning hazards.

FPN No. 2: For further information on the classification of locations, see ANSI/API RP 505-1997, *Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, or Zone 2;* ISA RP 12.24.01-1998, *Recommended Practice for Classification of Locations for Electrical Installations Classified as Class I, Zone 0, Zone 1, or Zone 2;* IEC 60079-10-1995, *Electrical Apparatus for Explosive Gas Atmospheres, Classification of Hazardous Areas;* and *Model Code of Safe Practice in the Petroleum Industry, Part 15: Area Classification Code for Petroleum Installations,* IP 15, The Institute of Petroleum, London.

FPN No. 3: For further information on protection against static electricity and lightning hazards in hazardous (classified) locations, see NFPA 77-2000, *Recommended Practice on Static Electricity;* NFPA 780-1997, *Standard for the Installation of Lightning Protection Systems;* and API RP 2003-1998, *Protection Against Ignitions Arising Out of Static Lightning and Stray Currents.*

FPN No. 4: For further information on ventilation, see NFPA 30-2000, *Flammable and Combustible Liquids Code,* and ANSI/API RP 505-1997, *Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, Zone 1, or Zone 2.*

FPN No. 5: For further information on electrical systems for hazardous (classified) locations on offshore oil and gas producing platforms, see ANSI/API RP 14FZ-2000, *Recommended Practice for Design and Installation of Electrical Systems for Fixed and Floating Offshore Petroleum Facilities for Unclassified and Class I, Zone 0, Zone 1, and Zone 2 Locations.*

FPN No. 6: For further information on the installation of electrical equipment in hazardous (classified) locations in general, see IEC 60079-14-1996, *Electrical Apparatus for Explosive Gas Atmospheres - Part 14: Electrical Installations in Explosive Gas Atmospheres (Other Than Mines),* and IEC 60079-16-1990, *Electrical Apparatus for Explosive Gas Atmospheres - Part 16: Artificial Ventilations for the Protection of Analyzer(s) Houses.*

FPN No. 7: For further information on application of electrical equipment in hazardous (classified) locations in general, see ISA 12.00.01-1999, *Electrical Apparatus for Use in Class I, Zones 0, and 1, Hazardous (Classified) Locations: General Requirements;* ISA 12.01.01-1999, *Definitions and Information Pertaining to Electrical Apparatus in Hazardous (Classified) Locations;* and ~~ANSI/UL 2279-1997 (Part 0), *Electrical Equipment for Use in Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations.*~~ ANSI/UL 60079-0, *Electrical apparatus for explosive gas atmospheres - Part 0: General requirements.*

Substantiation:

UL is changing the title and structure of its standard for Class I, Zone 0, 1, and 2 equipment. Instead of one document, ANSI/UL 2279, there will be eight documents that will reflect the IEC numbering, e.g. ANSI/UL 60079-0. These documents will be co-published with ISA.

Panel Meeting Action: Accept in Principle

Accept as recommended, but revise only the reference to the ISA publication in Fine Print Note No. 7 to reflect ANSI status (ANSI/ISA 12.00.01) and to use the correct issue date of 2002.

Panel Statement:

CMP 14 has updated references.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-76 Log #1800 NEC-P14 **Final Action: Accept in Principle**
(505-5(C)(1)(3) and FPN)

Submitter: David Wechsler, The Dow Chemical Company

Recommendation:

Revise text to read as follows:

(3) In which Group E combustible dusts ~~of an electrically conductive nature~~ may be present in ~~hazardous~~ quantities sufficient to be hazardous.

FPN: ~~Combustible dusts that are electrically nonconductive include dusts produced in the handling and processing of grain and grain products, pulverized sugar and cocoa, dried egg and milk powders, pulverized spices, starch and pastes, potato and wood flour, oil meal from beans and seed, dried hay, and other organic materials that may produce combustible dusts when processed or handled. Only Group E dusts are considered to be electrically conductive for classification purposes.~~ Dusts containing magnesium or aluminum are particularly hazardous, and the use of extreme precaution is necessary to avoid ignition and explosion.

Substantiation:

Group E combustible dusts are well defined within paragraph 500.6(B)(1) along with the unique characteristics that make these materials worthy of being grouped as they have been. The change made to the Division 1 definition simply clarifies that it is these Group E combustible dusts that are the focus of the Class II, Division 1 condition. Further, while it does not take much of a concentration of Group E dusts to be hazardous, the other change made does in fact recognize that the Group E combustible dust must be present in some quantity that is sufficient to be hazardous. There is a difference between present in hazardous quantities, and being present in a quantity sufficient to be hazardous; that is the hazard comes about due to the quantity and not vice versa. Consider that gold is a combustible dust, but because of its value, the quantity left lying around prevents the gold dust from being a hazard. The changes to the FPN also reflect the Group E definition and eliminate the incomplete summary of combustible dusts that are not listed that also are nonconductive and have little to do with Group E. In fact, much of this nonconductive wording came from an earlier code cycle when Group F was eliminated and only Group E and Group G existed because dusts where at the time considered only to be conductive or nonconductive.

Panel Meeting Action: Accept in Principle

Accept as a change to 500.5(C)(1)(3).

Delete last sentence of last paragraph of 502.1 of the 2002 edition of NEC.

Panel Statement:

The correct section reference is 500.5(C)(1)(3). The deletion eliminates redundant text from Article 502.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-77 Log #3287 NEC-P14 **Final Action: Reject**
(505-7(A))

Submitter: Richard Werner, Cannon USA

Recommendation:

Revise as follows:

Classification of areas and selection of equipment and wiring methods shall be under the supervision of a qualified Registered Professional Engineer, a qualified individual delegated by the authority having jurisdiction, or other individuals acceptable to the governing body involved.

Substantiation:

In North America the harmonization of the codes has led many persons to examine 505 more closely, but many are quite unfamiliar with the concept. In article 505, there is a statement in 505.7(A) Supervision of Work, which seems to be interpreted various ways, and in many instances it is difficult to find a registered professional engineer (PE), who is qualified or quite knowledgeable in Zone Classification. When our company visits with prospective customers and we have discussions with these companies or their local authorities we find that many of them, including registered PEs, do not have a good working knowledge of 505; consequently, many feel uncomfortable in discussing the information. I myself have been involved in hazardous location installations since 1985 and have become extremely knowledgeable in all of the associated codes. I have worked with our parent company in Italy on installations around the world, and with two PEs that have since left our organization; consequently, I am quite fluent in many of the electrical codes and standards, which exist. I have an extremely thorough knowledge of the following codes NFPA 30, NFPA 69, NFPA 70, NFPA 77, NFPA 91, NFPA 496, NFPA 497, NFPA 499, NFPA 555, ANSI/ISA-12.24.01, ISA-S12.00.01, IEC 60079-9, IEC 60079-10, IEC 60079-13, IEC 60079-16, API-RP 500, API-RP 505, and of course OSHA 1910-106. Even though I have such an extensive knowledge of the various codes and in many instances more than many of the registered PEs we encounter, because of the wording in 505.7(A), it appears I am not able to supervise any of the installations we are involved with, although I am the most qualified individual in the specific application and knowledge. Incidentally, my education degree (BA) is chemistry and associate level in electrical engineering technology, but I am not a registered PE.

Panel Meeting Action: Reject

Panel Statement:

A professional engineer (PE) is legally charged with a fiduciary responsibility to the client and the public at large, with severe penalties for noncompliance. The other individuals may not be so bound legally. Refer to individual state laws governing PEs.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-78 Log #2613 NEC-P14 **Final Action: Reject**
(505-7(A), FPN (New))

Submitter: Lon S. McDaniel, World Safty Organization

Recommendation:

Add a Fine Print Note following 505.7(A) statement: "Classification of areas and selection of equipment and wiring methods shall be under the supervision of a qualified Registered Professional Engineer."
FPN: The term "qualified Registered Professional Engineer" may be considered applicable to qualified members of the World Safety Organization certified by the WSO Professional Certification Board.

Substantiation:

The World Safety Organization (WSO) is in Consultative Status Category II (non-governmental) with the United Nations; and as such is fully recognized throughout the world as a professional organization. Its roster includes over 14,000 members, 1500 national and multi-national companies/corporations, and 184 nations. Also included, are over 2,000 professionals who are both nationally and internationally certified practitioners in the safety, health and environmental vocations. Since 1975 this organization has been strongly committed to the protection of people, property, resources and the environment. The WSO mandates and evaluation of its members mastery of safety knowledge and application; to include their professional and ethical behavior. Strict standards of professional performance are applied to ensure that WSO certified members, practicing safety, have attained a level of professionalism required to meet or exceed the needs of government, commerce, and industry on both national and international levels. Submitted is more information about the WSO and our certification exams, policy and programs.
Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement:

There is no documentation provided by the submitter that any state in the U.S. has recognized this designation as a registered professional engineer.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

WECHSLER: The proposal requested through a fine print note recognition of an alternative qualification organization certification for complying with 505.7 (A). Per the NEC Style manual, a fine print note may not contain a requirement, but only an advisory statement and clearly this is advisory in nature.

For the Panel to Reject this proposal on the basis that "there is no documentation provided by the submitter that any state in the U. S. has recognized this designation as a registered professional engineer" is clearly not an issue within the scope of Panel 14. Inclusion of the text "qualified registered professional engineer" was done solely as a political compromise during the introduction of the NEC Article 505, Zone classification methodology. At no time was there ever any justification provided that a registered professional engineer was any more or less qualified to oversee "Zones" than anyone else. Ironically, as a matter of general fact, there was hardly any equipment that could be installed in a Zone classified location at that time, due to listing and other considerations.

Section 505.7(A) is the only place within the entire NEC where the added stipulation for a registered professional engineer, who is also qualified, exists. To the best of my knowledge, no member of Panel 14 has ever been provided with any information to indicate that any state included within its professional engineer testing, proficiency with Zone area electrical classification.

Clearly being qualified to perform electrical work is an important attribute and it is one that is held in high importance within the NEC. Installers, designers, inspectors, engineers, etc. for example must be qualified, but the qualifications for one task, may not be the same as another task. The NEC has not established which task requires more or less qualified person(s), but provides in Article 100, a basic definition of a "Qualified Person. One who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training on the hazards involved."

The Article 505 Zone methodology while appearing in a document that is used within the US, does not make this a USA "only" used methodology. Further, the Panel statement and proposed action to reject, directly conflicts with 90-4 as "This Code is intended to be suitable for mandatory application by governmental bodies that exercise legal jurisdiction over electrical installations, including signaling and communications systems, and for use by insurance inspectors. The authority having jurisdiction for enforcement of the Code has the responsibility for making interpretations of the rules, for deciding on the approval of equipment and materials, and for granting the special permission contemplated in a number of the rules."
The US States are only one example of a governmental body. State derived "professional engineer" status, is not the only means of being qualified and should not be used as a means of restricting the application and use of the NEC outside the US.

Additionally the Panel 14 Committee has not been empowered by the NEC in the scope of documents under this Panel's control, nor by actions of the NEC Technical Correlating Committee to evaluate qualifications. If the final Panel action is not to recognize this organization by accepting their proposal as an FPN, it seems that after three code cycles, the politically "feel-good" band-aid text of 505.7 (A) now needs to be removed.

14-79 Log #26 NEC-P14 (505-7(F)) **Final Action: Accept in Principle**

TCC Action:

The Technical Correlating Committee understands that the only revision made by this action is to the text in 505.18(A).

NOTE: The following proposal consists of Comment 14-135 on Proposal 14-318a in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 14-318a was:
Revise Article 505 to read as shown:

[Text of (May 2001) Proposal 14-318a is shown on page 2383]

Submitter: Robert L. Seitz, Artech Engineering

Recommendation:

Add the following words to this section:
Where type "e" equipment is installed, every conductor that enters the type "e" equipment shall be terminated, properly at an approved type "e" termination.

Substantiation:

What to do with "spare" conductors is what brought this issue to light. In Division 1 equipment there is no requirement for special termination so spare conductors are often not terminated and are just folded into the enclosure with wire nut caps or heat shrink to prevent exposed conductor from making contact with other parts of the enclosure. For Type "e" the method of protection is determined by the termination. The requirement to terminate is not included within the ANSI standard as these are field conductors. It is important that this requirement be stated somewhere and NFPA 70 is the only place left.

Panel Meeting Action: Accept in Principle

In 505.18(A), add the following text:
"Every conductor (including spares) that enters type "e" equipment shall be terminated at a type "e" terminal."

Panel Statement:

The text has been revised for clarity. The text is more appropriately located in 505.18(A). The word "approved" has been deleted because type "e" equipment is required to be listed by 505.9(B).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-80 Log #3141 NEC-P14 **Final Action: Accept in Principle**
(505-8, FPN)

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the action on this proposal relative to the references to IEC standards. The Technical Correlating Committee understands that the UL references updated in this proposal are the IEC 60079 standards with appropriate US differences included to make the standard compatible in the US.

As such, the action on this comment provides for references to UL standards that are different than the IEC standards referenced. As such, it would appear that the panel should delete the IEC standards references and rely on the more complete UL references since the UL references contain the appropriate differences. Maintaining the IEC standard reference is misleading to users of the NEC since it does not contain all of the appropriate differences established by the ANSI/UL standard. This action shall be considered by the panel as a public comment.

Submitter: Michael A. Slowinske, Underwriters Laboratories Inc.

Recommendation:

Revise text as follows:

505.8 Protection Techniques. Acceptable protection techniques for electrical and electronic equipment in hazardous (classified) locations shall be as described in 505.8(A) through (I).

FPN: For additional information, see ISA 12.00.01-1999, *Electrical Apparatus for Use in Class I, Zones 0 and 1 Hazardous (Classified) Locations, General Requirements;* ISA 12.01.01-1999, *Definitions and Information Pertaining to Electrical Apparatus in Hazardous (Classified) Locations;* ~~ANSI/UL 2279, 1997, *Electrical Equipment for Use in Class I, Zone 0, 1, and 2 Hazardous (Classified) Locations*~~ ANSI/UL 60079-0, *Electrical apparatus for explosive gas atmospheres - Part 0: General requirements;* and IEC 60079-0-1998, *Electrical Apparatus for Explosive Gas Atmospheres - Part 0: General Requirements.*

Substantiation:

UL is changing the title and structure of its standard for Class I, Zone 0, 1, and 2 equipment. Instead of one document, ANSI/UL 2279, there will be eight documents that will reflect the IEC numbering, e.g. ANSI/UL 60079-0. These documents will also be co-published with ISA.

Panel Meeting Action: Accept in Principle

Accept as recommended, but revise the references to ISA publications to reflect ANSI status (ANSI/ISA) and to use correct issue date of 2002.

Panel Statement:

CMP 14 has updated references.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-81 Log #2968 NEC-P14 **Final Action: Reject**
(505-8, FPN 2)

Submitter: David Soffrin, American Petroleum Institute

Recommendation:

Revise as follows:

FPN No. 2: For further information, see ANSI/API RP~~500~~505, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0 ~~Division~~ Zone 1, ~~or Division~~ and Zone 2.

Substantiation:

The correct area classification reference for Zone 0, Zone 1 and Zone 2 installations is ANSI/API RP 505.

Panel Meeting Action: Reject

Panel Statement:

There is no Fine Print Note No. 2 to be revised.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-82 Log #2707 NEC-P14 **Final Action: Accept in Principle**
(505-8(C))

Submitter: Donny Cook, Shelby County Development Services

Recommendation:

(C) Intrinsic Safety. This protection technique shall be permitted for apparatus and associated apparatus in Class 1, Zone 0, Zone 1, or Zone 2 locations for which it is listed. The provisions of 505.15 shall not be considered applicable to such installations, except as required by Article 504, and installation of intrinsically safe apparatus and wiring shall be in accordance with the requirements of Article 504.

Substantiation:

This proposal correlates wiring requirements for IS circuits installed using the Zone scheme, with those permitted for IS circuits installed using the Division scheme. See 500.7(E). The hazard is the same.

Panel Meeting Action: Accept in Principle

See Proposal 14-96.

Panel Statement:

The action on Proposal 14-96 meets the submitter's intent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-83 Log #1477 NEC-P14 **Final Action: Reject**
(505-8(D))

Submitter: Nicholas P. Ludlam, FM Approvals

Recommendation:

Revise text to read as follows:
(D) Type of Protection "n". This protection technique shall be permitted for equipment in Class I, Zone 2 locations. Type of protection "n" is further subdivided into nA, nC, nL, and nR.
FPN: See Table 505.9(C)(2)(4) for the descriptions of subdivisions for type of protection "n".

Substantiation:

IEC60079-15-2000 which is listed in the FPN under Type of Protection "n" in 505.1 also includes the type of protection "nL". This is for energy limited apparatus.

Panel Meeting Action: Reject

Panel Statement:

The type of protection "nL" does not appear in the IEC 60079-15:1987; ANSI/ISA 12.12.02:2003; or ANSI/UL 60079-15:2002.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-84 Log #3464 NEC-P14 **Final Action: Reject**
(505-8(F))

Submitter: Charles M. Trout, Maron Electric Co. Inc.

Recommendation:

Delete the section in its entirety.

Substantiation:

The National Electrical Code is prescriptive code. To say "where the conditions of maintenance and supervision ensure that only qualified persons service the installation," is a performance requirement. Without prescriptive requirements indicating whether this qualified person is an employee of the owner of the premises or is a separately contracted person and the Authority Having Jurisdiction has a means of verification of the continued employment of the qualified person and whether the qualified person has been verified by the authority having jurisdiction as meeting the definition of a qualified person as shown in the definitions of this Code no prescriptive requirements have been followed.
To permit relaxation of the safety requirements of this Code without establishing a positive guarantee that the safety of persons and property is indisputably assured is a reprehensible act.

Panel Meeting Action: Reject

Panel Statement:

The text in question does not exist in 505.8(F).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-85 Log #2966 NEC-P14 (505-8(I)) **Final Action: Accept in Principle**

Submitter: David Soffrin, American Petroleum Institute

Recommendation:

Add new text following the main text of this section:
The type of detection equipment, its approval, installation location(s), alarm and shutdown criteria, and calibration frequency shall be considered when combustible gas detectors are used as a protection technique.

Substantiation:

The section for use of Combustible Gas Detection was included during the 2002 code cycle. In the directed rewrite (reorganization) of the new section by the Technical Correlating Committee (ROC 14-155), the provision "Use of this technique for each of the applications above includes adherence to established industrial practices and requirements" was removed because the provisions of other standards cannot be dictated in the NEC.
There are a number of specific considerations such the type of detection equipment, its approval, installation location, alarm and shutdown criteria, and calibration frequency and procedures, which have been established for the proper and safe application of the Combustible Gas Detection protection technique. The proposed wording while not requiring adherence to other codes or standards, does require consideration of the important elements in the use of this technique.

Panel Meeting Action: Accept in Principle

Add a new sentence after the main text of this section to read as follows:
"The type of detection equipment, its listing, installation location(s), alarm and shutdown criteria, and calibration frequency shall be documented when combustible gas detectors are used as a protection technique."

Panel Statement:

CMP 14 believes that installation details should be "documented" and not just "considered". The word "approval" has been changed to "listing" to correlate with the text of the current requirement.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-86 Log #2967 NEC-P14 (505-8(I), FPNs No. 1 thru 3) **Final Action: Accept**

Submitter: David Soffrin, American Petroleum Institute

Recommendation:

Relocate the following Fine Print Notes to under the main text of this section and make corrections to the API RP reference in FPN No. 2.
FPN No. 1: For further information, see ANSI/ISA-12.13.01, Performance Requirements, Combustible Gas Detectors.
FPN No. 2: For further information, see ANSI/API RP ~~500~~505, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, ~~Division~~ Zone 1, ~~or Division~~ and Zone 2.
FPN No. 3: For further information, see ISA-RP12.13.02, Installation, Operation, and Maintenance of Combustible Gas Detection Instruments.

Substantiation:

The Fine Print Notes are more appropriately located under the main text. As presently located, they appear to only apply to item (3). The correct ANSI/API reference for Zone 0, Zone 1 and Zone 2 installations is ANSI/API RP 505.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-87 Log #2963 NEC-P14 (505-8(I), FPN 2) **Final Action: Accept in Principle**

Submitter: David Soffrin, American Petroleum Institute

Recommendation:

Revise as follows:
FPN No. 2: For further information, see ANSI/API RP ~~500~~505, Recommended Practice for Classification of Locations for Electrical Installations at Petroleum Facilities Classified as Class I, Zone 0, ~~Division~~ Zone 1, ~~or Division~~ and Zone 2.

Substantiation:

The correct area classification reference for Zone 0, Zone 1 and Zone 2 installations is ANSI/API RP 505.

Panel Meeting Action: Accept in Principle

See Proposal 14-86.

Panel Statement:

The action on Proposal 14-86 meets the submitter's intent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-88 Log #1346 NEC-P14 **Final Action: Accept**
(505-9(B)(1))

Submitter: William G. Lawrence, Jr.

Recommendation:

Revise text to read as follows:
Equipment that is listed for a Zone 0 location shall be permitted in a Zone 1 or Zone 2 location of the same gas or vapor provided that it is installed in accordance with the requirements for the marked type of protection. Equipment that is listed of a Zone 1 location shall be permitted in a Zone 2 location of the same gas or vapor provided that it is installed in accordance with the requirements for the marked type of protection.

Substantiation:

The proposed revisions address a problem with the current wording where it can be interpreted that it is permitted to not provide a shunt diode safety barrier for AEx ia apparatus installed in Zone 1 or Zone 2, even when the Control Drawing requires one, or to forego the installation of the conduit or cable seals for AEx d apparatus installed in Zone 2. I believe it was the Panel's intent that Zone 0 apparatus could be used in Zone 1 or Zone 2, but had to be installed as it would be in Zone 0. The corresponding logic applies to Zone 1 apparatus installed in Zone 2.
If equipment has been specifically Listed or examined by the Authority Having Jurisdiction for its Zone 2 suitability, this section would not apply as the equipment is already suitable for Zone 2.

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-89 Log #1638 NEC-P14 **Final Action: Accept in Principle**
(505-9(C)(2))

Submitter: Nicholas P. Ludlam, FM Approvals

Recommendation:

Revise text to read as follows:
(2) Zone Equipment. Equipment meeting one or more of the protection techniques described in 505.8 shall be marked with the following in the order shown:
(1) Class
(2) Zone
(3) Symbol "AEx"
(4) Protection technique(s) in accordance with Table 505.9(C)(2)(4)
(5) Applicable gas classification group(s) in accordance with Table 505.9(C)
(6) Temperature classification in accordance with 505.9(D)(1)
Exception No. 1: Intrinsically safe associated apparatus shall be required to be marked only with (4), (5), and (6)
Exception No. 2: Simple Apparatus as defined in 504.2 shall not be required to have a marked operating temperature or temperature class.

Substantiation:

This proposal is linked to that for the temperature evaluation of simple apparatus (504.10(B)). Simple apparatus is not required to be identified or to be listed. (504.4 Exception).

Panel Meeting Action: Accept in Principle

Renumber proposed Exception No. 2 as Exception No. 3.

Panel Statement:

CMP 14 accepts the proposed new exception verbatim, but has renumbered it to accommodate another exception that was added via 14-88a (Log #CP1403).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

COOK: See my Explanation of Negative on Proposal 14-67.

14-88a Log #CP1403 NEC-P14 **Final Action: Accept**
(505-9(C)(2))

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and relocate both "examples" of markings into Fine Print Notes to be consistent with the NEC Style Manual. This action will be considered by the panel as a public comment.

Submitter: Code-Making Panel 14

Recommendation:

Revise 505.9(C)(2) as follows:
Change the Exception to read:
Exception No. 1: Associated apparatus suitable for installation in a hazardous (classified) location shall be required to be marked only with (3), (4), and (5), for example AEx d[ia] IIC.
Add a new Exception 2 to read:
Exception No. 2: For associated apparatus NOT suitable for installation in a hazardous (classified) locations, shall be required to be marked only with (3), (4), and (5), but BOTH the symbol AEx (3) and the symbol for the type of protection (4) shall be enclosed within the same square brackets, for example, [AEx ia] IIC
In Table 505.9(C)(2)(4): Delete "Intrinsically Safe" from before "Associated Apparatus" in two places.

Substantiation:

This incorporates Errata 3, 4, and 5 (use of square brackets for associated apparatus) and also corrects the defined term for Associated Apparatus in 504.2, which is not intrinsically safe.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

O'MEARA: In Exception 2, recommend to remove the "s" from "locations" and the initial "For" in the sentence, resulting in "Associated apparatus NOT suitable for installation in a hazardous (classified) location, shall be required...".

WECHSLER: The panel has undertaken appropriate actions in reaction to the change in definition of "live parts" that occurred from the 1999 to the 2002 NEC. Further the panel actions continue to correctly focus upon the concerns created by potential shock hazards as well as ignition potentials. However the proposed wording is not clear and should be improved. Specifically the phrase used in the second sentence of the proposed wording "Such uninsulated exposed parts.." grammatically refers back to the first sentence and the "no uninsulated exposed parts". This combined effect is an unclear requirement that does not really meet the intentions of the Committee and could be much improved.

In my opinion, two other aspects of the problem may stem from:

a) the current practice of having terminals in intrinsically safe equipment and nonincendive circuits that are exposed and uninsulated and

b) numerous earlier NEC Committee comments to unsuccessful NEC proposals that requested that intrinsically safe circuits be "considered" non-shock hazards, but resulted in unchanged NEC positions that intrinsically safe circuits can in fact be shock hazards.

For this specific issue, I recommend that we adopt a cleaner wording approach in which the conditions of the recognized protection techniques addressed in 500 (E), (F), and (G) simply are exempted from this specific section. The revised wording for 501, 502 and 503 should be:

Uninsulated Exposed Parts, Class I, Divisions 1 and 2.
There shall be no uninsulated, exposed, energized conductive parts, such as electric conductors, buses, terminals, or components, where contact would cause an involuntary reaction or physical harm due to the current flow though any part of the body.

Fpn: Where contact with electricity would cause an involuntary reaction or physical harm due to current flow through any part of the body, a shock hazard potential may exist.

Exception: Electrical and electronic equipment having protection techniques 500.7 (E), 500.7 (F) and 500.7 (G).

As a means of addressing the b) item mentioned above, the shock hazard scenario is addressed here and it is further suggest that this be used as a technical basis to help bring closure to the identification of a shock hazard.

Article 725 of the NEC has probably gone the farthest with what is not a shock hazard by defining in the second sentence of the defined term "Class 2 Circuit" in 725.2 Definitions by the following: "Due to its power limitations, a Class 2 circuit considers safety from a fire initiation standpoint and provides acceptable protection from electric shock." It may be logically assumed that based upon 725.41 (A) that the power supplied from a defined Class 2 power source provides acceptable protection from electric shock. One of these is defined as being a dry cell battery provided the voltage is 30 volts or less and the capacity is equal to or less than that available from series connected No. 6 carbon zinc cells. Another is what is called an inherently-limited, or Class 2 Power-limited source. The NEC Chapter 9, Table 11 (B) "Class 2 and Class 3 Direct-Current Power Source Limitations" for over 20 and through 30 volts (continuous dc indoors or where wet contact is not likely) defines the current limitation, Imax, as 8 amps (under any noncapacitive load, including short circuit). In NEC Chapter 9, Table 11 (A) ") "Class 2 and Class 3 Alternating-Current Power Source Limitations" for over 60 and through 150 volts (sinusoidal ac in indoor locations or where wet contact is not likely to occur), the current limitation, Imax, is defined as being 5 mA.

Contrast these stated current values with physiological effects contained in
Nave & Nave, Physics For the Health Sciences, 3rd Ed, W. B. Saunders, 1985. This reference states that a 1-second contract with an electric current of 1 mA, at a voltage of 1 volt applied to a body having a resistance of 1000 ohm, will result in a threshold of feeling, tingling sensation. The same 1-second contact of 10-20 mA to the same body at 10 volts will result in the beginning of sustained muscular contraction ("Can't let go" current). At 100-300 mA, again for a 1-second contact to the same body, but at a voltage of 100 volts, ventricular fibrillation, fatal if continued, will result.

Since it is the current which causes severity of the body's response, it may be shown from Ohm's Law that the current from a given source of voltage applied to the body will depend directly upon the resistance of the path to the body. More simply, the current, will be equal to the voltage divided by the resistance. So, for a voltage of 120 volts, the current to a body having a resistance of 1000 ohms would be subjected to a 120 mA which is capable of producing ventricular fibrillation and could be fatal.

According to IEEE Std. 80, the "maximum safe shock duration" may be calculated by the formula, T=0.116÷(E÷R), where T is duration in seconds, E is the electromotive force in volts, and R is resistance of the person, which is considered as being a constant 1,000 ohms. Again for a 120V circuit, the maximum shock duration [0.116÷(120V÷1,000)] would result in 1 sec.

These two sources provide the same conclusion, but yet approach the matter of body effects from slightly different perspectives. Both

These two sources provide the same conclusion, but yet approach the matter of body effects from slightly different perspectives. Both identify the "shock" hazard. It may thus be concluded that where contact with electricity would either cause an involuntary reaction or result in physical harm due to current flow through any part of the body, a condition of a "shock" hazard potential may exist.

14-90 Log #1476 NEC-P14 **Final Action: Reject**
(Table 505-9(C)(2)(4))

Submitter: Nicholas P. Ludlam, FM Approvals

Recommendation:

Revise Table 505.9(C)(2)(4) as follows:

Insert Table Here

(Table shown on page 2740)

Electrical equipment of types of protection "e", "m", "p", or "q", shall be marked Group II. Electrical equipment of types of protection "d", "la", "lb", "[ia]", or "[ib]" or "nL" shall be marked Group IIA, IIB, or IIC, or for a specific gas or vapor. Electrical equipment of types of protection "n" shall be marked Group II unless it contains enclosed-break devices, nonincendive components, or energy-limited equipment or circuits, in which case it shall be marked Group IIA, IIB, or IIC, or a specific gas or vapor. Electrical equipment of other types of protection shall be marked Group II unless the type of protection utilized by the equipment requires that it shall be marked Group IIA, IIB, or IIC, or a specific gas or vapor.

Substantiation:

IEC60079-15-2000 which is listed in the FPN under Type of Protection "n" in 505.1 also includes the type of protection "nL". This is for energy limited apparatus.

Panel Meeting Action: Reject

Panel Statement:

The type of protection "nL" does not appear in the IEC 60079-15;1987; ANSI/ISA 12.12.02:2003; or ANSI/UL 60079-15:2002.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-91 Log #3022 NEC-P14 **Final Action: Accept**
(505-9(E))

Submitter: Joseph H. Kuczka, Killark

Recommendation:

Add new text as follows:
Equipment provided with threaded entries for field wiring connections shall be installed in accordance with ~~505.9(D)~~ (1) or (2) below.

Substantiation:

505.9(D) is an incorrect reference. This is an editorial correction.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-93 Log #2396 NEC-P14 **Final Action: Reject**
(505-15(B)(1))

Submitter: Will E. McBride, Northern Electric Company

Recommendation:

Add a new paragraph:
In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, and where the cable is not subject to physical damage, Type TC-HL cable, listed for use in Class I, Zone 1 locations, with a gas/vaportight overall jacket of suitable polymeric material, separate dedicated grounding conductor(s) in accordance with 250.122, and provided with termination fittings listed for the application shall be permitted between enclosures or apparatus utilizing the increased safety type of protection technique "e" within the Class I, Zone 1 location. Type TC-HL cable shall be permitted as open wiring in lengths not to exceed 1.8 m (6 ft).
FPN 1: Type TC-HL cable that is listed for use in Class I, Zone 1, locations meets the same crush and impact requirements as Type MC-HL cable.
FPN 2: See 336.10 for restrictions on use of Type TC cable.

Substantiation:

The current NEC allows only Division 1 wiring methods in Zone 1 locations. This proposal recognizes the fact of the Zone System that Class I, Zone 1 has a lower level of risk than Class I, Division 1 locations. This proposal establishes a new type of cable specifically designated as a Zone 1 wiring method. The proposal is for Type TC-HL cable. Also this type of cable is intended for connections between enclosures utilizing only the type of protection "e" since increased safety enclosures do not contain any source of ignition. Since these enclosures are typically nonmetallic this proposal will allow the use of listed nonmetallic cable terminators and eliminate the need to bond the armor of Type MC-HL cables.
Type TC-HL cable shall the crush and impact requirements of MC-HL cable, and could only be used in industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation and where the classification of areas, selection of equipment and wiring methods are under the supervision of a qualified Registered Professional Engineer. This wiring method provides a level of protection consistent with the requirements of Class I, Zone 1 locations and with the limitation to not more than 1.8 m (6 ft) of “open wiring”, reduces the risk of physical damage to the cable below that of mechanically equivalent MC-HL.

Panel Meeting Action: Reject

Panel Statement:

The submitter cites only two of the many attributes that Type MC-HL incorporates in its design. CMP 14 believes that all of these qualities, including conductive armor, are required.
Further, CMP-14 does not accept the substantiation that Zone 1 has a lower level of risk than Division 1. There are locations within Division 1 which have identical risk as that associated with Zone 1 applications.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-94 Log #3393 NEC-P14 **Final Action: Reject**
(505-15(B)(1))

Submitter: John L. Ballard, Solar Turbines Inc.

Recommendation:

Add a new part (c) as follows:

(c) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, and where the cable is not subject to physical damage, Type TC-HL cable, listed for use in Class I, Zone 1 locations, with a gas/vaportight overall jacket of suitable polymeric material may be used for connection to apparatus utilizing the increased safety type of protection technique "e". Grounding and bonding shall comply with Article 250. Grounding conductors may be external or integral to the Type TC-HL cable. Termination fittings utilized to connect Type TC-HL cable to apparatus utilizing the increased safety type of protection shall be listed for this application. This cable shall be permitted as open wiring between the cable tray and the utilization equipment in lengths not to exceed 1.8 m (6 ft).

Where Type TC-HL cable is installed between apparatus utilizing increased safety sealing the cable shall not be required. Type TC-HL cable may be installed between apparatus utilizing the increased safety type of protection technique "e" and apparatus in nonhazardous locations. When this is done the cable shall be designed or sealed in a manner such that the cable core will to transmit gases or vapors through the cable core in excess of the quantity permitted for seal fittings, or in a quantity that could create a hazardous atmosphere in the nonhazardous location.

FPN 1: Type TC-HL cable that is listed for use in Class I, Zone 1, locations meets the same crush and impact requirements as Type MC-HL cable.

FPN 2: See 336.10 for restrictions on use of Type TC cable. These restrictions apply except as modified by this Article.

Change the existing (c) to (d), (d) to (e), and (e) to (f).

Substantiation:

This wiring method for Class I, Zone 1 would be allowed under conditions where there is a lower level of risk than that for Class I, Division 1 locations. This type of cable is appropriate for connections between enclosures utilizing only the type of protection "e", and would not be required to be sealed under these conditions, as increased safety does not contain a source of ignition.

Type TC-HL cable meets the crush and impact requirements of MC-HL cable, and can only be used in industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation. This wiring method provides a level of protection consistent with the requirements of Class I, Zone 1 locations and with a limitation of not more than 1.8 m (6 ft) of "open wiring", reducing the risk of physical damage to the cable below that of mechanically equivalent MC-HL.

As a Design Engineer in the Compliance and Development Department for a manufacturer of industrial equipment it is apparent there is a lack of a wiring method that fills the needs for Zone rated industrial equipment. Among the most important are physical constraints, and use of instrumentation precluding MC-HL cable use as a wiring method. This would be an important step to bridge the gaps existing for industrial equipment.

Supporting equipment designs for a global market will be simplified by increased similarity of design, and more design content that is 'universal'. Potential oversights in compliance are reduced for complex installations with all increases in simplification.

I have been in contact with other Engineers working on similar proposals but this proposal is presented with a strong desire to add support for the requirements faced by heavy industry equipment manufacturers.

Panel Meeting Action: Reject

Panel Statement:

The submitter cites only two of the many attributes that Type MC-HL incorporates in its design. CMP 14 believes that all of these qualities, including conductive armor, are required.

Further, CMP-14 does not accept the substantiation that Zone 1 has a lower level of risk than Division 1. There are locations within Division 1 which have identical risk as that associated with Zone 1 applications.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-95 Log #3465 NEC-P14 **Final Action: Reject**
(505-15(B)(1) (a) & (b))

Submitter: Charles M. Trout, Maron Electric Co. Inc.

Recommendation:

Delete the section in its entirety.

Substantiation:

The National Electrical Code is prescriptive code. To say "where the conditions of maintenance and supervision ensure that only qualified persons service the installation," is a performance requirement. Without prescriptive requirements indicating whether this qualified person is an employee of the owner of the premises or is a separately contracted person and the Authority Having Jurisdiction has a means of verification of the continued employment of the qualified person and whether the qualified person has been verified by the authority having jurisdiction as meeting the definition of a qualified person as shown in the definitions of this Code no prescriptive requirements have been followed.

To permit relaxation of the safety requirements of this Code without establishing a positive guarantee that the safety of persons and property is indisputably assured is a reprehensible act.

Panel Meeting Action: Reject

Panel Statement:

The text is appropriate as it is currently written. CMP 14 believes that there are applications where there is limited public access along with company policies and procedures, minimum personnel requirements for maintenance workers, government certification requirements, required apprenticeship training, required continuing education requirements, and, in many cases, a combination of more than one of these items can ensure that only qualified employees will service an installation. This does not occur in all geographic areas or all types of occupancies. However, in areas where it occurs, it is justification for flexibility.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-92 Log #1943 NEC-P14 **Final Action: Reject**
(505-15(B)(1)(e))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:

(e) Rigid nonmetallic conduit complying with Article 352 shall be permitted where encased in a concrete envelope a minimum of 50 mm (2 in.) thick and provided with not less than 600 mm (24 in.) of cover measured from the top of the conduit to grade. Threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (24 in.) of the underground run to emergence or to the point of connection to the aboveground raceway. An equipment ~~grounding~~ bonding conductor shall be included to provide for electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Introduction of the new term to substitute for that currently used will confuse the user. CMP 14 notes that this change would have to be effected throughout the entire Code, simultaneously, not one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

O'MEARA: See my Explanation of Negative on Proposal 14-1.

Comment on Affirmative:

COOK: I agree with the panel action, but do not agree with the panel statement. See my Comment on Affirmative for 14-1.

14-96 Log #1348 NEC-P14 **Final Action: Accept**
(505-15(B)(1)(a) (New))

Submitter: William G. Lawrence, Jr.

Recommendation:

Add a new (a) All wiring methods permitted by 505.15(A).
Renumber existing (a), (b), (c), (d), and (e) to (b), (c), (d), (e), and (f).

Substantiation:

The Panel has previously acknowledged this editorial omission whereby Intrinsic Safety wiring is not permitted as a wiring method in a Zone 1 location. There is no technical logic for this omission as Intrinsic Safety wiring is the only wiring method for connecting "AEx ib" apparatus that is permitted to be installed in Zone 1.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-97 Log #1621 NEC-P14 **Final Action: Reject**
(505-15(B)(1)(c))

Submitter: Vic Gournas, ISA-The Instrumentation, Systems and Automation Society

Recommendation:

Add a new part:

(c) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, and where the cable is not subject to physical damage, Type TC-HL cable, listed for use in Class I, Zone 1 locations, with a gas/vaportight overall jacket of suitable polymeric material, separate grounding conductors in accordance with 250.122, and provided with termination fittings listed for the application shall be permitted between apparatus utilizing the increased safety type of protection technique "e", and apparatus utilizing the increased safety type of protection technique "e" with the Class I, Zone 1 location. This cable shall be permitted as open wiring between the cable tray and the utilization equipment in lengths not to exceed 1.8 m (6 ft).

FPN 1: Type TC-HL cable that is listed for use in Class I, Zone 1, locations meets the same crush and impact requirements as Type MC-HL cable.

FPN 2: See 336.10 for restrictions on use of Type TC cable.

Change the existing (c) to (d), (d) to (e), and (e) to (f).

Substantiation:

The wiring method recognizes the important fact of the Zone System that Class I, Zone 1 has a lower level of risk than Class I, Division 1 locations. Also, this type of cable is appropriate for connections between enclosures utilizing only the type of protection (e) since increased safety does not contain a source of ignition.

Type TC-HL cable meets the crush and impact requirements of MC-HL cable, and can only be used in industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation and where the classification of areas, selection of equipment and wiring methods are under the supervision of a qualified Registered Professional Engineer. This wiring method provides a level of protection consistent with the requirements of Class I, Zone 1 locations and with the limitation to not more than 1.8 m (6 ft) of "open wiring", reduces the risk of physical damage to the cable below that of mechanically equivalent MC-HL.

ISA NOTE: The material contained in this proposal was reviewed and approved by the ISA SP12 Committee during its 04-October-2002 Meeting.

Panel Meeting Action: Reject

Panel Statement:

The submitter cites only two of the many attributes that Type MC-HL incorporates in its design. CMP 14 believes that all of these qualities, including conductive armor, are required.

Further, CMP-14 does not accept the substantiation that Zone 1 has a lower level of risk than Division 1. There are locations within Division 1 which have identical risk as that associated with Zone 1 applications.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-98 Log #2403 NEC-P14 **Final Action: Reject**
(505-15(B)(1)(c))

Submitter: Robert Seitz, Natchiq Technical Services

Recommendation:

Add a new paragraph (c):
In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons will service the installation, and where the cable is not subject to physical damage, listed TC cable with the crush resistance required of MC-HL cable with a gas/vaportight overall jacket of suitable polymeric material, complying with the requirements of Article 336.10(6), with separate grounding conductors in accordance with Section 250.122, and provided with termination fittings listed for the application shall be permitted within the Zone 1 location, where the enclosure has type of protection “e” or where the conditions of (1) through (5) are met.
(1) Type “d” enclosures are factory sealed with type “e” field terminations(type “de” protection).
(2) Flameproof(type “d”) and explosionproof enclosures only contain terminations(termination housing is isolated or factory sealed from arc and heat producing components)
(3) Seals are provided for each cable entering flameproof (without increased safety type “e” terminations)or explosionproof enclosures(505(B)(7))
(4) Cables are installed in cable tray or raceway
(5) Unsupported cable between cable tray or raceway and end device is 1.8 meters or less, and installed in a manner to avoid tensile stess at the termination fittings.
Then change the existing (c) to (d), (d) to (e), and (e) to (f).

Substantiation:

This wiring method recognizes the important fact of the Zone System that Class I, Zone 1 has a lower level of risk than Class I, Division 1 locations. Also this type of cable is appropriate for connection between enclosures utilizing the type of protection "e" since increased safety does not contain a source of ignition. This type of cable is also appropriate for connection to flameproof or explosion where there is a factory seal between the termination and the arc and high temperature producing components as there would be no source of ignition available where the termination is made. Where the terminations are not evaluated for increased safety (type “e”)a seal would provide the additional isolation consistent with the methods of protection required for a Zone 1 installation.
TC Cables are now manufactured which meet the crush and impact requirements of MC-HL cable. When installed in compliance with Article 336.10(6) and where the Classification of areas, selection of equipment and wiring methods are under the supervision of a qualified Registered Professional Engineer, and where installed under the provisions proposed a level of protection consistent with the requirements of Class I, Zone 1 locations would be maintained.
This cable would also provide the flexible connection means required of motors and other devices subject to vibration and motion and would permit the removal of process instruments and other devices mechanically without requiring determination of cable conductors at the end device. This would enhance safety by reducing the chance of problem where frequent change out might occur.

Panel Meeting Action: Reject

Panel Statement:

The submitter cites only two of the many attributes that Type MC-HL incorporates in its design. CMP 14 believes that all of these qualities, including conductive armor, are required.
Further, CMP-14 does not accept the substantiation that Zone 1 has a lower level of risk than Division 1. There are locations within Division 1 which have identical risk as that associated with Zone 1 applications.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-99 Log #3442 NEC-P14 **Final Action: Reject**
(505-15(B)(1)(c))

Submitter: Heinz Bockle, R. Stahl Inc.

Recommendation:

Add a new part (c). In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, and where the cable is not subject to physical damage, Type TC-HL cable, listed for use in Class I, Zone 1 locations, with a gas/vaportight overall jacket of suitable polymeric material, separate grounding conductors in accordance with 250.122, and provided with termination fittings listed for the application shall be permitted between apparatus utilizing the increased safety type of protection technique "e) in location, as well as between apparatus utilizing the increased safety type of protection technique "e" in Class I, Zone 1 location and general purpose apparatus within the unclassified location. Cables which leave the Class I, Zone 1 location shall be sealed at the increased safety "e" termination point. This cable shall be permitted as open wiring between the cable tray and the utilization equipment in lengths not to exceed 1.8 m (6 ft).

FPN 1: Type TC-HL cable that is listed for use in Class I, Zone 1, locations meets the same crush and impact requirements as Type MC-HL cable.

FPN 2: See 336.10 for restrictions on use of Type TC cable.

Change the existing (c) to (d), (d) to (e), and (e) to (f).

Substantiation:

This wiring method recognizes the important fact of the Zone System that Class I, Zone 1 has a lower level of risk than Class I, Division 1 locations. Also this type of cable is appropriate for connections between enclosures utilizing only the type of protection "e" since increased safety does not contain a source of ignition.

Type TC-HL cable meets the crush and impact requirements of MC-HL cable, and can only be used in industrial establishments where the conditions of maintenance and supervision ensure that only qualified persons service the installation and where the classification of areas, selection of equipment and wiring methods are under the supervision of a qualified Registered Professional Engineer. This wiring method provides a level of protection consistent with the requirements of Class I, Zone 1 locations and with the limitation to not more than 1.8 m (6 ft) of "open wiring", reduces the risk of physical damage to the cable below that of mechanically equivalent MC-HL.

Panel Meeting Action: Reject

Panel Statement:

The submitter cites only two of the many attributes that Type MC-HL incorporates in its design. CMP 14 believes that all of these qualities, including conductive armor, are required.

Further, CMP-14 does not accept the substantiation that Zone 1 has a lower level of risk than Division 1. There are locations within Division 1 which have identical risk as that associated with Zone 1 applications.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-100 Log #2300 NEC-P14 **Final Action: Accept in Principle**
(505-15(C)(1)(b))

Submitter: H. R. Stewart, HRS Consulting

Recommendation:

Add after MV, (approved for the use. Single conductor type MV cables must be shielded or metallic armored.)

Substantiation:

Problem # 1 - All MV cable constructions are not suitable for use as described "in cable tray systems". To be installed in a cable tray the cable should be listed and approved for the use. This requires a Flame Test and Sunlight Resistance test for general purpose use. The same requirement should apply for installation in a Class I, Zone 2 location.

Problem # 2 - The Type MV cable designation covers single and multiconductor constructions as well as non-shielded and shielded constructions.

The use of a single conductor non-shielded MV cable in a Zone 2 location should not be allowed.

The non-shielded cable will have a surface discharge from the cable surface to any ground plane (such as metal cable tray). This discharge is an ignition source that can cause an explosion in the event of gas or vapors being present.

The proposed wording would require the single conductor MV cable to have a shield or metallic armor to provide a ground plane. This ground plane will eliminate any external electrical discharge thus eliminating the ignition source and precluding any possibility of creating an explosion.

Panel Meeting Action: Accept in Principle

Add the following sentence to 505.15(C)(1)(b):

"Single conductor Type MV cables shall be shielded or metallic-armored. "

Panel Statement:

The Panel action better meets the intent of the submitter.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-101 Log #111 NEC-P14 **Final Action: Accept in Principle**
(505-15(C)(1)c)

Submitter: James M. Daly, General Cable

Recommendation:

Revise 505.15(C)(1)(c) as follows:
(c) Type ITC cable in cable trays, in raceways, supported by messenger wire, ~~where afforded~~ exposed with continuous mechanical protection ~~and run as open wiring,~~ or directly buried where the cable is listed for this use.

Substantiation:

This is one of a series of proposals to provide consistency throughout the code in the use of the terms "exposed", "open wiring", and "open runs" as applied to wiring methods.
"Exposed" is used 306 times throughout the code, "open runs" is used 7 times, and "open wiring" is used 29 times but only 10 of those instances do not refer to "open wiring on insulators".
Exposed is defined in Article 100 as shown below.
"Exposed (as applied to live parts). Capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to parts that are not suitably guarded, isolated or insulated."
"Exposed (as applied to wiring methods). On or attached to the surface or behind panels designed to allow access."
Open wiring on insulators is defined in 398.2 as "An exposed wiring method using cleats, knobs, tubes, and flexible tubing for the protection and support of single insulated conductors run in or on buildings."
"Open runs" is not defined in the code.
This series of proposals will limit the term "open wiring" to open wiring on insulators (Article 398) and have the term "exposed" apply to "open runs" and open wiring not on insulators.
Wire and cable that must be continuously supported and protected will be specifically addressed in the applicable section.

Panel Meeting Action: Accept in Principle

See Proposal 14-102.

Panel Statement:

The action on Proposal 14-102 meets the submitter's intent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-102 Log #2912 NEC-P14 **Final Action: Accept**
(505-15(C)(1)(c))

Submitter: Dorothy Kellogg, American Chemistry Council

Recommendation:

Revise as follows:
(c) Type ITC cable as permitted in 727.4 ~~in cable trays, in r aceways, supported by messenger wire, where afforded mechancial protection and run as open wiring, or directly buried where the cable is listed for this use.~~

Substantiation:

The phrase "open wiring" appears more than 30 times in the current 2002 NEC, but it exists in two distinct formats: a) as the defined term "open wiring on insulators" by Article 398.2, or b) simply as the undefined term "open wiring'. With the defined term, open wiring makes reasonable sense. However when used as the undefined term "open wiring", especially when used to describe a cable that is required to have mechanical integrity and protection takes on an entirely different meaning. Clearly such an installation is not "open". Due to the significant difference in the use of the terms, this and associated other proposals if accepted would replace the undefined use of the term "open wiring" with more appropriate language that addresses the installation in 501.4(B)(1)(5), 501.5 Exception No. 2; 503.3(B); 504.30(A)(1); 505.15(C)(1)(c); 505.16(C)(1) Exception No. 2; 610.12(A); 725.61(D)(4); and 727.4(4)(5)(6), and use the full 398.2 defined term where the text suggests as in 300.16(A); 312.5(B); 314.17(B); 314.17(C). Again, individual proposals have been submitted to address each section mentioned.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-103 Log #2404 NEC-P14 **Final Action: Reject**
(505-16(B)(1))

Submitter: Robert Seitz, Natchiq Technical Services

Recommendation:

Alter the text (1) Seals shall be provided for each conduit entering enclosures have type of protection "d"(for explosion containment) or "e" (to maintain environmental integrity).
Exception No. 1 Where the enclosure having type of protection "d" is marked to indicate that a seal is not required.
Exception No. 2 Conduit and/or conduit fittings shall be allowed to be connected to a type "e"; "de" enclosure or other enclosure with type "e" terminations, provided only tapered threads(no straight thread couplings) are included in the installation.

Substantiation:

This would 1) limit the length of a conduit to less than one length(generally 10 ft) so there would be reduced concern over where the conduit might extend to(ie an explosionproof housing) 2)provide fewer threaded connections than if a seal is permitted(the threads at the seal would be eliminated (A short conduit run between two boxes would only have two threaded connections at the hubs at both ends rather than 4 threads if a seal is installed. 3) Allow the connection of MC-HL cable to a type "e" enclosure in confines areas by allowing the use of Unions, Elbows, reducers and nipples to enter from some direction other than directly into the side(ie from behind) This would add 2 to 4 tapered thread connections within inches of the enclosure and thus not degrade the integrity of the enclosure.4) Allow hubs to be used with reducers so that cable connections can be made to larger openings than required for a given cable connector.
The intent of sealing at a type "e" device is to limit the moisture and dirt that might affect the creepage and clearance of the terminations in a Zone 1 environment. Since the tapered threaded components can be tightened the integrity of the enclosure can be maintained.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided technical justification for the suggested changes. Proposed Exception No. 2 includes a construction that does not exist ("de" enclosure). The new location for the seal has not been adequately addressed.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-104 Log #112 NEC-P14 **Final Action: Accept in Principle**
(505-16(C)(1)b Exception No. 2)

Submitter: James M. Daly, General Cable

Recommendation:

In the 4th line, change "or open wiring" to "or exposed wiring".

Substantiation:

This is one of a series of proposals to provide consistency throughout the code in the use of the terms "exposed", "open wiring", and "open runs" as applied to wiring methods.
"Exposed" is used 306 times throughout the code, "open runs" is used 7 times, and "open wiring" is used 29 times but only 10 of those instances do not refer to "open wiring on insulators".
Exposed is defined in Article 100 as shown below.
"Exposed (as applied to live parts). Capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to parts that are not suitably guarded, isolated or insulated."
"Exposed (as applied to wiring methods). On or attached to the surface or behind panels designed to allow access."
Open wiring on insulators is defined in 398.2 as "An exposed wiring method using cleats, knobs, tubes, and flexible tubing for the protection and support of single insulated conductors run in or on buildings."
"Open runs" is not defined in the code.
This series of proposals will limit the term "open wiring" to open wiring on insulators (Article 398) and have the term "exposed" apply to "open runs" and open wiring not on insulators.
Wire and cable that must be continuously supported and protected will be specifically addressed in the applicable section.

Panel Meeting Action: Accept in Principle

See Proposal 14-105.

Panel Statement:

The action on Proposal 14-105 meets the submitter's intent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-105 Log #2911 NEC-P14 **Final Action: Accept**
(505-16(C)(1)(b) Exception No. 2)

Submitter: Dorothy Kellogg, American Chemistry Council

Recommendation:

Revise as follows:

Exception No. 2: Conduit systems terminating at an unclassified location where a wiring method transition is made to cable tray, cablebus, ventilated busway, Type MI cable, or cable that is not installed in a raceway or cable tray system ~~open wiring~~, shall not be required to be sealed where passing from the Class I, Zone 2 location into the unclassified location. The unclassified location shall be outdoors or, if the conduit system is all in one room, it shall be permitted to be indoors. The conduits shall not terminate at an enclosure containing an ignition source in normal operation.

Substantiation:

The phrase "open wiring" appears more than 30 times in the current 2002 NEC, but it exists in two distinct formats: a) as the defined term "open wiring on insulators" by Article 398.2, or b) simply as the undefined term "open wiring'. With the defined term, open wiring makes reasonable sense. However when used as the undefined term "open wiring", especially when used to describe a cable that is required to have mechanical integrity and protection takes on an entirely different meaning. Clearly such an installation is not "open". Due to the significant difference in the use of the terms, this and associated other proposals if accepted would replace the undefined use of the term "open wiring" with more appropriate language that addresses the installation in 501.4(B)(1)(5), 501.5 Exception No. 2; 503.3(B); 504.30(A)(1); 505.15(C)(1)(c); 505.16(C)(1) Exception No. 2; 610.12(A); 725.61(D)(4); and 727.4(4)(5)(6), and use the full 398.2 defined term where the text suggests as in 300.16(A); 312.5(B); 314.17(B); 314.17(C). Again, individual proposals have been submitted to address each section mentioned.

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-106 Log #1620 NEC-P14 (505-16(D)(3)) **Final Action: Accept in Principle in Part**

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and review the panel action relative to the mandatory language terms used. 505.16(E)(3)(a) uses the term "does not require" and should be replaced by "shall not require". 505.16(E)(3)(b) uses the phrase "requires an additional" and should be replaced by "shall require an additional". This action will be considered by the panel as a public comment.

Submitter: Vic Gournas, ISA-The Instrumentation, Systems and Automation Society

Recommendation:

Add new material to the end of the existing section:
Process connected equipment that is identified and marked "Single Seal" or "Dual Seal" does not require additional process sealing when used within the manufacturer's ratings.
FPN: For construction and testing requirements for single seal and dual seal process connected equipment, refer to ISA 12.27.01, Requirements for Process Sealing Between Electrical Systems and Potentially Flammable or Combustible Process Fluids.

Substantiation:

Existing NEC Section 505.16(D)(3) attempts to address the issue of process sealing of electrical equipment, but places the burden of ensuring reliable sealing primarily on the installer. It is widely recognized in the industry that there are very few reliable means of effecting a process seal in the field. Many installers assume that a standard poured conduit seal is sufficient, but it is clear that these seals are typically not rated or suitable for process conditions, which typically involve aggressive materials at high pressures and temperatures.
The ISA SP12 Committee and ISA SP 12.27 Subcommittee have been working for years to address industry concerns related to the reliability of process seals that form part of electrical equipment. The result of this effort is ISA 12.27.01, Requirements for Process Sealing Between Electrical Systems and Potentially Flammable or Combustible Process Fluids which will be published by January of 2003.
The intent of this proposal is to off-load the responsibility for effecting an adequate process seal from the installer and place it on the manufacturer of the process-connected equipment as long as the equipment has been examined, identified, and marked in accordance with ISA 12.27.01.
ISA NOTE: The material contained in this proposal was reviewed and approved by the ISA SP12 Committee during its 04-October-2002 Meeting.

Panel Meeting Action: Accept in Principle in Part

Revise 505.16(E)(3) to read as follows:
Process Sealing. Electrical connections to equipment such as canned pumps or instruments for flow, pressure, or analysis measurement, shall be provided with sealing to prevent the process fluid from entering the raceway or cable system in accordance with (a) or (b).
(a) Equipment that is listed as and marked "Dual Seal" does not require additional process sealing when used within the manufacturer s ratings.
FPN: For additional information, reference ISA 12.27.01; Requirements for Process Sealing Between Electrical Systems and Flammable or Combustible Process Fluids.
(b) Equipment that depends on compression seals, diaphragms, or tubes to prevent flammable or combustible fluids from entering the electrical raceway or cable system capable of transmitting process fluids, requires an additional approved seal, barrier, or other means to prevent the process fluid from entering the raceway or cable system capable of transmitting process fluids beyond the additional seal, barrier or other means, in the event of primary seal failure. The additional approved seal, barrier, or other means along with the interconnecting enclosure shall meet the temperature and pressure conditions to which they will be subjected upon failure of the primary seal, unless other approved means are provided to accomplish the purpose above. Drains, vents, or other devices shall be provided so that primary seal leakage will be obvious.
FPN: See also the fine print notes to 505.16.

Panel Statement:

A single seal is not considered by CMP 14 to afford an acceptable level of safety.
CMP 14 recognizes that evaluation and verification of unlisted process seals is not easily accomplished in the field. Therefore, "identified" was changed to "listed" for dual seal equipment.
CMP 14 has reorganized the text of this section to better indicate the Panel's intent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

ENGLER: To enhance the clarity of the new requirement, add an additional FPN to new section 505.16(e)(3)(b) as follows:
"FPN No. 1: Field-poured seals such as those described in 501.16(a) through (d) may not provide an adequate level of protection."
Adjust the numbering of the FPN already in the panel action: "FPN No. 2: See also the fine print notes to 505.16."

14-107 Log #1139 NEC-P14 **Final Action: Reject**
(505-17, FPN)

Submitter: Ray C. Mullin, Ray C. Mullin / Rep. Ray C. Mullin Books

Recommendation:

Revise as follows:
FPN: See 505.18 for flexible cords exposed to liquids having a ~~deleterious~~ damaging effect on the conductor insulation.

Substantiation:

The present FPN contains the word "deleterious." This word is totally confusing to the majority of electrical apprentices. Let's make the NEC easier for users by changing certain words to those understood by the majority of users.

Panel Meeting Action: Reject

Panel Statement:

The dictionary definition correctly conveys the intent of the Panel.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-108 Log #2236 NEC-P14 **Final Action: Reject**
(505-25)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
505.25 Grounding and Bonding. Grounding and bonding shall comply with Article 250 and the requirements in 505.25(A) and (B).
(A) Bonding. The locknut-bushing and double-locknut types of contacts shall not be depended on for bonding purposes, but bonding jumpers with proper fittings or other approved means of bonding shall be used. Such means of bonding shall apply to all intervening raceways, fittings, boxes, enclosures, and so forth,, between Class I locations and the point of grounding for service equipment or point of grounding of a separately derived system.
Exception: The specific bonding means shall only be required to the nearest point where the ~~grounded~~ earth circuit conductor and the grounding electrode and connected together on the line side of the building or structure disconnecting means as specified in 250.32(A), (B), and (C), provided the branch-circuit overcurrent protection is located on the load side of the disconnecting means.
FPN: See 250.100 for additional bonding requirements in hazardous (classified) locations.
(B) Types of Equipment Grounding Conductors. Where flexible metal conduit or liquidtight flexible metal conduit is used as permitted in 505.15(C) and is to be relied on to complete a sole equipment grounding path, it shall be installed with internal or external bonding jumpers in parallel with each conduit and complying with 250.102.
Exception: In Class I, Zone 2 locations, the bonding jumper shall be permitted to be deleted where all the following conditions are met:
(a) Listed liquidtight flexible metal conduit 1.8 m (6 ft.) or less in length, with fittings listed for grounding, is used
(b) Overcurrent protection in the circuit is limited to 10 amperes or less.
(c) The load is not a power utilization load.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

Introduction of this new term to replace the word "grounded", as currently used, will confuse the user. CMP 14 notes that this change would have to be made throughout the entire Code simultaneously, not just one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-109 Log #2614 NEC-P14 **Final Action: Accept in Principle in Part**
(506 (New))

Submitter: Al Engler, EGS Electrical Group

Recommendation:

Add a new section, Article 506, to cover the installation of electrical equipment in hazardous (classified) areas that have flammable dust, fibers, or flyings, using the IEC Zone based system.

[Text of Proposal 14-109 recommendation is shown on page 2392]

Substantiation:

A Zone based classification system, Zone 20, Zone 21, and Zone 22, for flammable dusts, fibers and flyings has been introduced in Europe. Area classification standards and methods of protection have been defined for these areas, and standards developed and published by IEC TC 31, which is the IEC committee that develops standards for electrical equipment in hazardous areas. The U.S. participated in the development of these standards, and has recently joined the IEC Ex organization, whose goal is to eventually harmonize hazardous area equipment standards world wide.

As was the case with the Zone classification system for flammable gases; installation rules and regulations need to be in place in the U.S., for companies that wish to utilize equipment in the U.S. employing the Zone based methods of protection. The Zone dust classification and protection methods must be recognized by the National Electrical Code for installation of such equipment to be legal in many jurisdictions. The IEC zone system has been employed in Europe where it has been proven to be a safe system. This proposal will allow the flexibility to use an alternate method that is recognized as safe, and provides the necessary framework to allow the recognition of the Zone dust protection system in the NEC by the addition of Article 506 to cover installation of electrical equipment in Zone 20. 21, and 22.

Panel Meeting Action: Accept in Principle in Part

See panel Proposal 14-108a (Log #CP1409).

Panel Statement:

Panel Proposal 14-108a (Log #CP1409), which proposes the addition of a new Article 506 addressing combustible dusts and ignitable fibers, accomplishes the objectives and intent of this proposal. CMP-14 notes that there are changes between this proposal and panel Proposal 14-108a (Log #CP1409).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

COOK: See my Explanation of Negative on 14-108a.
WELDON: See my Explanation of Negative on Proposal 14-108a.

Comment on Affirmative:

BRIESCH: See my affirmative comment on Proposal 14-108a.

14-108a Log #CP1409 NEC-P14 **Final Action: Accept**
(506 (New))

TCC Action:

The Technical Correlating Committee directs the panel to take actions as follows:
1) Further consideration be given to Mr. Cook's Explanation of Negative Vote.
2) The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee directs the panel to reconsider 506.1 FPN relative to the IEC standard reference since the ISA reference is to the same standard with modifications.
3) Revisit all of the references to IEC standards throughout the article and include only references where the standard has been reviewed and adopted or adapted for the US. If an ISA or UL standard has modified the IEC standard, that reference should be the one included.
4) Reconsider 506.3 since this requirement is already covered by 90.3 and the NEC Style Manual indicates that such references should not be included where already covered by 90.3.
5) Determine if appropriate standards have been adopted or adapted in the US for the application of the techniques outlined in 506.8. If there are no adopted US standards, the panel needs to reconsider whether the technique is acceptable in the NEC.
6) Correct the requirement in 506.9(C)(2)(4) to require enclosure protection appropriate for the US since IEC 60529 is not a standard recognized or adopted in the US and ingress protection is not otherwise defined.
7) Revise the article to eliminate the use of the "&" sign.
8) The panel should consider the necessary action in 500.1 FPN to properly reference Article 506.
This action will be considered by the panel as a public comment.
It was the further action of the Technical Correlating Committee that this proposal be referred to the Electrical Equipment in Chemical Atmospheres Committee for Information.

Submitter: Code-Making Panel 14

Recommendation:

Add a new Article 506 to read as follows:

[Text of Proposal 14-108a recommendation is shown on page 2397]

Substantiation:

CMP 14 is proposing this new Article 506 addressing combustible dusts and ignitable fibers using the Zone concept, as an optional alternative to Article Nos. 500, 502, or 503, as applicable.

Consideration of a new Article is a complex responsibility that requires the closest panel scrutiny to assure the maximum level of safety that is fundamental to the NEC. CMP 14 members invite the closest public scrutiny and study, thereby providing the Panel the benefit of public input.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

COOK: I am not opposed to a new Article 506 for Zone requirements in dust application; however, I have the following concerns about the proposed text:

- 506.1 FPN No. 2 indicates the area classification is based on the IEC area classification system. Was this system developed through a consensus process that includes contractors, electricians, and electrical inspectors? Was this process subject to public review? neither the ISA nor the IEC document is provided for panel or public review.
- No substantiation is provided to treat Class II and Class III materials the same.

506.2 describes protection techniques that no US product standards exists to evaluate these products to. Will the future product standards be developed through a consensus process and include public review?

- Will the enclosures described in 506.2 be different than those currently required in Articles 500-503 and if the proposed enclosures have less restrictive requirements, what substantiation is provided for a decrease in requirements?
- Are the requirements in 506.2 for pressurization the same as those located in NFPA 496? If not, how can the panel determine that an equivalent level of safety is provided? Has the IEC document referenced in the FPN been developed through a consensus process? This IEC document was not provided for panel or public review.
- 506.5 does not differentiate between electrically conductive dust and electrically nonconductive dust as provided in Article 500. No substantiation is provided for the difference.
- 506.5(B)(1)(2) and (3) indicates that dust, fibers or flyings are present for "long periods of time". This text, just like the text in Article 505, is very difficult for inspection agencies to enforce. IAEI was opposed to vague terms when Article 505 was accepted and is opposed again. I understand the difficulty in clearly defining what constitutes a long time. Industry is consistently concerned and constantly complaining about inspection departments having various interpretations of NEC requirements. With vague requirements, that problem will not get better.
- 506.5(B)(1)(3) FPN No. 1 includes references to ISA and IEC documents that are not provided for panel or public review.
- 506.5(B)(2) (1) and (2) includes the use of the terms occasionally and frequently. This text, just like the text in Article 505, is very difficult for inspection agencies to enforce, IAEI was opposed to vague terms when Article 505 was accepted and is opposed again. I understand the difficulty in clearly defining what constitutes a long time. Industry is consistently concerned and constantly complaining about inspection departments having various interpretations of NEC requirements. With vague requirements, that problem will not get better.

• 506.5(B) (2) (5) FPN No. 1 includes references to ISA and IEC documents that are not provided for panel or public review.
• 506.5(B) (3) (1) includes the use of the phrase "short period". This text, just like the text in Article 505, is very difficult for inspection agencies to enforce. IAEI was opposed to vague terms when Article 505 was accepted and is opposed again. I understand the difficulty in clearly defining what constitutes a long time. Industry is consistently concerned and constantly complaining about inspection departments having various interpretations of NEC requirements. With vague requirements, that problem will not get better.
• 506.5(B) (3) (3) FPN No. 1 includes references to ISA and IEC documents that are not provided for panel or public review.
• 506(B) includes provisions for a facility to have both division and Zone systems, dual classification. I expressed concern over this issue in the A95 ROC, Comment 14-6 and have the same concerns about the confusion that it will cause in Class II areas today. I believe some users will understand and manage the dual classification. The proposal will also apply to construction electricians, design engineers, contractors and inspectors that must work in hazardous locations and also in many other types of occupancies. For those people that are not in facilities every day and familiar with all of the details about where the division system stops and where the zone system starts, I believe the confusion can be a very real safety concern.
• The protection techniques included in 506.8 are required to be listed or identified and no product standards exist to evaluate the equipment to. The IEC standard that is included for protection by pressurization is not included for panel and public review.
• 506.9(C) (2) (4) requires an ingress protection level marking and the FPN following this section indicates that information on ingress protection can be found in IEC 60529. This document was not provided for panel and public review.
• 506.15(A) includes wiring methods for Zone 20, which seems to be the dust equivalent of Zone 0 for gases and vapors. For Zone 0 only intrinsically safe wiring is permitted. For Zone 20, the most hazardous areas, power circuits and equipment seem to be permitted, not just intrinsically safe wiring and equipment. No substantiation is provided for allowing power wiring in an area that includes ignitible concentrations for "long periods" of time.
• 506.16(1) requires permanent and effective seals. This phrase will be difficult for enforcement because of the use of vague terms. It will result in users not getting consistent inspections.
• 506.17(3) provides no guidance for installers and inspectors about which manners of connection should be approved and which manners should not.
• 506.17(5) provides no guidance for installers and inspectors about what constitutes a suitable seal where flexible cable enters a box or fitting.
• 506.20(B) and (C) only require equipment to be identified. Equipment in Class I, Zones 1 and 2 is required to be listed. No substantiation is provided for this reduction in requirements for dust applications.
• 502.2 includes restrictions for transformers and capacitors that do not exist in proposed Article 506. Will the safety concerns that generated those restrictions in Article 502 not exist because we call this a Zone project? No substantiation was provided to eliminate these restrictions.
• Article 502 has a number of added restrictions for areas where metal dusts are present. These are not provided in proposed Article 506. No substantiation was provided to eliminate these restrictions.
• Many of the restrictions placed on motors, generators, luminaires, receptacles and attachment plugs in Articles 502 and 503 do not exist in Article 506. No substantiation was provided to eliminate these restrictions.
• 502.15 and 503.15 prohibit live parts from being exposed. Proposed Article 506 does not. No substantiation was provided to eliminate these restrictions.
• 503.13 provides limitations for cranes and hoists operating over Class III locations. Proposed Article 506 does not. No substantiation was provided to eliminate these restrictions.
• 503.14 provides limitations for use of battery charging equipment around Class III locations. Proposed Article 506 does not. No substantiation was provided to eliminate these restrictions.
• I believe proposed Article 506 should be rejected and a task group established to address the many unanswered questions.

WELDON: The original submitter's substantiation was (see 14-109) inadequate and the panel's subsequent substantiation sheds little light.

The adoption of a new section demands the fullest panel review and public input.

Comment on Affirmative:

BRIESCH: While UL supports in principle the introduction of the international Zone area classification system for combustible dust atmospheres, there are several issues related to this proposal that need to be addressed before this system can be implemented with an adequate level of safety. These include but are not limited to the following:

1. The lack of published standard for the defined protection techniques for the electrical equipment.
2. The special hazards presented by metal dusts which are inadequately addressed in the IEC standards.
3. Temperature class (T-Code) based on the dust layer depth is impractical to apply and enforce.
4. The IEC standard for protection technique "tD", protection by enclosure, does not provide an acceptable level of safety for the areas in which it is permitted. It is permitted in areas classified as Zone 20 or 21. These areas are equivalent o Class II, Division 1 as defined in Article 500 yet the protection afforded against the entrance of dust is considerably less than that provided by dust ignitionproof equipment required in these areas by Article 502.

It should also be noted that, while this system in some form may currently be used outside of North America, it is only recently that an effort to standardize the system has been made through the IEC. Indeed, most of the IEC standards are not yet published. It is, therefore, a very immature system with a lack of practical experience in its application. This is in contrast to the Zone system for gases and vapors reflected in Article 505, where there was a great deal of experience in using that system before it was introduced into the NEC in 1996.

O'MEARA:

• As Article 506 is all new material, I recommend the text of the Article is presented in the ROP without revision marks such as deleted text and underscoring.
• In 506.1, "Class III, Division 1 or Division 2" is duplicated in FPN No.1
• In 506.3, recommend add "Article 504" to the exception since intrinsically safe systems are permitted in 506.20.
• In 506.9(D), Exception 2 recommend changing "500.6(D)" to "500.8(B)" in two places.
• Table 506.20(F)(1) is mislabeled as "Table 506(F)(1)".
• In 506.25(A) recommend relocating the word "only" so that the sentence reads "...bonding means shall be required only to the nearest point...".

14-110 Log #3180 NEC-P14 (511-1) **Final Action: Accept in Principle**

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 19 for possible action in Article 555 or for comment back to Code-Making Panel 14. This action will be considered by Code-Making Panel 19 as a Public Comment.

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc. / Rep. Mass Electrical Code Adv. Committee

Recommendation:

511.1. Revise the parenthetical note to read as follows:
"(including, but not limited to, passenger automobiles, buses, trucks, tractors, and motorboats)".

Substantiation:

Adding motorboats to the list is important in order to have appropriate rules in place for motorboat repair facilities. Occasional leakage of gasoline in such areas is a major concern, as is the extensive use of cords in areas with moist concrete floors. The panel rejected this concept in the 1996 cycle (Proposals 14-201 and 202) because of a lack of subject coverage in NFPA 88A and 88B. However, that position still leaves a vacuum in NFPA standards on this topic. The rewritten NFPA 303 does not address this topic unless the facility is part of a marina, and even in this case, Chapter 3 of that standard generally defers to the NEC with respect to hazardous (classified) locations. Acceptance of this proposal will clarify the requirements for these vehicles.

Panel Meeting Action: Accept in Principle

CMP 14 recommends to the NEC Correlating Committee that the following new section 555.22 be recommended to CMP-19 for inclusion into Article 555.

555.22 (new) Repair Facilities - Hazardous (Classified) Locations. Electrical wiring and equipment located at facilities for the repair of marine craft containing flammable or combustible liquids or gases shall comply with Article 511 in addition to the requirements of this article.

Panel Statement:

Marine craft are already included in the term "self-propelled vehicle". CMP 14 has recommended to the NEC Correlating Committee appropriate language for Article 555 and is asking the Correlating Committee to refer this issue to CMP 19.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-111 Log #3354 NEC-P14 **Final Action: Accept in Principle**
(511-3)

TCC Action:

The Technical Correlating Committee directs the panel to add titles to 511.3(A)(2), (A)(6) and (B)(1). This action will be considered by the panel as a public comment.

In addition, the Technical Correlating Committee directs that this Proposal be referred to the NFPA Committee on Automotive and Marine Service Stations and the Techical Committee on Garages and Parking Structures for comment.

Submitter: Donald Cook, Shelby County Building Inspections

Recommendation:

Revise text to read as follows:

Article 511 Commercial Garages, Repair and Storage.

FPN: Rules that are followed by a reference in brackets contain text that has been extracted from NFPA ~~88B-1997~~ 30A-2000, Code for Motor Fuel Dispensing Facilities and Repair Garages ~~Standard for Repair Garages~~. Only editorial changes were made to the extracted text to make it consistent with this Code.

511.3 Classifications of Locations.

(A) Unclassified Locations.

(1) Parking and Repair Garages. Parking garages used for parking or storage and areas within repair garages where no repair work is done except exchange of parts and routine maintenance requiring no use of electrical equipment, open flame, welding, or the use of volatile flammable liquids are not classified.

FPN ~~No. 1~~: For further information, see NFPA 88A-2002, Standard for Parking Structures, and NFPA 30A-2000, Code for Motor Fuel Dispensing Facilities and Repair Garages.

(2) The storage, handling, or dispensing into motor vehicles of alcohol-based windshield washer fluid in areas used for the service and repair operations of the vehicles shall not cause such areas to be classified as hazardous (classified) locations.

FPN: For further information, see 8.3.5 of NFPA 30A-2002, Code for Motor Fuel Dispensing Facilities and Repair Garages.

(3) Areas Adjacent to Defined Locations or with Positive-Pressure Ventilation. Areas adjacent to defined locations in which flammable vapors are not likely to be released, such as stock rooms, switchboard rooms, and other similar locations, shall not be classified where mechanically or naturally ventilated at a rate of four or more air changes per hour or where effectively cut off by walls or partitions.

(4) Adjacent Areas by Special Permission. Adjacent areas that by reason of ventilation, air pressure differentials, or physical spacing are such that, in the opinion of the authority enforcing this Code, no ignition hazard exists, shall be unclassified.

(5) Lubrication or Service Room where Class I liquids are, or are not, transferred:

(a) Up to a Level of 450 mm (18 in.) Above the Floor. For each floor, the entire area up to a level of 450 mm (18 in.) above the floor shall be considered unclassified where ~~the enforcing agency determines that~~ there is mechanical or natural ventilation providing a minimum of four air changes per hour or one cubic foot per minute of exchanged air for each square foot of floor area. Ventilation shall provide for air exchange across the entire floor area within 0.3 m (12 in.) of the floor.

(b) Pits in Lubrication or Service Room where Class I liquids are not transferred. Any pit, below grade work area, or subfloor work area that is provided with exhaust ventilation at a rate of not less than 0.3 $m^3/min/m^2$ (1 cfm/ft^2) of floor area at all times that the building is occupied or when vehicles are parked in or over this area and where exhaust air is taken from a point within 300 mm (12 in.) of the floor of the pit, below grade work area, or subfloor work area is unclassified. [NFPA 30A-2000, 7.4.5.4 & Table 8.3.1]

(c) Within 457 mm (18 in.) of the Ceiling. Where compressed natural gas (CNG) vehicles are repaired or stored in Lubrication or Service Room where Class I liquids are transferred or in major repair garages, the area within 457 mm (18 in.) of the ceiling shall be considered unclassified where ventilation of at least four air changes per hour is provided. [NFPA 30A-2000, 8.2.1 Exception]

(B) Classified Locations. Classification shall be in accordance with Article 500.

(1) Areas in which flammable fuel is dispensed into vehicle fuel tanks shall also conform to Article 514.

(2) Lubrication or Service Room where Class I liquids are not transferred. The following spaces that are not designed in accordance with 511.3(A)(5) shall be classified as Class I, Division 2:

(a) Up to a Level of 450 mm (18 in.) Above the Floor. For each floor, the entire area up to a level of 450 mm (18 in.) above the floor.

~~Exception: Where the enforcing agency determines that there is mechanical ventilation providing a minimum of four air changes per hour or one cubic foot per minute of exchanged air for each square foot of floor area. Ventilation shall provide for air exchange across the entire floor area within 0.3 m (12 in.) of the floor.~~

(b) Entire area within any unventilated pit, below grade work area, or subfloor area.

(c) Within 457 mm (18 in.) of the Ceiling. In major repair garages where compressed natural gas (CNG) vehicles are repaired or stored, the area within 457 mm (18 in.) of the ceiling, ~~except where ventilation of at least four air changes per hour is provided. [NFPA 88B, 3.1.1.1]~~ [NFPA 30A-2000, 8.2.1]

(3) Lubrication or Service Room where Class I liquids are transferred. The following spaces that are not designed in accordance with 511.3(A)(4) shall be classified as noted:

(a) Up to a Level of 450 mm (18 in.) Above the Floor. For each floor, the entire area up to a level of 450 mm (18 in.) above the floor shall be considered to be a Class I, Division 2 location.

(b) Any Unventilated Pit or Depression Below Floor Level. Any unventilated pit or depression below floor level shall be considered to be a Class I, Division 1 location and shall extend up to said floor level.

(c) Any Ventilated Pit or Depression Below Floor Level. Any ventilated pit or depression in which six air changes per hour are exhausted at the floor level of the pit shall be permitted ~~to be judged by the enforcing agency~~ to be a Class I, Division 2 location.

Substantiation:

Proposal reorganizes existing requirements found in 511.3 and Table 514.3(B)(1). Reorganization places all unclassified spaces in commercial repair and storage garages into subsection (A) of 511.3 and all classified spaces into subsection (B).

Some of the unclassified spaces are currently found in subsection (A), while others are found as exceptions to the classified spaces, and others are in Article 514. Some of the classified spaces of commercial garages are currently found in subsection (B), while others are in Article 514.

This proposal is intended to correlate the existing extracted electrical requirements (in accordance with the NEC regulations for extraction of requirements from other NFPA Standards/Codes) for repair garages from the previous, outdated, editions of NFPA 88A, 88B, and 30A with the most recent and revised editions of NFPA 88A and NFPA 30A. Please note that NFPA 88B requirements have been

incorporated into the latest edition of NFPA 30A, and NFPA 88B was withdrawn as a Standard at the 2002 NFPA Fall Meeting in Atlanta.

See Report on Jiffy Lube "Prototype" Ventilation Requirements, provided by Robert M. Young & Associates based on January 1989 testing. This report will support the changes to ventilation requirements.

See companion proposal to delete "Lubrication or Service Room - With and Without Dispensing" requirements from Table 514.3(B)(1) dealing with Lubrication or Service Rooms.

Panel Meeting Action: Accept in Principle

Revise Section 511.3 to read as follows:

[Text of Proposal 14-111 panel action is shown on page 2402]

Panel Statement:

CMP 14 agrees with the submitter but has made editorial changes for clarity. CMP 14 has also added text to address lighter-than-air gases and the unique properties of liquefied natural gas (LNG).

The action on this proposal will be referred to the Technical Committee on Automotive and Marine Service Stations for their review.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

GOODMAN: Throughout the section, several of the classification criteria are based on ventilation and specific minimum ventilation rates. In those cases where ventilation is used to limit or reduce the classification of a location, some means to alarm or provide indication upon loss of ventilation should be required. As much of the information and requirements of this section are to correlate with NFPA 30A, it is suggested that this comment also be considered by that working group.

14-112 Log #1409 NEC-P14 **Final Action: Accept in Principle**

(511-3(A))

Submitter: Technical Committee on Automotive and Marine Service Stations

Recommendation:

511.3 Classifications of Locations.

(A) Unclassified Locations.

(1) Parking garages used for parking or storage and areas within repair garages where no repair work is done except exchange of parts and routine maintenance requiring no use of electrical equipment, open flame, welding, or the use of volatile flammable liquids are not classified.

FPN ~~No. 1~~: For further information, see NFPA 88A ~~1998~~ 2002, Standard for Parking Structures and ~~NFPA 88B-1997, Standard for Repair Garages~~. NFPA 30A-2000, Code for Motor Fuel Dispensing Facilities and Repair Garages.

(2) The storage, handling, or dispensing into motor vehicles of alcohol-based windshield washer fluid in areas used for the service and repair operations of the vehicles shall not cause such areas to be classified as hazardous (classified) locations.

FPN ~~No. 2~~: For further information, see ~~7~~ 8.3.5 of NFPA 30A-2000, Code for Motor Fuel Dispensing Facilities and Repair Garages.

Substantiation:

Editorial numbered as (1) & (2), the existing requirements under 511.3(A) since they covered different areas/issues.

The Fine Print Notes (FPN) are placed under the appropriate requirements that relate to each FPN.

Article 511.3(A) (1) is clarified that certain areas in repair garages, such as lubritoriums, are not classified. The FPN under (A)(1) is being revised since NFPA 30A now covers repair garage requirements and NFPA 88B has been withdrawn as a standard by the NFPA 30A Committee (which was responsible for NFPA 88B).

The FPN under (2) is revised editorially since NFPA 30A Section 8.3.5 is the correct reference for this FPN.

Panel Meeting Action: Accept in Principle

See Proposal 14-111.

Panel Statement:

The action on Proposal 14-111 meets the submitter's intent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-113 Log #1410 NEC-P14 (511-3(B)) **Final Action: Accept in Principle**

Submitter: Technical Committee on Automotive and Marine Service Stations

Recommendation:

511.3 Classifications of Locations.

(B) Classified Locations. Classification shall be in accordance with Article 500. Areas in which flammable fuel is transferred to vehicle fuel tanks shall also conform to Article 514.

(1) Up to a Level of 450 mm (18 in.) Above the Floor. For each floor, the entire area up to a level of 450 mm (18 in.) above the floor shall be considered to be a Class I, Division 2 location.

Exception No. 1: The floor level shall be permitted to be unclassified ~~W~~where the enforcing agency determines that there is mechanical ventilation providing a minimum of four air changes per hour or one cubic foot per minute of exchanged air for each square foot of floor area. Ventilation shall provide for air exchange across the entire floor area within 0.3 m (12 in.) of the floor.

Exception No. 2: The floor level of lubrication and service rooms without dispensing shall be permitted to be unclassified where both of the following conditions apply:

a. No repair work is done except exchange of parts and routine maintenance requiring no use of electrical equipment, open flame, welding, or the use of volatile flammable liquids, and

b. The facility has a ventilated pit, belowgrade work area, or subfloor work area in accordance with Table 514.3(B)(1).

Substantiation:

Code proposal is submitted for correlation with NFPA 30A requirements.

The NFPA 30A Committee has reviewed the electrical requirements in the 2000 edition of NFPA 30A, Chapter 8, as they relate to the NEC Sections 511.3(B)(1) vs. 511.3(B)(3) Exception #2.

The editorial clarification to Exception #1 is for conformity with the Style Manual to create a complete sentence.

Under new Exception #2, this correlation issue appears to the NFPA 30A Committee to have been an apparent oversight with respect to the addition of Exception #2 to Section 511.3(B)(3) in the 1993 NEC without providing a companion exception to Section 511.3(B)(1).

The NFPA 30A Committee notes that under Article 511.3(B)(3) Exception #2 if the ventilated pit, belowgrade work area, or subfloor work area is designed in accordance with Table 514.3(B)(1), the ventilated lower level work area is unclassified. However, under the existing Section 511.3(B)(1) wording, within repair garages where no repair work is done except exchange of parts and routine maintenance requiring no use of electrical equipment, open flame, welding, or the use of volatile flammable liquids, the floor level above (up to 18") such ventilated, unclassified lower level work areas would be required to be Class I, Division 2.

The Class I, Division 2 classification of the floor level, within a repair garage that does only minor maintenance work as noted above, does not correlate with the unclassified work area below since the exhaust ventilation for the unclassified lower area will be safely removing any gasoline vapors from the floor level above through the exhaust ventilation that is located in the lower level.

Panel Meeting Action: Accept in Principle

See Proposal 14-111.

Panel Statement:

The action on Proposal 14-111 meets the submitter's intent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-114 Log #132 NEC-P14 (511-3(B)(1) Exception) **Final Action: Reject**

Submitter: William Winglar Grandville, MI

Recommendation:

Add new text to read as follows:

Exception: Where the enforcing agency determines that there is continuous mechanical ventilation...

Substantiation:

It is my opinion that there are possibilities of an accumulation of explosive gases accumulating during non-working hours that could be ignited by a spark such as a motor starting automatically.

Panel Meeting Action: Reject

Panel Statement:

The submitter provides no substantiation that there is a problem with the requirement as currently written.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-115 Log #1411 NEC-P14 **Final Action: Accept in Principle in Part**
(511-4)

Submitter: Technical Committee on Automotive and Marine Service Stations

Recommendation:

511.4 Wiring and Equipment in Class I Locations.
(A) Wiring Located in Class I Locations. Within Class I locations as classified in 511.3, wiring shall conform to applicable provisions of Article 501.
(1) Raceways. Raceways embedded in a masonry wall or buried beneath a floor shall be ~~considered to be within the Class I location above the floor if any connections or extensions lead into or through such areas~~ sealed with a listed seal where they emerge from below grade or from being embedded in a masonry wall. Refer to Table 300.5 and 501.5(A)(4) Exception #2.

Substantiation:

Code proposal is submitted for correlation with NFPA 30A requirements.
The NFPA 30A Committee has reviewed the electrical requirements in the 2000 edition of NFPA 30A, Chapter 8, as they relate to the NEC Sections 511.4 and 514.8 (See separate code proposal submission).
The NFPA 30A Committee notes that the space below the surface of a Class I, Division 1 or 2 location does not meet the literal definition in NEC Section 500.5(B) (1) as a Class I, Division 1, unless a pocket or void is left in the earth to collect air. However, the revised text will still require any electrical wiring that is installed in the ground under Class I, Division 1 or 2 locations to be sealed at the point of emergence above grade. Therefore, the end result is the same requirement for raceways under Section 511.4, but without the technically incorrect electrical classification of the earth as a Class I, Division 1 or 2 location.

Panel Meeting Action: Accept in Principle in Part

Delete 511.4(A)(1) and its exception. Also, delete in 501.4(A)(1)(a) exception the phrase "511.4 Exception."

Panel Statement:

The Panel believes that simply deleting the paragraph better clarifies its intent to apply the existing conditions of 501.4 and 501.5.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-116 Log #1278 NEC-P14 **Final Action: Accept in Principle**
(511-4(A)(1))

Submitter: David H. Kendall, Carlon, Lamson & Sessions

Recommendation:

Add new text to read as follows:
511.4 Wiring and Equipment in Class I Locations.
(1) Wiring Located in Class I Locations. Within Class I locations as classified in 511.3, wiring shall conform to applicable provisions of Article 501.
(1) Raceways. Raceways embedded in a masonry wall or buried beneath a floor shall be considered to be within the Class I location above the floor if any connections or extensions lead into or through such areas.
Exception No. 1: Rigid nonmetallic conduit that complies with Article 352 shall be permitted where buried under not less than 600 mm (24 in.) of cover. Where rigid nonmetallic conduit is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (24 in.) of the underground run to emergence or to the point of connection to the aboveground raceway and an equipment grounding conductor shall be included to provide electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.
Exception No. 2: Metal conduit that contains no unions, couplings, boxes, or fittings and passes completely through the Class I location above the floor with no fittings less than 12 inches from the Class I boundary shall not be required to be sealed if the conduit terminates within the unclassified location.

Substantiation:

The addition of this new exception will help clarify the application of this common application and help correlate with 501.5(B)(2), Exception No. 1 if the raceway passes unbroken all the way through the classified area and terminates within the unclassified area. This is common question that has been asked by many AHJ's where dealing with commercial repair garages.

Panel Meeting Action: Accept in Principle

See Proposal 14-115.

Panel Statement:

The action on Proposal 14-115 meets the submitter's intent. See action on Proposal 14-115.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-117 Log #2691 NEC-P14 **Final Action: Reject**
(511-4(A)(1))

Submitter: Phil Simmons, Simmons Electrical Services / Rep. National Armored Cable Manufacturers Assn.

Recommendation:

Revise existing Section 511.4(A)(1) and add a new exception as follows:
(1) Raceways. Raceways embedded in a masonry wall or buried beneath a floor shall be considered to be within the Class I location above the floor if any connections or extensions lead into or through such areas.
Exception No. 1: Rigid nonmetallic conduit that complies with Article 352 shall be permitted where buried under not less than 600 mm (24 in.) of cover. Where rigid nonmetallic conduit is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (24 in.) of the underground run to emergence or to the point of connection to the aboveground raceway and an equipment grounding conductor shall be included to provide electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.
Exception No. 2: Where the cable does not penetrate the floor, listed Type MC cable having a continuous impervious nonmetallic covering shall be permitted to be installed beneath a floor.

Substantiation:

Type MC cables that are listed and have a continuous impervious nonmetallic covering are suitable for direct burial in the earth and for encasement in concrete. As can be seen, the area below the floor is not classified as a Class I, Division 1 or 2 area. As a result, the Type MC cable in the proposal is suitable for installation in this area.

Panel Meeting Action: Reject

Panel Statement:

This section addresses only raceways, while the proposed exception applies to cables. An exception cannot apply to a subject that is not addressed in the main text.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

COOKS: I agree with the panel statement that an exception relating to use of cable does not fit under a section covering raceways. However, the changes made in Proposal 14-115 will allow the installation that the submitter is proposing. Based on that action, I believe this proposal should be accepted in principle.

14-118 Log #2708 NEC-P14 **Final Action: Accept in Principle in Part**
(511-4(A)(1))

Submitter: Donny Cook, Shelby County Development Services

Recommendation:

Revise to read as follows:
(1) Raceways. Raceways embedded in a masonary wall or buried beneath a floor shall be considered to be within the Class 1 location above the floor if any connections or extensions lead into or through such areas.
Exception: Rigid nonmetallic conduit that complies with Article 352 shall be permitted where buried under not less than 600 mm (24 in.) of cover. Where rigid nonmetallic conduit is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (24 in.) of the underground run to emergence or to the point of connection to the aboveground raceway and an equipment grounding conductor shall be included to provide electrical continuity of the raceway system and or grounding of noncurrent metal parts.

Substantiation:

Delete text in 511.4(A)(1). I do not believe the oxygen content of a raceway buried beneath the floor of a garage would permit an ignitable concentration of gas to occur, therefore, any wiring requirements for this space should be located in section 8 to match the requirements in Article 513. I also believe consistent wording in all of the special occupancies would be useful to the usability of the code. The current exception is not needed, since (A) already refers back to Article 501 which permits the use of rigid nonmetallic conduit underground. A companion proposal for a new 511.8 will address sealing all raceways embedded, installed under slab, or underground. If the raceway is sealed, minimizing the passage of gas from underground conduits to ignition sources, the safety issues will be addressed.

Panel Meeting Action: Accept in Principle in Part

Panel Statement:

The action on Proposal 14-115 meets the submitter's intent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-119 Log #2800 NEC-P14 **Final Action: Accept in Principle**
(511-4(A)(1) Exceptions)

Submitter: Henry A. Jenkins, Wake County

Recommendation:

In Section 511.4(A)(1) change "Exception" to "Exception no. 1" Add a second Exception.
Exception No. 1: No change
Exception No. 2: Metal conduit that contains no unions, couplings, boxes, or fittings and passes completely through the class 1 location above the floor with no fittings less than 12 in. from the class 1 boundary shall not be required to be sealed if the conduit terminates within the unclassified location.

Substantiation:

The addition of this new Exception will help clarify the application of this common application and help correlate with 501.5(B)(2), Exception No. 1 if the raceway passes unbroken all the way through the classified area and terminates within the unclassified area. This is a common question that has been asked by many Authorities Having Jurisdiction where dealing with commercial garages.

Panel Meeting Action: Accept in Principle

See Proposal 14-115.

Panel Statement:

The action on Proposal 14-115 meets the submitter's intent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-120 Log #1944 NEC-P14 **Final Action: Reject**
(511-4(A)(1) Exception)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
Exception: Rigid nonmetallic conduit that complies with Article 352 shall be permitted where buried under not less than 600 mm (24 in.) of cover. Where rigid nonmetallic conduit is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (24 in.) of the underground run to emergence or to the point of connection to the aboveground raceway and an equipment ~~grounding~~ bonding conductor shall be included to provide electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Introduction of the new term to substitute for that currently used will confuse the user. CMP 14 notes that this change would have to be effected throughout the entire Code, simultaneously, not one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

O'MEARA: See my Explanation of Negative on Proposal 14-1.

14-121 Log #2506 NEC-P14 **Final Action: Reject**
(511-7(A)(1))

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and clarify the panel statement considering that manufactured wiring systems are permitted and Article 604 permits AC cable to be used in the manufactured wiring system. This action will be considered by the panel as a public comment.

Submitter: George W. Flach, Nat'l Armored Cable Mfrs' Assn. (NACMA)

Recommendation:

Revise to include Type AC cables as follows:
(A) Wiring in Spaces Above Class I Locations.
(1) Fixed Wiring Above Class I Locations. All fixed wiring above Class I locations shall be in metal raceways, rigid nonmetallic conduit, electrical nonmetallic tubing, flexible metal conduit, liquidtight flexible metal conduit, or liquidtight flexible nonmetallic conduit or shall be Type MC, AC, MI, manufactured wiring systems, or PLTC cable in accordance with Article 725, or Type TC cable or Type ITC cable in accordance with Article 727. Cellular metal floor raceways or cellular concrete floor raceways shall be permitted to be used only for supplying ceiling outlets or extensions to the area below the floor, but such raceways shall have no connections leading into or through any Class I location above the floor.

Substantiation:

Type AC cable should be added as an approved wiring method because it is mechanically and electrically equivalent to several of the wiring methods currently permitted by 511.7(A)(1).

Panel Meeting Action: Reject

Panel Statement:

The submitter has provided no evidence that Type AC cable is equivalent to the other cable types allowed in this section.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-122 Log #1412 NEC-P14 (511-8) **Final Action: Accept in Principle**

TCC Action:

The Technical Correlating Committee directs the panel to reconsider this proposal and address the reference to Article 352. 4.1.1 of the NEC Style Manual does not permit references to entire articles when those references are already covered by 90.3. In addition, the Technical Correlating Committee directs the Panel to review the SI dimension of 3.05 meters and determine whether a hard or soft conversion be used in accordance with 90.9 and the NEC Style Manual. This action will be considered by the Panel as a Public Comment.

Submitter: Technical Committee on Automotive and Marine Service Stations

Recommendation:

514.8 Underground Wiring. Underground wiring shall be installed in threaded rigid metal conduit or threaded steel intermediate metal conduit. Any portion of electrical wiring ~~or equipment~~ that is below the surface of a Class I, Division 1, or a Class I, Division 2 location [as classified in Table 514.3(B)(1) and Table 514.3(B)(2)] shall ~~be considered to be in a Class I, Division 1, location that shall extend at least to the point of emergence above grade~~ sealed in accordance with 501.5(A). Refer to Table 300.

Exception No. 1: Type MI cable shall be permitted where it is installed in accordance with Article 332.

Exception No. 2: Rigid nonmetallic conduit complying with Article 352 shall be permitted where buried under not less than 600 mm (2 ft) of cover. Where rigid nonmetallic conduit is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (2 ft) of the underground run to emergence or to the point of connection to the aboveground raceway, and an equipment grounding conductor shall be included to provide electrical continuity of the raceway system and for grounding of non-current-carrying metal parts.

Substantiation:

Code proposal is submitted for correlation with NFPA 30A requirements.

The NFPA 30A Committee has reviewed the electrical requirements in the 2000 edition of NFPA 30A, Chapter 8, as they relate to the NEC Section 514.8 and 511.4 (See separate code proposal submission).

The deletion to the reference to equipment is because this section is for underground wiring, not equipment. Electrical classification of equipment is already covered under Table 514(3) (B) (1) (which is the extracted NFPA 30A Table 8.3.1).

The NFPA 30A Committee notes that the space below the surface of a Class I, Division 1 or 2 location does not meet the literal definition in NEC Section 500.5(B) (1) as a Class I, Division 1, unless a pocket or void is left in the earth to collect air. However, the revised text will still require any electrical wiring that is installed in the ground under Class I, Division 1 or 2 locations to be sealed in accordance with 501.5(A). Therefore, the end result is the same requirement for underground electrical wiring under Section 514.8, but without the technically incorrect electrical classification of the earth as a Class I, Division 1 or 2 location.

Panel Meeting Action: Accept in Principle

514.8 Underground Wiring. Underground wiring shall be installed in threaded rigid metal conduit or threaded steel intermediate metal conduit. Any portion of electrical wiring ~~or equipment~~ that is below the surface of a Class I, Division 1, or a Class I, Division 2 location [as classified in Table 514.3(B)(1) and Table 514.3(B)(2)] shall be ~~considered to be in a Class I, Division 1, location that shall extend at least to the point of emergence above grade~~ sealed within 3.05 m (10 ft.) of the point of emergence above grade. Except for listed explosionproof reducers at the conduit seal, there shall be no union, coupling, box, or fitting between the conduit seal and the point of emergence above grade. Refer to Table 300.5.

Exception No. 1: Type MI cable shall be permitted where it is installed in accordance with Article 332.

Exception No. 2: Rigid nonmetallic conduit complying with Article 352 shall be permitted where buried under not less than 600 mm (2 ft) of cover. Where rigid nonmetallic conduit is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (2 ft) of the underground run to emergence or to the point of connection to the aboveground raceway, and an equipment grounding conductor shall be included to provide electrical continuity of the raceway system and for grounding of non-current-carrying metal parts.

Panel Statement:

Additional text has been added to clarify where the seal is to be installed.

CMP 14 notes that this proposal is to 514.8, not 511.8.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-123 Log #2709 NEC-P14 (511-8) **Final Action: Accept in Principle**

Submitter: Donny Cook, Shelby County Development Services

Recommendation:

511.8. Wiring and Equipment Embedded, Under Slab, or Underground.
All wiring installed in or under Class 1 locations shall be sealed after the conduit leaves the ground or slab.
There shall be no union, coupling box, or fitting, other than listed explosionproof reducers at the sealing fitting, in the conduit between the sealing fitting and the point at which the conduit leaves the ground or slab. Where such wiring is located in vaults, pits, or ducts, adequate drainage shall be provided.

Substantiation:

The proposal addresses the need to seal all wiring that passes under Class 1 locations when it emerges from below grade. See companion proposal for 511.4. The requirement would not depend on the termination location of the raceway to require that the raceway be sealed.

Panel Meeting Action: Accept in Principle

See Proposal 14-115.

Panel Statement:

The action on Proposal 14-115 meets the submitter's intent.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-124 Log #2237 NEC-P14 (511-16) **Final Action: Reject**

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
511.16 ~~Grounded~~ Earthed and Grounding Requirements.
(A) General Grounding Requirements. All metal raceways, the metal armor or metallic sheath on cables, and all non-current-carrying metal parts of fixed or portable electrical equipment, regardless of voltage, shall be grounded as provided in Article 250.
(B) Supplying circuits with ~~Grounded~~ Earth and Grounding Conductors in Class I Locations. Grounding in Class I locations shall comply with 501.16.
(1) Circuits Supplying Portable Equipment or Pendants. Where a circuit supplies portables or pendants and includes a ~~grounded~~ earth conductor as provided in Article 200, receptacles, attachment plugs, connectors, and similar devices shall be of the grounding type, and the ~~grounded~~ earth conductor of the flexible cord shall be connected to the screw shell of any lampholder or to the ~~grounded~~ earth terminal of any utilization equipment supplied.
(2) Approved Means. Approved means shall be provided for maintaining continuity of the grounding conductor between the fixed wiring system and the non-current-carrying metal portions of pendant luminaires (fixtures), portable lamps, and portable utilization equipment.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

Introduction of this new term to replace the word "grounded", as currently used, will confuse the user. CMP 14 notes that this change would have to be made throughout the entire Code simultaneously, not just one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-125 Log #697 NEC-P14 **Final Action: Reject**
(511-16(A))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
General Grounding Requirements. All metal raceways, the metal armor or metallic sheath on cables, metal auxiliary gutters, metallic cable trays, and all exposed noncurrent-carrying metal parts of fixed or portable electric equipment, regardless of voltage, shall be grounded. ~~as provided in Article 250.~~
Exception: Listed equipment protected by a system of double insulation or its equivalent, shall not be required to be grounded, where not located in a hazardous (classified) location.
Or alternatively revise: All metal raceways, the metal armor or metallic sheath on cables, metal auxiliary gutters, metallic cable trays, and all exposed noncurrent-carrying metal parts of fixed or portable electric equipment, regardless of voltage, shall be grounded in accordance with applicable provisions of Part VII of Article 250.

Substantiation:

This section is not clear. Is it intended to apply whether or not metal parts are exposed or unlikely to be energized? If it is intended to require grounding without exception reference to the whole of Article 250 is superfluous was that article is already applicable. "As provided in Article 250" can be interpreted as including applicable provisions which may exempt grounding or method and manner of grounding. The Style Manual indicated references should not be made to entire articles.
If the whole of Article 250 is intended to apply, 250.112(F)(I) allows for nongrounding of pendant lampholders not over 150 volts to ground, and certain circuits and equipment, which conflicts with the "regardless of voltage".

Panel Meeting Action: Reject

Panel Statement:

The proposed wording does not add clarity to the text.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-126 Log #796 NEC-P14 **Final Action: Accept**
(513-7(A) Exception)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Exception: Wiring in unclassified locations as ~~classified~~ described in 513.3(D) shall be ~~of a~~ permitted to be any suitable type wiring method recognized in Chapter 3.

Substantiation:

Edit. A location cannot be both classified and unclassified; 513.3(D) describes, but does not classify a location. The Exception should indicate wiring methods other than the raceways and cables of (A) since they are already recognized wiring methods. In addition, reference to only types of wiring does not cover the permitted or not permitted uses. All types may not be suitable.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-127 Log #1947 NEC-P14 **Final Action: Reject**
(513-7(B))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(B) Pendants. For pendants, flexible cord suitable for the type of service and identified for hard usage or extra-hard usage shall be used. Each such cord shall include a separate equipment ~~grounding~~ bonding conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Introduction of the new term to substitute for that currently used will confuse the user. CMP 14 notes that this change would have to be effected throughout the entire Code, simultaneously, not one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

O'MEARA: See my Explanation of Negative on Proposal 14-1.

14-127a Log #CP1410 NEC-P14 **Final Action: Accept**
(513-8 and 513.9)

Submitter: Code-Making Panel 14

Recommendation:

Revise 513.8 and 513.9 to read as follows:
513.8 Underground Wiring
513.8.1 Wiring and Equipment Embedded, Under Slab, or Under Ground. All wiring installed in or under the hangar floor shall comply with the requirements for Class I, Division 1 locations. Where such wiring is located in vaults, pits, or ducts, adequate drainage shall be provided.
513.8.2 Uninterrupted Raceways, Embedded, Under Slab, or Underground. Uninterrupted raceways that are embedded in a hangar floor or buried beneath the hangar floor shall be considered to be within the Class I location above the floor, regardless of the point at which the raceway descends below or rises above the floor.
513.9 Sealing. Seals shall be provided in accordance with 501.15 or 505.16, as applicable. Sealing requirements specified shall apply to horizontal as well as to vertical boundaries of the defined Class I locations.

Substantiation:

The proposed text better explains the requirements.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

COOK: Based on panel actions in Articles 511 and 514, it seems that CMP-14 has determined that the lack of oxygen in the dirt or a concrete slab indicates that a classified location does not exist in these spaces. I do not see the difference in the dirt or slab under an aircraft hanger. No matter how much fuel that may collect in these spaces, the lack of oxygen will not allow an ignitibe concentration to exist.

14-128 Log #3005 NEC-P14 **Final Action: Accept in Principle**
(513-9)

Submitter: Donny Cook, Shelby County Development Services

Recommendation:

Revise as follows:
513.9 Sealing. Seals shall be provided in accordance with 501.5 and 505.16. Sealing requirements specified shall apply to horizontal as well as to vertical boundaries of the defined Class I locations. Raceways embedded in a concrete floor or buried beneath a floor shall be sealed with a listed seal where they emerge from below grade.

Substantiation:

Current text indicates that embedded and or nderground installatins are in Class I locations. A Class I location would include an ignitible concentration of gas flammable material and oxygen. I do not believe the oxygen content in this application supports that statement. The proposed text will require that wiring methods be sealed. This will minimize the passage of flammable material that might enter the wiring method underground from communicating to an ignition source. This should be done whether the underground space includes an ignitible concentration or not.

Panel Meeting Action: Accept in Principle

See action on panel Proposal 14-127a (Log #CP1410).

Panel Statement:

The changes proposed by panel Proposal 14-127a (Log #CP1410) address the submitter's concerns.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

COOK: See my Explanation of Negative on Proposal 14-127a. That panel action does not address the submitter's concern.

14-129 Log #1945 NEC-P14 **Final Action: Reject**
(513-10(C)(3))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(3) Cords. Flexible cords for aircraft energizers and ground support equipment shall be identified for the type of service and extra-hard usage and shall include an equipment ~~-grounding~~ bonding conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Introduction of the new term to substitute for that currently used will confuse the user. CMP-14 notes that this change would have to be effected throughout the entire Code, simultaneously, not one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

O'MEARA: See my Explanation of Negative on Proposal 14-1.

14-130 Log #1946 NEC-P14 **Final Action: Reject**
(513-10(D)(2))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(2) Cords and Connectors. Flexible cords for mobile equipment shall be suitable for the type of service and identified for extra-hard usage and shall include an equipment ~~-grounding~~ bonding conductor. Attachment plugs and receptacles shall be identified for the location in which they are installed and shall provide for connection of the equipment ~~-grounding~~ bonding conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Introduction of the new term to substitute for that currently used will confuse the user. CMP 14 notes that this change would have to be effected throughout the entire Code, simultaneously, not one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

O'MEARA: See my Explanation of Negative on Proposal 14-1.

14-131 Log #1948 NEC-P14 **Final Action: Reject**
(513-10(E))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(E) Portable Equipment.
(1) Portable Lighting Equipment. Portable lighting equipment that is used within a hangar shall be identified for the location in which they are used. For portable lamps, flexible cord suitable for the type of service and identified for extra-hard usage shall be used. Each such cord shall include a separate equipment ~~-grounding~~ bonding conductor.
(2) Portable Utilization Equipment. Portable utilization equipment that is or may be used within a hangar shall be of a type suitable for use in Class I, Division 2 or Zone 2 locations. For portable utilization equipment flexible cord suitable for the type of service and approved for extra-hard usage shall be used. Each such cord shall include a separate equipment ~~-grounding~~ bonding conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Introduction of the new term to substitute for that currently used will confuse the user. CMP 14 notes that this change would have to be effected throughout the entire Code, simultaneously, not one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

O'MEARA: See my Explanation of Negative on Proposal 14-1.

14-132 Log #1862 NEC-P14 **Final Action: Accept in Principle**
(513-12 Exception)

Submitter: Andre R. Cartal, Princeton Borough Building Dept.

Recommendation:

Add new title as follows:
Ground-Fault Circuit-Interrupter Protection for Personnel.
All 125-volt, single phase, 15 and 20 ampere receptacles installed in areas where electrical diagnostic equipment, electrical hand tools, or portable lighting equipment are to be used shall have ground-fault protection for personnel.

Substantiation:

Personnel servicing and maintaining aircraft use the same hand tools and equipment that are used in commercial garages and should be afforded the same level of personnel protection.

Panel Meeting Action: Accept in Principle

Add a new 513.12 to read as follows:
513.12 Ground-Fault Circuit-Interrupter Protection for Personnel. All 125-volt, 50/60 Hz., single phase, 15 and 20 ampere receptacles installed in areas where electrical diagnostic equipment, electrical hand tools, or portable lighting equipment are to be used shall have ground-fault circuit -interrupter protection for personnel.

Panel Statement:

CMP 14 agrees with the concept, but has specified 50/60 Hz. to avoid confusion with 400 Hz. equipment commonly used on aircraft.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-133 Log #2238 NEC-P14 **Final Action: Reject**
(513-16)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
513.16 ~~Grounded~~ Earth and Grounding Requirements.
(A) General Grounding Requirements. All metal raceways, the metal armor or metallic sheath on cables, and all non-current-carrying metal parts of fixed or portable electrical equipment, regardless of voltage, shall be grounded as provided in Article 250. Grounding in Class I locations shall comply with 501.16 for Class I, division 1 and 2 locations and 505.25 for Class I, Zone 0, 1, and 2 locations.
(B) Supplying Circuits with ~~Grounded~~ Earth and Grounding Conductors in Class I Locations.
(1) Circuits Supplying Portable Equipment or Pendants. Where a circuit supplies portables or pendants and includes a ~~grounded~~ earth conductor as provided in Article 200, receptacles, attachment plugs, connectors, and similar devices shall be of the grounding type, and the ~~grounded~~ earth conductor of the flexible cord shall be connected to the screw shell of any lampholder or to the ~~grounded~~ earth terminal of any utilization equipment supplied.
(2) Approved Means. Approved means shall be provided for maintaining continuity of the grounding conductor between the fixed wiring system and the non-current-carrying metal portions of pendant luminaires (fixtures), portable lamps, and portable utilization equipment.
FPN: Refer to Articles 510 and 511 with respect to electrical wiring and equipment for other areas used as lubritoriums, service rooms, repair rooms, offices, salesrooms, compressor rooms, and similar locations.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

Introduction of this new term to replace the word "grounded", as currently used, will confuse the user. CMP 14 notes that this change would have to be made throughout the entire Code simultaneously, not just one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-134 Log #1131 NEC-P14 **Final Action: Accept in Principle**
(514-2, 515.2 and 514.1)

TCC Action:

The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee Accepts the Panel Action.

Submitter: Jon Nisja, Northcentral Regional Fire Code Development Committee/Southern Fire

Recommendation:

Replace the definitions of Motor Fuel Dispensing Facilities with:
514.2 Motor Fuel Dispensing Facility. That portion of a property where motor fuels are stored and dispensed from fixed equipment into the fuel tanks of motor vehicles or marine craft or into approved containers, including all equipment used in connection therewith (30A:3.1.15)
Replace the definitions of Bulk Storage Plant with:
515.2 Bulk Plant or Terminal. That portion of a property where liquids are received by tank vessel, pipelines, tank car, or tank vehicle and are stored or blended in bulk for the purpose of distributing such liquids by tank vessel, pipeline, tank car, tank vehicle, portable tank, or container. (30:1.6.35.1)
Delete existing 514.1 and replace with:
This section shall apply to motor fuel dispensing facilities, marine/motor fuel dispensing facilities, motor fuel dispensing facilities located inside buildings, fleet vehicle motor fuel dispensing facilities, and repair garages. (30:1.1)

Substantiation:

The definitions currently in the NEC are inconsistent with the definitions from the source documents that deal specifically with the hazards. These definitions should be extracted from the source documents for consistency.

Panel Meeting Action: Accept in Principle

Accept as suggested, but mark the definitions as extracted text, per NEC Style Manual.
Revise 514.1 to read as follows:
"This Article shall apply to motor fuel dispensing facilities, marine/motor fuel dispensing facilities, motor fuel dispensing facilities located inside buildings, and fleet vehicle motor fuel dispensing facilities."

Panel Statement:

The text is extracted from NFPA 30A and should be marked as such. Deletion of "repair garages": repair garages are covered in Article 511.
CMP 14 acknowledges that the scope is within the jurisdiction of the NEC Correlating Committee, but recommends adoption of the change.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-135 Log #1055 NEC-P14 **Final Action: Accept**
(514-3, FPN 3)

Submitter: Robert A. McCullough, Ocean County Construction Insp. Dept.,

Recommendation:

Revise text to read as follows:
FPN No. 3. See 555.21 for ~~gasoline~~ motor fuel dispensing stations in marinas and boatyards.

Substantiation:

Revision is proposed to reflect the current terminology used for dispensing operations. Consideration should be given to relocating this as simply a FPN under 514.3(B)(1). The current placement under (B)(2) which deals with CNG, LNG, and LPG seems incorrect.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-136 Log #1054 NEC-P14 **Final Action: Accept**
(Table 514-3(B)(1))

Submitter: Robert A. McCullough, Ocean County Construction Insp. Dept.,

Recommendation:

Add a new note 1 following the table to read:
[1] For marine application, grade level means the surface of a pier extending down to water level.
Add superscript 1 to column title "Extent of Classified Location" as follows:
Extent of Classified Location[1]
Renumber existing notes as 2 through 5 respectively, renumber existing superscript notes accordingly within the Table.

Substantiation:

Prior to the 1975 edition, Article 555 was silent on (gasoline) dispensing stations at a marina, specifically dispensing equipment located on an over-water pier. Proposal No. 11 in the Preprint of Proposed Amendments for the 1974 NEC added requirements at 555-9. This was submitted by the NEC Technical Subcommittee on Marinas and Boatyards. The text spelled out where the lower limit of the hazardous location was for marine applications and this was set at the lowest water surface. This was necessary since for a marine application, there isn't really a "grade level" referenced to earth as is the case for a dispenser located on shore.

In the 1981 NEC, the text delineating Class I locations in 514-2 was deleted and Table 514-2 was created using Table 7-1 from NFPA 30. The new table did not contain any reference for marine applications. In 1984, the chapter covering automotive and marine service stations was deleted from NFPA 30 and used as the basis for a new document, NFPA 30A.

For the 1990 NEC, 555-9 was revised to delete the area classifications and merely require compliance with Article 514 and the FPN was modified to include references to NFPA 30A and NFPA 303. This appears to have been done to comply with a NEC Correlating Committee note regarding extracted material. The net result of this was to leave the NEC without any reference to the lowest water surface for marine applications and this is a vital piece of information for proper application of the area classification. Part of the substantiation in 1981 to include Table 514-2 was to provide information without the need for an additional reference code. With the deletion of 555-9, that was precisely what we ended up with, the need to go to NFPA 30A to find the requirements. Many states do not adopt the referenced standards in fine print notes as these notes are informational only and not enforceable as requirements.

Adding this note which is taken from Table 8.3.1 of NFPA 30A will place the extent of these classified locations into the NEC as an enforceable requirement in the same manner as a hore-based dispenser. As this table is an extract now, it should be relatively easy to add this note. If this note is not added to Table 514.3(B)(1) it will be necessary for Code-Making Panel 19 to extract the requirements from NFPA 30A and add them to Article 555. While this will achieve the desired result, it is certainly a more cumbersome process.

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-137 Log #2758 NEC-P14 **Final Action: Accept**
(Table 514-3(B)(1))

Submitter: Donald Cook, Shelby County Building Inspections

Recommendation:

Delete "and Commercial Garages" from title. Delete the following locations and related text from the table:
Lubrication or Service Room - with Dispensing
Lubrication or Service Room - without Dispensing

Substantiation:

See companion proposal for 511.3. This deleted text should be relocated to Article 511, Commercial Garages, Repair and Storage. If the scopes of Articles 511 and 514 are reviewed, this information appears to fit into the scope of Article 511 better than 514.

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

14-136a Log #CP1412 NEC-P14 (Table 514.3(B)(1)) **Final Action: Accept**

Submitter: Code-Making Panel 14

Recommendation:

Revise the following parts of Table 514.3(B)(1) as indicated:

Insert Table 514.3(B)(1) Here

(Table shown on page 2740)

Revise Figure as shown below:

<<Insert Figure 514.3 Here>>

Figure 514.3 Classified Areas Adjacent to Dispensers as Detailed in Table 514.3(B)(1). [30A:ROP 30A-52 (Log #CP22)]

Substantiation:

Correlation with NFPA 30A-2003. CMP 14 does not agree with the deletion of the words "or space". CMP 14 agrees that the earth itself does not have to be classified, but is concerned that any cavity within the earth (space) should be classified. CMP 14 invites comment on this issue.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-138 Log #1949 NEC-P14 (514-8 Exception No. 2) **Final Action: Reject**

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:

Exception No. 2: Rigid nonmetallic conduit complying with Article 352 shall be permitted where buried under not less than 600 mm (2 ft) of cover. Where rigid nonmetallic conduit is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (2 ft) of the underground run to emergence or to the point of connection to the aboveground raceway, and an equipment ~~grounding~~ bonding conductor shall be included to provide electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Introduction of the new term to substitute for that currently used will confuse the user. CMP 14 notes that this change would have to be effected throughout the entire Code, simultaneously, not one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

O'MEARA: See my Explanation of Negative on Proposal 14-1.

14-139 Log #2692 NEC-P14 **Final Action: Reject**
(514-8 Exception No. 3 (New))

Submitter: Phil Simmons, Simmons Electrical Services / Rep. National Armored Cable Manufacturers Assn.

Recommendation:

Add a new exception as follows:
514.8 Underground Wiring.
Underground wiring shall be installed in threaded rigid metal conduit or threaded steel intermediate metal conduit. Any portion of electrical wiring or equipment that is below the surface of a Class I, Division 1, or a Class I, Division 2 location [as classified in Table 514.3(B)(1) and Table 514.3(B)(2)] shall be considered to be in a Class I, Division 1, location that shall extend at least to the point of emergence above grade. Refer to Table 300.5.
Exception No. 1: Type MI cable shall be permitted where it is installed in accordance with Article 332.
Exception No. 2: Rigid nonmetallic conduit complying with Article 352 shall be permitted where buried under not less than 600 mm (2 ft) of cover. Where rigid nonmetallic conduit is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (2 ft) of the underground run to emergence or to the point of connection to the aboveground raceway, and an equipment grounding conductor shall be included to provide electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.
Exception No. 3: Listed Type MC cable having a continuous impervious nonmetallic jacket shall be permitted where buried under not less than 600 mm (2 ft) of cover. Where subject to physical damage, protection shall be provided from the point of emergence above ground to the connection to the aboveground raceway.

Substantiation:

Type MC cables that are listed and have a continuous impervious nonmetallic covering are suitable for direct burial in the earth and for encasement in concrete. The outer nonmetallic jacket is of the same composition as rigid nonmetallic conduit. Listed Type MC cable contains an equipment grounding conductor for grounding electrical equipment. As a result, the Type MC cable in the proposal is suitable for installation in this area. Where physical protection is necessary, such as where the cable emerges from ground at a building or canopy, a channel similar in protection to rigid steel conduit or intermediate metal conduit could be provided.

Panel Meeting Action: Reject

Panel Statement:

The following issues have not been addressed by this proposal:
- conditions where the cable emerges from underground;
- public access;
- area classification at the point of emergence;
- sealing requirements.

The exception states that the cable must be buried at least 2 ft., but only protected from the point of emergence. This creates a conflict with the requirements of 300.5(D).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-140 Log #2239 NEC-P14 **Final Action: Reject**
(514-11)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
514.11 Circuit Disconnects.
(A) General. Each circuit leading to or through dispensing equipment, including equipment for remote pumping systems, shall be provided with a clearly identified and readily accessible switch or other acceptable means, located remote from the dispensing devices, to disconnect simultaneously from the source of supply, all conductors of the circuits, including the ~~grounded~~ earth conductor, if any. Single-pole breakers utilizing handle ties shall not be permitted.
(B) Attended Self-Service Motor Fuel Dispensing Facilities. Emergency controls as specified in 514.11(A) shall be installed at a location acceptable to the Authority Having Jurisdiction, but controls shall not be more than 30 m (100 ft) from dispensers. [NFPA 30A, 6.7.1]
(C) Unattended Self-Service Motor Fuel Dispensing Facilities. Emergency controls as specified in 514.11(A) shall be installed at a location acceptable to the authority having jurisdiction, but the control shall be more than 6 m (20 ft) but less than 30 m (100 ft) from the dispensers. Additional emergency controls shall be installed on each group of dispensers or the outdoor equipment used to control the dispensers. Emergency controls shall shut off all power to all dispensing equipment at the station. controls shall be manually reset only in a manner approved by the authority having jurisdiction. [NFPA 30A, 6.7.2]
FPN: For additional information, see 6.7.1 and 6.7.2 of NFPA 30A-2000, Code For Motor Fuel Dispensing Facilities and Repair Garages.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

Introduction of this new term to replace the word "grounded", as currently used, will confuse the user. CMP 14 notes that this change would have to be made throughout the entire Code simultaneously, not just one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-141 Log #1279 NEC-P14 **Final Action: Reject**
(514-13)

Submitter: David H. Kendall, Carlon, Lamson & Sessions

Recommendation:

Add new text to read as follows:
514.13 Provisions for Maintenance and Service of Dispensing Equipment. Each dispensing device shall be provided with a means to remove all external voltage sources, including feedback, during periods of maintenance and service of the dispensing equipment. The location of this means shall be permitted to be other than inside or adjacent to the dispensing device.
Exception: Intrinsically safe circuits and communications circuits shall not be required to be disconnected during periods of service and maintenance of dispensing equipment.

Substantiation:

Intrinsically safe and communications circuits do not have an inherent shock or ignition hazard energy level of voltage or current to cause problems for the service technician. It is often imperative that these circuits remain energized where these circuits are connected to the computer maintaining the data for the dispenser.

Panel Meeting Action: Reject

Panel Statement:

The substantiation is not correct. Some intrinsically safe circuits can present a shock hazard. Some communications circuits can also present a shock hazard and an ignition hazard.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-142 Log #2817 NEC-P14 **Final Action: Reject**
(514-13)

Submitter: Michael I. Callanan, NJATC / Rep. IBEW

Recommendation:

Revise Section 514.13 to read as follows:
514.13 Provisions for maintenance and Service of Dispensing Equipment. Each dispensing device shall be provided with a means to remove all external voltage sources, including feedback, during periods of maintenance and service of the dispensing equipment. The location of this means shall be ~~permitted to be other than~~ inside or adjacent to the dispensing device.

Substantiation:

The existing wording is too broad and vague and can lead to confusion regarding the location of the maintenance and servicing disconnecting means. The lack of a standard for the location of this disconnecting means for service and maintenance can provide for a serious safety hazard for both people and property when maintenance is performed at the individual dispensing site.
This proposal represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Reject

Panel Statement:

Many service station dispensers are supplied by a common submersible pump at the fuel storage tank which must be shut down before maintenance can be safely done. Existing language provides protection from both electrical shock and fuel spills during maintenance.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

COOK: Although I am not sure that "inside or adjacent to the dispensing device" is the best location for a maintenance disconnect, I agree that the current text, "shall be permitted to be other than inside or adjacent to the dispensing device" provides no direction for those installing or inspecting the installation. Most disconnecting means that is provided for maintenance of equipment is required to be within a specific distance from the equipment, or within sight of the equipment, or capable of being locked off. The disconnects in 514.11 are required to be within 100 ft of the dispenser. I am not sure I understand why we would allow the maintenance disconnect to be out of sight of the maintenance worker.
WELDON: In large, busy stations with multiple dispensing islands the management of these stations have been known to pressure servicing Journeymen to work "hot", so that they do not have the entire system shut down with consequent loss of sales during servicing.
The submitter's recommendation requiring a disconnecting means "inside or adjacent to the dispensing device", would increase safety to the public and the Journeymen servicing the equipment.

14-143 Log #2804 NEC-P14 **Final Action: Reject**
(514-13 Exception (New))

Submitter: Henry A. Jenkins, Wake County

Recommendation:

Add an exception to 514.13 as follows:
Exception: Intrinsically safe circuits and communication circuits shall not be required to be disconnected during periods of service and maintenance of dispensing equipment.

Substantiation:

Intrinsically safe and communication circuits do not have an inherent shock or ignition hazard energy level of voltage or current to cause problems for the service technician. It is often imperative that these circuits remain energized where these circuits are connected to the computer maintaining the data for the dispenser.

Panel Meeting Action: Reject

Panel Statement:

The substantiation is not correct. Some intrinsically safe circuits can present a shock hazard. Some communications circuits can also present a shock hazard and an ignition hazard.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-144 Log #2693 NEC-P14 **Final Action: Reject**
(515-8(A))

Submitter: Phil Simmons, Simmons Electrical Services / Rep. National Armored Cable Manufacturers Assn.

Recommendation:

Revise existing Section 515.8(A) and add a new exception as follows:

(A) Wiring Method. Underground wiring shall be installed in threaded rigid metal conduit or threaded steel intermediate metal conduit or, where buried under not less than 600 mm (2 ft) of cover, shall be permitted in rigid nonmetallic conduit ~~or a listed cable.~~ Where rigid nonmetallic conduit is used, threaded rigid metal conduit or threaded steel intermediate metal conduit shall be used for the last 600 mm (2 ft) of the conduit run to emergence or to the point of connection to the aboveground raceway. ~~Where cable is used, it shall be enclosed in threaded rigid metal conduit or threaded steel intermediate metal conduit from the point of lowest buried cable level to the point of connection to the aboveground raceway.~~

Exception: Listed Type MC cable having a continuous impervious nonmetallic jacket shall be permitted where buried under not less than 600 mm (2 ft) of cover. Where subject to physical damage, protection shall be provided from the point of emergence above ground to the connection to the aboveground raceway.

Substantiation:

Type MC cables that are listed and have a continuous impervious nonmetallic covering are suitable for direct burial in the earth and for encasement in concrete. The outer nonmetallic jacket is of the same composition as rigid nonmetallic conduit. Listed Type MC cable contains an equipment grounding conductor for grounding electrical equipment. As a result, the Type MC cable in the proposal is suitable for installation in this area. Where physical protection is necessary, such as where the cable emerges from ground at a building or canopy, a channel similar in protection to rigid steel conduit or intermediate metal conduit could be provided.

Panel Meeting Action: Reject

Panel Statement:

The following issues have not been addressed by this proposal:
- conditions where the cable emerges from underground;
- public access;
- area classification at the point of emergence;
- sealing requirements.

The exception states that the cable must be buried at least 2 ft., but only protected from the point of emergence. This creates a conflict with the requirements of 300.5(D).

The proposal eliminates the use of other listed cable types without substantiation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

14-145 Log #1950 NEC-P14 **Final Action: Reject**
(515-8(C))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:

(C) Nonmetallic Wiring. Where rigid nonmetallic conduit or cable with a nonmetallic sheath is used, an equipment ~~grounding~~ bonding conductor shall be included to provide for electrical continuity of the raceway system and for grounding of non–current-carrying metal parts.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Introduction of the new term to substitute for that currently used will confuse the user. CMP-14 notes that this change would have to be effected throughout the entire Code, simultaneously, not one section at a time.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

O'MEARA: See my Explanation of Negative on Proposal 14-1.

14-145a Log #CP1413 NEC-P14 (516.3) **Final Action: Accept**

TCC Action:

The Technical Correlating Committee directs the panel to give further consideration to the comments expressed in the voting. This action will be considered by the Panel as a public comment.

Submitter: Code-Making Panel 14

Recommendation:

Revise 516.3 as follows:

[Text of Proposal 14-145a recommendation is shown on page 2403]

Substantiation:

These changes correlate with the inclusion of the Zone concept into NFPA 33 and 34, including the diagrams which are extracted from same.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

BRIESCH: UL supports the proposal to include zone classified areas in the occupancies covered by Article 516. However, in order to correlate with the actions taken by the Technical Committee on Finishing Processes as reflected in the ROC on NFPA 33 and 34, suggest the following revisions to Proposal 14-145a:

1. Renumbering problem - 516.3(B) appears twice. Renumber the second (B) as (C), and renumber (C) as (D), etc.
2. 516.3(B)(4) add "For open dipping and coating operations..." because this applies only to open operations. Enclosed operations are covered in 516.3(C).
3. Add a new item 516.3(B)(6): "All space in all directions outside of but within 900 mm (3 ft) of open containers, supply containers, spray gun cleaners, and solvent distillation units containing flammable liquids."
4. Add a new item 516.3(C)(7): "Open Containers. All space in all directions within 600 mm (2 ft) of the Division 1 or Zone 1 area surrounding open containers, supply containers, spray gun cleaners, and solvent distillation units containing flammable liquids, as well as the area extending 1.5 m (5 ft) beyond the Division 1 or Zone 1 area up to a height of 460 mm (18 in.) above the floor or grade level."

O'MEARA:

• In 516.3(A) title, recommending add "I" after "Class" to make title "Class I, Division 1 or...".

• The addition of a new 516.3(A) will cause the following paragraphs to be increased by one letter. Thus (B) becomes (C), (C) becomes (D), etc. It will also cause Figures to be renumbered and references to them to change.

14-146 Log #2505 NEC-P14 (516-7(A)) **Final Action: Reject**

Submitter: George W. Flach, Nat'l Armored Cable Mfrs' Assn. (NACMA)

Recommendation:

Revise to include Type AC cable as follows:

516.7 Wiring and Equipment Not Within Class I and II Locations.

(A) Wiring. All fixed wiring above the Class I and II locations shall be in metal raceways, rigid nonmetallic conduit, or electrical nonmetallic tubing, or shall be Type MI, TC, AC, or MC cable. Cellular metal floor raceways shall be permitted only for supplying ceiling outlets or extensions to the area below the floor of a Class I or II location, but such raceways shall have no connections leading into or through the Class I or II location above the floor unless suitable seals are provided.

Substantiation:

Type AC cable should be added as an approved wiring method because it is mechanically and electrically equivalent to several of the wiring methods currently permitted by 516.7(A).

Panel Meeting Action: Reject

Panel Statement:

The submitter has provided no evidence that Type AC cable is equivalent to the other cable types allowed in this section.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

15-5 Log #473 NEC-P15 (517) **Final Action: Accept in Principle**

TCC Action:

It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.

Submitter: Jim Everitt, Western Regional Fire Code Dev. Committee / Rep. Western Regional Fire Code Dev. Committee

Recommendation:

Coordinate the extraction of the provisions of NFPA 99 on Life Safety Branches in the NEC.

Substantiation:

Currently the requirements for Life Safety Branch circuits in NFPA 99 and NFPA 70 are different. A proposal was sent to NFPA 99 to extract the material from the NEC, the committee statement stated that NFPA 70 extracts these requirements from NFPA 99.

Panel Meeting Action: Accept in Principle

Update each text and reference to NFPA 99-2002.

[Text of Proposal 15-5 panel action is shown on page 2405]

Panel Statement:

The panel has reviewed each of the NFPA 99 extracts and changes requested by the submitter.
Update each text and reference to NFPA 99-2002.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

MORGAN: Editorial changes are needed in references as follows:
Section ~~516.30(B)(6)~~ 517.30(B)(6)
Section 517.31 - Change reference to NFPA 99, 4.4.2.2.2.1 and ~~4.5.2.2.2~~ 4.4.3.1
Section 517.34(B)(3) which is relocated to 517.34(A)(6)
Renumber paragraphs 517.34(B)(4) through (B)(9) to (B)(3) through (B)(9)
Section ~~517.40(A)(c)~~ 517.40(A) Exception (c)
Section 517.41(A) - Change reference to FPN: NFPA 99, ~~4.5.2.2.1 and 4.5.2.2.1~~ 2002
Section ~~517.30(B)(4)~~ 517.41(B)
4.5.3.2 Transfer Switch Operation, ~~Type 1~~ Type II
Section 517.42(C)(2)
FPN: Change reference to NFPA 99, ~~17.3.4.1.2(3)~~ 4.4.2.2.2.2.3
Section 517.43(B)(3) - Change reference to NFPA 99, 4.5.2.2.3.3~~(c)~~(C)
Section 517.44(B) Exception No. 2 - Change reference to NFPA 99, ~~4.4.1.1.1, 17.3.4.1.1~~ 17.3.4.1.3 and 18.3.4.1.1 ~~One~~ Two of the reference was were deleted.
Section 517.45(A) - Change reference to FPN: NFPA 99, ~~14.3.4.1~~ 2002 (Not an extract)
(Add) Section 517.45(B)
(Add) Change reference to NFPA 99, 14.3.4.2.1
(Note: This section and reference was omitted in panel report)
Section 517.45(C) - Change reference to NFPA 99, ~~14.3.4.2~~ 14.3.4.2.2
Section 517.60(A)(1) - Change reference to FPN: NFPA 99, ~~Annex E, E.1, E.2, E.3~~ 2002 (Not an extract)
Section 517.61(A)(1) - Change reference to FPN: NFPA 99, ~~Annex E, E.6.6.2~~ 2002 (Not an extract)
Section 517.61(A)(3) - FPN: NFPA 99, 2002 ~~Annex E, E.2.1, E.4.5, E.4.6, E.4.7~~ (Not an extract)
Section 517.64(F) FPN: - ~~Change reference to NFPA 99, 8.4.1.2.2~~ (Deleted by Panel Proposal 15-52b)
Section 517.160(A)(2) - Change reference to FPN: NFPA 99, ~~4.3.2.6.1~~ 2002 (Not an extract)
Section ~~517.160(A)(4)(2)~~ 517.160(A)(4)(b)(2) - Change reference to FPN: NFPA 99, ~~13.4.1.2.6.4, 13.4.1.2.6.6~~ 2002 (Not an extract)
(Note: The references above noted "Not an extract" is based on the 2003 NEC Style Manual, Section 4.3.3.2.2 requiring that "Any editing of the extracted text shall be confined to making the style consistent with that of the NEC." The revisions to the 2003 NFPA 99 apparently not only relocated reference numbers but also made changes in the text, so that those noted above are no longer actual extracts from NFPA 99. They could appear as FPN references).

15-6 Log #1770 NEC-P15 (517) **Final Action: Reject**

Submitter: D Radder, Naval Air Station Lemoore

Recommendation:

Request that Article 517 be reviewed and changed to clarify the permitted/prohibited use of Health Care Facility Emergency Generators for "all Loads" and for "Load Shedding".

Substantiation:

The Public Works Engineering Department at Naval Air Station Lemoore was asked to study the feasibility of rewiring the Base Hospital's Emergency Generators/Distribution System to allow "picking-up" all of the Hospital's Electrical Load, (combined Nonessential and Essential Loads) rather than just the Essential Load, (combined Nonessential and Essential Loads) rather than just the Essential Loads. The purpose of picking-up "all Loads" would be to allow the Hospital to continue to "Conduct Normal Business" should an extended blackout occur during California's Energy Crisis and to Load Shed some power back to the civilian market to avert local Blackouts. The Generators serve as the "Alternate Source of Power" as defined in Article 517.

Article 700, Emergency Systems, addresses the issue of Load Shedding only for other than Health Care Facilities, but Article 517, the Article governing health Care Facilities makes no mention of using the Emergency Generators for "Load Shedding", or to power "all Loads", should the reader assume those uses are prohibited? The "prohibited use" is the conclusion that a reader would reach after studying Article 517 Figures 517-30(a), (b) and (c). However, relying on several figures without written text to re-enforce the "prohibited" conclusion leaves a lot to be desired.

Panel Meeting Action: Reject

Panel Statement:

This proposal does not comply with the method of submitting a proposal per 4-3.3 of the NFPA Regulations Governing Committee Projects.

The EPS can be used to power all loads of a health care organization. The purpose of the EPS is to house separate branches of emergency power serving life safety, critical, and equipment loads essential for a hospital's continued operation. If an organization wants to also supply the "normal" side of the electrical power system, this is an acceptable configuration as long as the load can be shed if the EPS capacity becomes challenged.

Refer to 517.30(B)(5).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-7 Log #3116 NEC-P15 (517) **Final Action: Reject**

Submitter: Thomas J. Garvey, State of Wisconsin

Recommendation:

Add new title to read: "X-ray, MRI, Nuclear and other types of Hospital Imaging Equipment".

Substantiation:

The existing text is interpreted to prohibit the use of Schedule 40 rigid nonmetallic conduit and electrical nonmetallic tubing as an emergency system feeder, even if encased in concrete.

Panel Meeting Action: Reject

Panel Statement:

The submitter failed to provide any information regarding the location of the proposed changes. The submitter should consider appropriate reference to 517.30(C)(3).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-8 Log #2843 NEC-P15 **Final Action: Reject**
(517-1)

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 2 for action in Article 220. This action will be considered by Code-Making panel 2 as a public comment.

Submitter: James M. Imlah, City of Hillsboro,OR

Recommendation:

Add new text to read as follows:
Hospitals, Medical, or Dental Facilities.

Substantiation:

"Article 517.1 Scope: The provisions of this article shall apply to electrical construction and installation criteria in health care facilities that provide services to human beings.

The requirements in Parts II and III not only apply to single function building but are also intended to be individually applied to their respective forms of occupancy within a multifunction building (e.g., a doctor's examining room located within a limited care facility would be required to meet the provisions of 517.10)."

There has been confusion on determining the amount of lighting required for medical or dental facilities. 517.1 references doctor's examining rooms, but a clarification of the lighting load by occupancy would resolve the confusion. The above statement would resolve the lighting requirements for medical or dental exam facilities and would have the same lighting load requirement as a hospital occupancy.

Panel Meeting Action: Reject

Panel Statement:

In discussing this proposal with the submitter, it was his intention to revise Table 220.3(A). The panel recommends that the TCC forward this proposal to Panel 2 for comment and action.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-9 Log #673 NEC-P15 **Final Action: Reject**
(517-2)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Isolated Power System. ~~A~~ An ungrounded system comprising an isolating transformer, ~~or its equivalent~~ a motor generator set, or suitable isolated batteries, line isolation monitor, and its ungrounded circuit conductors.

Substantiation:

An isolating type transformer can have a grounded secondary and supply only ungrounded conductors. An isolating type transformer, single-phase or 3-phase wye often has a secondary grounding connection without a (neutral) grounding conductor and supplying only ungrounded conductors.

Sections 668.20(B) and 668.21(A) clarify that isolated power means an isolating transformer (or equivalent) and ungrounded secondary. "Isolating type" is used in the Code to describe a separate winding type unrelated to whether the secondary is grounded or ungrounded. Many of these are required to be grounded.

"Or its equivalent" is nonnspecific and vague; 517.160(A) limits "the equivalent" to motor-generator sets or batteries, and the proposal correlates the definition with that section.

Difference in wording for similar requirements creates confusion per 3.3.5 of the Style Manual.

Panel Meeting Action: Reject

Panel Statement:

The existing definition is consistent with that in NFPA 99.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-10 Log #1422 NEC-P15 **Final Action: Reject**
(517-2)

Submitter: Edward Joseph Ptaszynksi, Jr., University of Michigan Construction Service

Recommendation:

Those special units, intensive care units, coronary care units, angiography laboratories, cardiac catherization laboratories, delivery rooms, operating rooms, and similar areas, (Add) (and rooms listed intermediate or moderate care,) in which patients are intended to be subjected to invasive procedures and connected to line-operated electromedical devices.

Substantiation:

This is due to having 2 (two) architects, for the same floor/ward, draw 2 (two) prints, without same electrical requirements because this type of room is not defined in the NEC. In talking to Laura Cherven MPH, BSN, RN, I found out these rooms are used for patients that need more than general care but one step less than critical care. Laura also told me this is becoming standard for health care across USA, to deal with health insurance companies.

Panel Meeting Action: Reject

Panel Statement:

The submitter should refer to NFPA 99, which provides performance criteria for critical patient care areas.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-11 Log #1472 NEC-P15 **Final Action: Reject**
(517-2)

Submitter: Jamie McNamara Hastings, MN

Recommendation:

I underlined added text
517.2 Health Care Facilities. Buildings or portions of buildings in which medical, dental, psychiatric, nursing, obstetrical, or surgical care are provided. Health care facilities include, but are not limited to, hospitals, nursing homes, limited care facilities, clinics, medical, chiropractic and dental offices, and ambulatory care centers, whether permanent or movable.

Substantiation:

To make the code clearer that 517 is intended to include chiropractics office patient care areas.

Panel Meeting Action: Reject

Panel Statement:

Section 517.13 covers wiring methods required where medical devices come into contact with the patient. It is not limited to equipment used in hospitals, nursing homes, limited care facilities, clinics, medical, and dental offices, and ambulatory care centers, whether permanent or movable.

The submitter should refer to NFPA 99, which provides performance criteria for critical patient care areas.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-12 Log #1602 NEC-P15 **Final Action: Reject**
(517-2)

Submitter: David Shapiro, Safety First Electrical Contracting, Consulting, and Safety Education

Recommendation:

Add new text to read as follows:
FPN: See 517.2 Patient Care Areas, for a specialized definition.

Substantiation:

Where Article-unique definitions conflict with the Article 100 definitions, there may be an advantage to steering users to them.

Panel Meeting Action: Reject

Panel Statement:

The submitter failed to specifically identify where he wanted the fine print note to be located. Article 100 does not contain a definition of Patient Care Areas; therefore, a fine print note in 517.2 referencing 517.2 is unnecessary.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-13 Log #3182 NEC-P15 **Final Action: Accept in Principle**
(517-3 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc. / Rep. Mass Electrical Code Adv. Committee

Recommendation:

Insert the following new section:
517.3 Application of Other Articles. The requirements in Article 700 shall apply to emergency systems covered in this article except as modified in 517.30(B) and 517.41(B).

Substantiation:

The 1999 NEC resolved a major correlation failure between Articles 517 and 700 by amending the definition of Emergency System to provide for a modification of Article 700 rules. The 2002 NEC abandoned that sensible change, and reverted to the NFPA 99 definition of Emergency System. That results in direct conflicts with Article 700 over the single transfer switch allowances [conflict with 700.6(D) by being less severe] and automatic load shedding [conflict with 700.5(B) by being more severe]. The Technical Correlating Committee asked the panel to correct this during the comment period, but the effort failed. Since amending an extracted definition conflicts with NFPA regulations, this proposal solves the problem by using now vacant 700.3, which is the generic location for other article provisions. Nothing in 90.3 resolves conflicts between articles in Chapters 5, 6, and 7.

Panel Meeting Action: Accept in Principle

Panel Statement:

See the panel action and statement in Proposal 15-38 (Log #1281), which satisfies the submitter's intent.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-14 Log #2830 NEC-P15 **Final Action: Reject**
(517-10(B)(2) (New))

Submitter: C. W. Kimblin, Cutler-Hammer

Recommendation:

Add new text to read as follows:
All branch circuits that supply 125-volt, single phase, 15- and 20-ampere outlets installed in these areas shall be protected by an arc-fault circuit interrupter listed to provide protection of the entire branch circuit.

Substantiation:

Cutler-Hammer considers that arc-fault circuit interrupters should protect the areas of nursing homes and limited care facilities wired in accordance with Chapters 1 through 4 of this Code where these areas are used exclusively as patient sleeping areas. The location of the requirement could be 517.10(B)(2) or possibly 517.22(New). The present proposal deals with the 517.10(B)(2) location.

517.10(B)(2) deals with areas of nursing homes and limited care faciltiies wired in accordance with Chapters 1 through 4 of this Code where these areas are used exclusively as patient sleeping areas. Chapter 2 (210-12) requires that the branch circuits that supply 125-volt, single-phase, 15- and 20-ampere outlets installed in dwelling unit bedrooms shall be protected by an arc-fault circuit interrupter listed to provide protection of the entire branch circuit. However, it is probable that the areas used exclusively as patient sleeping areas in nursing homes and limtied care faciltiies do not receive this 210-12 protection because they may not be recognized as dwelling unit bedrooms. The intent of this Code change, thereofre, is to ensure that areas used exclusively as patient sleeping areas in nursing homes and limited care facilities, and wired in accordance with Chapters 1 through 4, indeed receive the same fire safety protection as dwelling unit bedrooms. Here it must be noted that the definitions of nursing homes and limited care facilities show that we are dealing with the protection of people with limited capacity. On the one hand, the fire safety of these people is improved over the safety of people in dwelling units by the presence of supervisory personnel and by different construction technologies including sprinklers. On the other hand, fire safety becomes even more critical in nursing homes and limtied care facilities because of the patients' limited capacity. Fires of electrical origin do occur, and AFCIs are available and effective in fire mitigation (1, 2, 3). These devices are required for the branch circuits supplying the outlets of dwelling unit bedrooms in 210.12, and these devices should also be required to enhance the fire safety of the areas of nursing homes and limited care facilities that are used exclusively as patient sleeping areas.

References:

1. "Preventing Home Fires: Arc Fault Circuit Interrupters or AFCIs", August 16, 2002. Available on the CPSC web-site at www.cpsc.gov/CPSCPUB/PUBS/afci.html
2. "The Consumer Product Safety Commission", J. Lardear, NEC Digest, Volume 1, pages 38-44, August/September 2002
3. "AFCI Inquiry and Report", prepared by the Consumer Product Safety Task Force of the National Association of State Fire Marshals, August 1, 2002. Available on the NASFM web-site at www.firemarshals.org/issues/home/electricalfires.

Panel Meeting Action: Reject

Panel Statement:

The proposal provides no evidence that fires leading to loss of life or property in patient sleeping areas of nursing homes are due to arc fault phenomena. There is a significant difference between a nursing home and a dwelling area; a nursing home is held to a higher construction standard (i.e., noncombustible and fire protection system). Nursing homes also have on-site supervisory staff.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 3

Explanation of Negative:

KAHN: This proposal should have been accepted. The recommendation is to require arc-fault circuit interrupter protection in the same locations as required in similar locations in other structures. The application is limited to those areas where Part II of this Article does not apply.

I am not sure that the sleeping areas of all limited care facilities are held to higher construction standards as noted in the Panel Statement and that the supervisory staff in such facilities can accomplish the same safety as the arc-fault circuit interrupter. These facilities should be afforded the same safety provisions as required in general.

WHITE: The arc-fault circuit interrupter listed for the purpose, is an insurance from fire that protects against life and property - its time has come.

WISEMAN: Fires of electrical origin do occur in areas of nursing homes and limited care facilities that are used exclusively as patient sleeping areas. NEMA considers that the applications of AFCIs should be expanded to provide increased protection against electrical fires.

Comment on Affirmative:

MORGAN: I agree with the concept that arc-fault circuit interrupter devices would add a certain degree of safety to the wiring in bedroom areas of nursing homes and limited care facilities. However, the submitter did not provide specific evidence of injury, death or property loss due to arcing faults in these facilities. Also, I believe there should be some provision to exclude circuits related to fire or life safety from disconnection by an arc-fault circuit-interrupter.

15-15 Log #2723 NEC-P15 **Final Action: Reject**
(517-12)

Submitter: Frank Martucci Fort Lee, NJ

Recommendation:

After existing material add:
Exception: Redundantly grounded cord and cordsets shall be permitted in all healthcare facilities.
(a) Two grounding conductors shall be permitted in cord, and cord sets, with the branch circuit conductors supplying the unfixed equipment in all areas.
(b) Four conductor cord connectors and attachment plugs shall be permitted with two separate wiring sites only at existing grounding poles.

Substantiation:

This proposal is an alternate proposal to the one mandating the use of my electrocution-proof grounding system in health care facilities.
The exception, if accepted in the 2005 code, will make it possible to market the system as second standard, scientifically tested, and with UL approval for use in healthcare facilities.
The substantiation is the same as for the mandated standard.
The electrified, grounded, hospital bed, especially when wet with incontinence, places the patient in a grounded environment as dangerous as a bathtub.
The patient, who wouldn't dare touch an electrical appliance while in a bathtub, meekly permits medical devices to be attached to, or inserted into, their body while in the same dangerous environment.
The patient is in extreme danger an many thousands are electrocuted each, and every, year because of design defects in the cord-and-plug connected grounding system.
(Name deleted), alluding to an article in the 1970 Federal Register, stated doctors electrocute 5000 patients each year and cover them up. The deaths, and cover-ups, should be considerably higher today in view of 10-fold proliferation of medical devices.
(Name deleted), in a 1970 overview stated 1200 patients are electrocuted each year with currents as little as 20 microamperes. The micro-shock deaths should also be higher today because no attempt, except mine, has ever been made to correct the design defects responsible for them.
To properly protect the patient, it is extremely important that the grounding conductor is properly sized, as mandated in Article 250-95 of the original code available in codebooks published until 1999.
Likewise, to prevent micro-shock, it is essential that the equipment grounding conductor shall be adjusted (larger) in size to compensate for voltage drop proportionately according to circular mil area, as mandated in Article 250-95.
Both of these code mandates have been violated with exceptions that gravely compromise patient safety.
Exception No. 1 permits a tiny, rarely tested, severely undersized, 7 ampacity grounding conductor to protect patients on 20-ampere branch circuits.
Exception No. 2 allows the grounding conductor to be no larger than the circuit conductors and, to this day, no cord, or cordset, except mine, has ever been adjusted to compensate for voltage drop, the primary cause of electrocutions due to micro-shock.
(Name deleted), in his June 24th, 2002 testimony in support of the World Trade Center NIST investigation stated the NFPA is involved in developing scientifically based consensus codes, and standards, that provide for our electrical and fire safety.
In no way were these exceptions developed as a standard according to the scientifically based method extolled by (name deleted).
An exemption that modifies an existing scientifically based consensus standard should contain adjustments that will compensate for any changes that may compromise electrical safety.
If there is a need to reduce the size of the protective grounding conductor, and abolish the need for larger grounding conductors than circuit conductors, simply add another similar sized grounding conductor in all cords and cordsets.
The second, redundant, grounding conductor will ameliorate, if not, eliminate, any hazard due to cord down sizing and also provide the extra copper required to prevent line drop.
And there is a dire need for two grounding conductors in order to provide a safeguard that prevents human wiring errors from causing electrocutions and current to flow through metal raceways.
Try as you many, there is no other way to correct this hazardous defect except with two conductors. And without a mandate to provide a second conductor in all cords, my life saving four wiring site cord electrocution-proof components cannot be made available to protect patients.
Had code panels, and technical committees, made the scientifically based testing (name deleted) alludes to, they would have discovered, as I did, that four of six ways to wire cord components can cause shock, electrocution, and current to flow through inappropriate metal raceways instead of the proper circuit conductor.
I discovered this heinous design defect on March 15, 1956l. A patient was electrocuted because a qualified factory worker wired a plug with reversed green and white conductors and a qualified electrician wired an explosion-proof wall outlet with reversed black and white conductors. Make the test of the wiring hazard and discover how even a wall outlet, wired with reversed polarity, can kill.
The patient died, not because of a ground fault in an electrical device but because of wiring faults made by skilled, experienced, well supervised, workers.
To prevent any further electrocutions, especially after two harrowing days of interrogation by the homicide division, and a severe reprimand from my supervisor for not covering it up, I initiated a new cord-and-plug connected grounding system for the protection of all patients.
I replaced the the three conductor cords on all medical devices with four conductor cords so as to provide a second ground path that prevented miswired components from ever causing shock or electrocution. A second grounding outlet was installed next to existing outlets. I have photos of wall outlets and cardiac care patient centers I designed and installed, should you request them.
The system required costly changes so I designed a system that only requires a second wiring site at the ground pole of existing cord components. A second grounding conductor in all cords is all that is required to save thousands of lives each and every year for about the cost of a few cups of coffee.
I suggest code panels make a scientific based test of the present standard and see why it should never have been adopted in the first place.
Then test my system and see how every design defect in the cord-and-plug grounding system has been corrected.
Does my standard compensate for reductions in the grounding conductor? Yes
Does my standard ensure grounding integrity during massive shorts? Yes

Does my standard adjust in size to compensate for voltage drop? Yes
Does my standard prevent massive current to flow through raceways? Yes
Does my standard prevent shock or electrocution due to miswired cords? Yes

I guarantee my standard will save lives with the same offer I made in Denver at the NFPA annual meeting. I will give one thousand dollars to the first code panel member who can wire a four-conductor cord to each of the four wiring sites of my components so as to cause an electrocution or massive current to flow thorough inappropriate steel screws, connectors, and raceways.

And, I also offer one thousand dollars to the first code panel member who can prove miswired grounding components of existing cords, and cordsets, will NOT cause shock, electrocution, or massive current to flow through raceways.

Conclusion: When I received a patent for my grounding system in 1988, I expected fame and fortune, my picture on the front page of Time Magazine, and maybe a Nobel Prize for saving thousands of lives each, and every, year.

Instead I have been scorned, vilified, accused of lying, hyperbole, being disingenuous, and worse of all, almost a victim of a drive-by shooting during my stay in Denver for the annual NFPA meeting.

It is obvious, since code panel members of the electrical industrial complex are the ones who designed the present hazardous grounding system, my standard will never be approved, adopted, or even scientifically tested.

And unless adopted by our nation, thus mandating the use of two grounding conductors in all cords, my four site electrocution-proof and fireproof cord components are useless; the people of our nation will be deprived of the redundancy, and wiring safeguards, desperately needed to provide true electrical and fire safety.

In this proposal I ask that an exemption be granted to at least provide patients with the redundancy and wiring safeguards that prevent shock, or electrocution, due to loss of grounding, line drop, and miswired cords. My system is superior to the costly system I protected patients with.

Your approval of the exemption and its' adoption into the 2005 code will assure UL approval because the UL sits on the panels that have rejected my system.

Without UL approval I cannot have the system marketed.

As an exemption I do not ask the elimination of the three conductor standard now in use. My standard is only to be used in healthcare facilities.

Text of entire substantiation is available at NFPA headquarters.

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

Panel Meeting Action: Reject

Panel Statement:

The proposal offers substantiation that is over 30 years old.

The federal government, through the FDA's Safe Medical Device Tracking Act (SMDTA), requires all electrical equipment failures to be reported. There is no significant data supporting an electrical issue or problem.

Joint Commission (JCAHO) requires the reporting of any event that results in a patient injury or death, and they have received no reports of electrical equipment incidents resulting in injury or death.

The quality of medical equipment is much better today than in the early '70s. Technology has changed in the last 30 years to utilize more solid-state equipment, lower voltages, and isolation transformers.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-16 Log #2724 NEC-P15 **Final Action: Reject**
(517-12)

Submitter: Frank Martucci Fort Lee, NJ

Recommendation:

After existing material add:
(A) Equipment connected by cord and plug. Exposed noncurrent carrying metal parts of cord and plug connected equipment likely to become energized shall be redundantly grounded.
(a) Two grounding conductors shall be installed in cord, and cord sets, with the branch circuit conductors supplying the unfixed equipment in all areas.
(b) Component grounding poles. Cord connectors and attachment plugs shall be provided with two separate wiring sites at the existing grounding pole. Cord female connectors, and male attachment plugs shall be designed so that only the grounding pole can be wired with two conductors.
(c) Hospital grade components shall be used on all cords and cordsets.

Substantiation:

The electrified, grounded, hospital bed, especially when wet with incontinence, places the patient in a grounded environment as dangerous as a bathtub.
The patient, who wouldn't dare touch an electrical appliance while in a bathtub, meekly permits medical devices to be attached to, or inserted into, their body while in the same dangerous environment.
The patient is in extreme danger an many thousands are electrocuted each, and every, year because of design defects in the cord and plug connected grounding system.
(Name deleted), alluding to an article in the 1970 Federal Register, stated doctors electrocute 5000 patients each year and cover them up. The deaths, and cover-ups, should be considerably higher today in view of 10-fold proliferation of medical devices.
(Name deleted), in a 1970 overview stated 1200 patients are electrocuted each year with currents as little as 20 microamperes. The micro-shock deaths should also be higher today because no attempt, except mine, has ever been made to correct the design defects responsible for them.
To properly protect the patient, it is extremely important that the grounding conductor is properly sized, as mandated in Article 250-95 of the original code available in codebooks published until 1999.
Likewise, to prevent micro-shock, it is essential that the equipment grounding conductor shall be adjusted (larger) in size to compensate for voltage drop proportionately according to circular mil area, as mandated in Article 250-95.
Both code mandates have been violated with exceptions that gravely compromise patient safety.
Exception No. 1 permits a tiny, rarely tested, severely undersized, 7 ampacity grounding conductor to protect patients on 20-ampere branch circuits.
Exception No. 2 allows the grounding conductor to be no larger than the circuit conductors and, to this day, no cord, or cordset, except mine, has ever been adjusted to compensate for voltage drop, the primary cause of electrocutions due to micro-shock.
(Name deleted), in his June 24th, 2002 testimony in support of the World Trade Center NIST investigation stated the NFPA is involved in developing scientifically based consensus codes, and standards, that provide for our electrical and fire safety.
In no way were these exceptions developed as a standard according to the scientifically based method extolled by (name deleted).
An exemption that modifies an existing scientifically based consensus standard should contain adjustments that will compensate for any changes that may compromise electrical safety.
If there is a need to reduce the size of the protective grounding conductor, and abolish the need for larger grounding conductors than circuit conductors, simply add another similar sized grounding conductor in all cords and cordsets.
The second, redundant, grounding conductor will ameliorate, if not, eliminate, any hazard due to cord down sizing and also provide the extra copper required to prevent line drop.
And there is a dire need for two grounding conductors in order to provide a safeguard that prevents human wiring errors from causing electrocutions and current to flow through metal raceways.
I discovered this heinous design defect on March 15, 1956. A patient was electrocuted because a qualified factory worker wired a plug with reversed green and white conductors and a qualified electrician wired an explosion-proof wall outlet with reversed black and white conductors. Make the test of the wiring hazard and discover how even a wall outlet, wired with reversed polarity, can kill.
The patient died, not because of a ground fault in an electrical device but because of wiring faults made by skilled, experienced, well supervised, workers.
To prevent any further electrocutions, especially after two harrowing days of interrogation by the homicide division, and a severe reprimand from my supervisor for not covering it up, I initiated a new cord-and-plug connected grounding system for the protection of all patients.
I replaced the the three conductor cords on all medical devices with four conductor cords so as to provide a second ground path that prevented miswired components from ever causing shock or electrocution. A second grounding outlet was installed next to existing outlets. I have photos of wall outlets and cardiac care patient centers I designed and installed, should you request them.
The system required costly changes so I designed a system that only requires a second wiring site at the ground pole of existing cord components. A second grounding conductor in all cords is all that is required to save thousands of lives each and every year for about the cost of a few cups of coffee.
I suggest code panels make a scientific based test of the present standard and see why it should never have been adopted in the first place.
Then test my system and see how every design defect has been corrected.
Does my standard compensate for reductions in the grounding conductor? Yes
Does my standard ensure grounding integrity during massive shorts? Yes
Does my standard adjust in size to compensate for voltage drop? Yes
Does my standard prevent massive current to flow through raceways? Yes
Does my standard prevent shock or electrocution due to miswired cords? Yes
I guarantee my standard will save lives with the same offer I made in Denver at the NFPA annual meeting. I will give one thousand dollars to the first code panel member who can wire a four-conductor cord to each of the four wiring sites of my components so as to cause an electrocution or massive current to flow thorough inappropriate steel screws, connectors, and raceways.
And, I also offer one thousand dollars to the first code panel member who can prove miswired grounding components of existing cords, and cordsets, will NOT cause shock, electrocution, or massive current to flow through raceways.

Text of entire substantiation is available at NFPA headquarters.
Note: Supporting material available for review at NFPA headquarters.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-15 (Log #2723).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-18 Log #2705 NEC-P15 (517-13(A)) **Final Action: Reject**

Submitter: George Straniero, AFC Cable Systems

Recommendation:

Revise 517.13(A) to permit Type MC cable Listed for the purpose as follows:
(A) Wiring Methods. All branch circuits serving patient care areas shall be provided with a groundpath for fault current by installation in a metal raceway system, or a cable armor or sheath assembly. The metal raceway system, or cable armor, or sheath assembly, shall itself qualify as an equipment grounding return path in accordance with 250.118. Type AC, Type MC, Type MI cables shall have an outer metal armor or sheath that is identified as an acceptable grounding return path. Size 14, 12, or 10 AWG Type MC cable with a grounding return path consisting of combined interlocked metal armor and grounding conductor, listed for this purpose shall be permitted in lengths not exceeding 100 feet with fittings identified for grounding.

Substantiation:

I have provided a Fact Finding Report demonstrating that the outer metal sheath of Type MC cable, that is Listed for use in patient care areas, itself qualifies as an acceptable ground return path in lengths not exceeding 100 feet. The proposed text will require that the cable be listed for the purpose, which would require specific cable construction and performance requirements to maintain the acceptability of the ground path as demonstrated by the Fact Finding Investigation. The proposed text also includes language that clarifies that the cable requires an equipment grounding conductor in conformance with 250.118(11) so that it is not mistaken for the Insulated Equipment Grounding Conductor that is required by 517.13(B).
Note: Supporting Material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement:

Patient care area wiring methods require two independent ground return paths. Interlocked metal armor, does not of itself, provide the required redundant ground path, and is not consistent with the basic requirement of 517.13(A).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-17 Log #2694 NEC-P15 (517-13(A) and (B)) **Final Action: Accept**

Submitter: Phil Simmons, Simmons Electrical Services / Rep. National Armored Cable Manufacturers Assn.

Recommendation:

Revise existing Section 517.13(A) and (B) as follows:
517.13 Grounding of Receptacles and Fixed Electric Equipment in Patient Care Areas.
Wiring in patient care areas shall comply with ~~517.13~~(A) and (B).
(A) Wiring Methods. All branch circuits serving patient care areas shall be provided with a ground path for fault current by installation in a metal raceway system, or a cable having a metallic armor or sheath assembly. The metal raceway system, or metallic cable armor, or sheath assembly, shall itself qualify as an equipment grounding return path in accordance with 250.118. ~~Type AC, Type MC, Type MI cables shall have an outer metal armor or sheath that is identified as an acceptable grounding return path.~~
(B) Insulated Equipment Grounding Conductor. ~~In an area used for patient care~~, The grounding terminals of all receptacles and all non–current-carrying conductive surfaces of fixed electric equipment likely to become energized that are subject to personal contact, operating at over 100 volts, shall be grounded by an insulated copper conductor. The equipment grounding conductor shall be sized in accordance with Table 250.122 and installed in metal raceways or ~~metal-clad~~ as a part of listed cables having a metallic armor or sheath assembly with the branch-circuit conductors supplying these receptacles or fixed equipment.
Retain the two existing exceptions.

Substantiation:

This proposal is intended as an editorial improvement. Several words or phrases that are redundant are proposed to be eliminated.
However, it is also intended to permit Section 250.118 to control which cable wiring systems are suitable as an equipment grounding conductor. This will make cable wiring systems treated equal to metal raceways. For example, Section 250.118(5) permits flexible metal conduit, where the flex and the fittings are listed for grounding, to be used as an equipment grounding conductor in any length for wiring in patient care areas. Section 250.118(6) permits flexible metal conduit that is not listed for grounding to be used as an equipment grounding conductor for not more than six ft. Section 250.118(7) permits listed liquidtight flexible metal conduit (not listed for grounding) to be used as an equipment grounding conductor in lengths up to six ft in the ground return path, in some cases with contained conductors protected by not more than a 60 ampere OC device.
Section 250.118 should be allowed to govern which cables with a metallic sheath are suitable as an equipment grounding conductor.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-19 Log #3183 NEC-P15 **Final Action: Reject**
(517-13(A) Exception (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc. / Rep. Mass Electrical Code Adv. Committee

Recommendation:

Add an exception as follows:
Exception: Wiring that is used to supply or control luminaires (lighting fixtures) more than 2.3 m (7 1/2 ft) above the floor in a patient care area shall be permitted to utilize any of the wiring methods recognized in Chapter 3 of this Code provided all of the following conditions are met:
(a) No portion of the wiring installed in accordance with this exception and located at or below the 2.3 m (7 1/2 ft) level is exposed;
(b) No outlet(s) supplied by such wiring is (are) located at or below the 2.3 m (7 1/2 ft) level in any patient care area; and
(c) No control point(s) supplied by such wiring is (are) located in any patient vicinity.

Substantiation:

Both 517.13(B) Exception No. 2 and 517.13(A) need to be changed for this rule to really have any effect, and this proposal is one of a pair. The key to these proposals is maintaining the enhanced grounding requirements in place for any likely exposure to patient touch, and the key to that is bringing in the concept of "patient vicinity" here as well as 517.13(B) (defined in 517.2).
In a nutshell, if the switch is outside any patient vicinity, and if the wiring method isn't exposed below the 7 1/2 foot level, then any suitable wiring method can be used. Note, however, that the exception (see "b") is written so that the home run from any outlet below 7 1/2 feet in a patient care area must still qualify under the normal redundant grounding provisions of 517-13(A). Please refer to the companion proposal on 517.13(B) Exception No. 2 for additional substantiation.

Panel Meeting Action: Reject

Panel Statement:

The submittal changes the concept of branch circuits in patient care areas and would encourage a mixture of wiring methods that could not be effectively enforced. Adding "outlets" to this exception would mean that receptacles without a redundant ground could be installed at 7 feet 7 inches above a patient bed or vicinity. An outlet at this location may be more accessible for use than one with the redundant ground, located behind the patient bed.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-20 Log #1951 NEC-P15 **Final Action: Reject**
(517-13(B))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(B) Insulated Equipment ~~Grounding~~ Bonding conductor Conductor. In an area used for patient care, the grounding terminals of all receptacles and all non–current-carrying conductive surfaces of fixed electric equipment likely to become energized that are subject to personal contact, operating at over 100 volts, shall be grounded by an insulated copper conductor. The grounding conductor shall be sized in accordance with Table 250.122 and installed in metal raceways or metal-clad cables with the branch-circuit conductors supplying these receptacles or fixed equipment.
Exception No. 1: Metal faceplates shall be permitted to be grounded by means of a metal mounting screw(s) securing the faceplate to a grounded outlet box or grounded wiring device.
Exception No. 2: Luminaires (light fixtures) more than 2.3 m (7_ ft) above the floor and switches located outside of the patient vicinity shall not be required to be grounded by an insulated equipment ~~grounding~~ bonding conductor conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-1 (Log #2453o).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

SMITH: See my Comment on Affirmative on Proposal 15-1.

15-21 Log #3184 NEC-P15 **Final Action: Reject**
(517-13(B) Exception No. 2 (New))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc. / Rep. Mass Electrical Code Adv. Committee

Recommendation:

Revise to read as follows:
Exception No. 2: Luminaires (lighting fixtures) more than 2.3 m (7 1/2 ft) above the floor in a patient care area and switches located outside of a patient vicinity shall be permitted to utilize any of the types of equipment grounding conductors included in 250.118, and any of the wiring methods otherwise permitted for the location by Chapter 3 of this Code.

Substantiation:

The original substantiation for the existing exception (1995 AM, Proposal 17-21a) seems to have been based on a panel response to Proposal 17-21, which attempted to include the light fixtures in the redundant grounding provisions, and which was rejected. This is shown in the comments in the voting. The submitter of Proposal 17-21 came back with Comment 17-16, in which he pointed out that without correlating changes in (1996) 517-13(B) the change had no practical effect. The panel statement that the wording in then 517.13(B) incorporates by reference the provisions in subsection (a) was incorrect. The 1993 517-13(B) had by then added provisions on top of the rules in (a). We are now left with an exception that will allow a steel raceway without a separate grounding conductor in some cases. Any electrical contractor will tell you that the significant installation issue is what wiring method must be installed; the presence or absence of a piece of No. 12 green wire being of negligible importance.
This proposal as submitted preserves the zone where redundant grounding has demonstrated safety value, that is, in the patient vicinity, and it removes those requirements in areas where there isn't any greater exposure than in other occupancies. In addition, by changing "the patient vicinity" to "a patient vicinity" this proposal corrects an error in the Code, whereby on the literal text the switch for a patient's light fixture couldn't go in its own patient vicinity, but it could go in an adjacent patient vicinity. This proposal is a companion to one that makes correlating changes in 517.13(A).

Panel Meeting Action: Reject

Panel Statement:

Changing the phrase "the patient vicinity" to "a patient vicinity" narrows the concept to a single patient. The phrase "the patient vicinity" is applicable whether there is one or several patients in a given patient care area. Existing Exception 2 is adequate and is generally well understood.
See the action and statement in Proposal 15-19 (Log #3183).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-22 Log #3334 NEC-P15 **Final Action: Accept in Principle**
(517-14)

Submitter: Christopher Brown, RDLA

Recommendation:

Add new text to read as follows:
517.14 Panelboard Bonding. The equipment grounding terminal buses of the normal and essential branch-circuit panelboards serving the same individual patient vicinity shall be bonded together with an insulated continuous copper conductor not smaller than 10 AWG. Where two panelboards serving the same individual patient vicinity are served from two separate transfer switches on the emergency system, the equipment grounding terminal buses of those two panelboards shall be bonded together with an insulated continuous copper conductor not smaller than 10 AWG. Where more than two panels serve the same location, this conductor shall be continuous from panel to panel but shall be permitted to be broken in order to terminate on the ground bus in each panel.

Substantiation:

Exception No. 3 of 517.18(A) and Exception No. 2 of 517.19(A) allows branch circuits in General Care and Critical Care Areas, respectively, to be supplied by two separate transfer switches (with no normal panel branch circuits). To ensure that the ground potential of panelboards serving general and critical care areas which are fed from two separate transfer switches is equal, the bus of the two panels fed from separate transfer switches should be bonded.
The first sentence in 517.14 addresses the equalization of the ground bus for a normal and an emergency panel supplying branch circuits at the same location. The second sentence addresses situations where more than two panels serve the same location. The situation where only two emergency panels serve the same location is not addressed.

Panel Meeting Action: Accept in Principle

Add new text to read as follows:
"517.14 Panelboard Bonding. The equipment grounding terminal buses of the normal and essential branch-circuit panelboards serving the same individual patient vicinity shall be bonded together with an insulated continuous copper conductor not smaller than 10 AWG. Where two or more panelboards serving the same individual patient vicinity are served from separate transfer switches on the emergency system, the equipment grounding terminal buses of those panelboards shall be bonded together with an insulated continuous copper conductor not smaller than 10 AWG. Where more than two panelboards serve the same location, this conductor shall be continuous from panel to panel but shall be permitted to be broken in order to terminate on the ground bus in each panel."

Panel Statement:

The panel's revision better clarifies the submitter's intent to require that multiple panelboards serving the same patient vicinity to be bonded together.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-23 Log #1863 NEC-P15 **Final Action: Reject**
(517-15 (New))

Submitter: Andre R. Cartal, Princeton Borough Building Dept.

Recommendation:

Add new text to read as follows:
Section 517.15 Panelboard Grounding.
All feeders supplying branch circuits covered in 13(B) shall be installed in metal raceways and shall include an insulated equipment grounding conductor sized in accordance with Table 250.122.

Substantiation:

The code requires "redundant" or 2 equipment grounding paths in 517.13(B), however, these redundant paths originate from a single path provided by the feeder raceway. This path relies on locknuts and bushings as do the branch circuit raceways. The only way to provide true grounding reduncy is to provide the 2 grounding paths in the panelboard feeder.

Panel Meeting Action: Reject

Panel Statement:

The proposal does not present specific substantiation demonstrating a hazard to warrant such a significant change. This is an issue with the quality of workmanship in an installation.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-24 Log #3435 NEC-P15 **Final Action: Accept in Principle**
(517-16, FPN)

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and review the use of the term "dedicated" considering the Code-Making Panel 5 comment on Proposal 5-243. The use of the term "dedicated" may be interpreted to mean that the conductor cannot serve any additional receptacles that may be connected on the same circuit.

This action will be considered by the panel as a public comment.

Submitter: Robert Schuerger, EYP Mission Critical Facilities, Inc.

Recommendation:

Revise as follows:
FPN: Caution is important in specifying such a system with receptacles having insulated grounding terminals, since the grounding impedance is controlled only by the dedicated equipment grounding conductors and does not benefit functionally from any parallel grounding paths. This type of installation is typically used where a reduction of electrical noise (electromagnetic interference) is a necessary and parallel grounding paths are to be avoided.

Substantiation:

The above change clarifies why the "caution" and brings the wording into alignment with the proposed definition for "dedicated equipment grounding conductor," and 250.146(D).

Panel Meeting Action: Accept in Principle

Revise the submitter's proposed text to read:
FPN: Caution is important in specifying such a system with receptacles having insulated grounding terminals, since the grounding impedance is controlled only by the dedicated equipment grounding conductors and does not benefit functionally from any parallel grounding paths. This type of installation is typically used where a reduction of electrical noise (electromagnetic interference) is necessary and parallel grounding paths are to be avoided.

Panel Statement:

The panel revised the proposed text to make it editorially correct.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-24a Log #CP1500 NEC-P15 **Final Action: Accept**
(517-17)

TCC Action:

It was the action of the Technical Correlating Committee that this proposal be sent to Code-Making Panel 2 and Code-Making Panel 4 for consideration of the comment from Code-Making Panel 15 as noted in the substantiation. This action will be considered by Code-Making Panels 2 and 4 as a public comment.

Submitter: Code-Making Panel 15

Recommendation:

Change 517.17 Ground-Fault Protection as follows:
"(A) Applicability. The requirements of 517.17 shall apply to hospitals and other buildings housing critical care areas or utilizing life support equipment, and buildings which provide essential utilities or services for the operation of critical care areas or electrical life support equipment.
(B) Feeders. Where ground-fault protection is provided for operation of the service disconnecting means or feeder disconnecting means as specified by 230.95 or 215.10, an additional step of ground-fault protection shall be provided in all next level feeder disconnecting means downstream toward the load. Such protection shall consist of overcurrent devices and current transformers or other equivalent protective equipment that shall cause the feeder disconnecting means to open.
The additional levels of ground-fault protection shall not be installed as follows:
(1) On the load side of an essential electrical system transfer switch
(2) Between the on-site generating unit(s) described in 517.35(B) and the essential electrical system transfer switch(es)
(3) On electrical systems that are not solidly grounded wye systems with greater than 150 volts to ground but not exceeding 600 volts phase-to-phase"
Renumber existing paragraph entitled "Selectivity."
Renumber existing paragraph entitled "Testing" and change reference 517.17(B) to 517.17(C).

Substantiation:

The panel determined that language is needed to clearly identify when and where a second level of ground-fault protection is needed to prevent nuisance tripping of the main. The panel action incorporates the intent of Proposal 15-27 and places requirements into positive language to comply with NEC Style Manual guidelines.
Panels 4 and 2 should add a fine print note to 230.95 and 215.10, respectively, referencing the special requirements of 517.17 for all structures that may potentially contain health care occupancies. The panel recommends that the TCC forward this proposal to Panels 4 and 2 for comment and action.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

MORGAN: Editorial comment on recommended change:
"Renumber existing paragraph entitled 'Selectivity' to (C)."
"Renumber existing paragraph entitled 'Testing' to (D) and change reference 517.17(B) to 517.17(C)."
FPN following (B) to remain.

15-25 Log #2809 NEC-P15 **Final Action: Reject**
(517-17 Exception (New))

Submitter: Henry A. Jenkins, Wake County

Recommendation:

Add a new exception to immediately follow the first paragraph in 517.17(A) to read as follows:
Exception: The additional level of feeder ground fault protection shall not be required for health care facilities in general commercial buildings where the health care does not require surgical treatment involving general anesthesia or consist of patient life support equipment.

Substantiation:

The Exception would permit, but not require, general office buildings, strip malls, and other similar structures to waive the additional level of ground fault protection required for more critical care facilities. This would permit dental offices, medical examining facilities, and similar installations to not be involved with the extra costs of the additional level of ground fault protection of feeders where life threatening procedures and surgery are not involved.

Panel Meeting Action: Reject

Panel Statement:

Additional levels of ground fault protection are required. See 15-24a (Log #CP1500).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

MORGAN: Editorial comment on panel statement, which may not have addressed the submitter's concerns adequately; add to end of panel statement:
Panel Proposal 15-24a includes a paragraph on "applicability" that defines where an additional level of Ground Fault Protection is required.

15-26 Log #1280 NEC-P15 **Final Action: Reject**
(517-17(A))

Submitter: David H. Kendall, Carlon, Lamson & Sessions

Recommendation:

Add new text to read as follows:
517.17 Ground-Fault Protection.
(A) Feeders. Where ground-fault protection is provided for operation of the service disconnecting means or feeder disconnecting means as specified by 230.95 or 215.10, an additional step of ground-fault protection shall be provided in the next level of feeder disconnecting means downstream toward the load. Such protection shall consist of overcurrent devices and current transformers or other equivalent protective equipment that shall cause the feeder disconnecting means to open.
Exception: The additional level of feeder ground fault protection shall not be required for health care facilities in general commercial buildings where the health care does not require surgical treatment involving general anesthesia or consist of patient life support equipment.
The additional levels of ground-fault protection shall not be installed as follows:
(1) On the load side of an essential electrical system transfer switch
(2) Between the on-site generating unit(s) described in 517.35(B) and the essential electrical system transfer switch(es)
(3) On electrical systems that are not solidly grounded wye systems with greater than 150 volts to ground but not exceeding 600 volts phase-to-phase.

Substantiation:

The exception would permit general office buildings, strip malls, and other similar structures to waive the additional level of ground fault protection required for more critical care facilities. This would permit dental offices, medical examining facilities, and similar installations to not be involved with the extra costs of the additional level of ground fault protection of feeders where life threatening procedures and surgery are not involved.

Panel Meeting Action: Reject

Panel Statement:

Additional levels of ground fault protection are required. See 15-24a (Log #CP1500).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

MORGAN: Editorial comment on panel statement, which may not have addressed the submitter's concerns adequately; add to end of panel statement:
Panel Proposal 15-24a includes a paragraph on "applicability" that defines where an additional level of Ground Fault Protection is required.

15-27 Log #1395 NEC-P15 **Final Action: Accept in Principle**
(517-17(A))

Submitter: Lanny G. McMahill Phoenix, AZ

Recommendation:

Add new text as follows:
517.17 Ground-Fault Protection.
(A) Feeders. In buildings with critical care areas, and where ground-fault protection is provided for operation of the service disconnecting means or feeder disconnecting means as specified by 230.95 or 215.10, an additional step of ground-fault protection shall be provided in the next level of feeder disconnecting means downstream toward the load.

Substantiation:

The current wording in this section causes many problems for enforcement officials and theoretically makes no sense. The section basically requires that all health care facilities have a second level of GFP where service or feeder GFP is provided. A strip center with service equipment GFP and minor medical and dental occupancies, in addition to retail occupancies, requires a second level of GFP on the medical and dental offices. However, the second level of GFP is not required on the retail occupancies. Logically, this makes no sense and provides no additional protection for the medical and dental occupancies. This section needs to be clarified! Making the second level of GFP specific to buildings with critical care areas is in order and clarifies the intent.

Panel Meeting Action: Accept in Principle

Panel Statement:

See Panel Proposal 15-24a (Log #CP1500) which addresses the submitter's concerns.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-28 Log #3377 NEC-P15 **Final Action: Reject**
(517-17(A)(1))

Submitter: Dennis M. Darling, Ayres, Lewis, Norris and May, Inc.

Recommendation:

Revise text to read as follows:
The additional levels of ground-fault protection shall not be installed (1) On the load side of an emergency ~~essential~~ electrical system transfer switch, or...".

Substantiation:

GFP is required on substation breakers in a hospital. In a case where a substation breaker supplies the normal side of an equipment ATS that in turns feeds a number of loads through a distribution panel, GFP should be allowed in the distribution panel so that a single equipment load could be tripped by a breaker in the distribution panel with GFP instead of a substation breaker. If the substation breaker is tripped, the ATS will start the generator and transfer the ground fault onto the generator.
A ground fault in an elevator motor threatened an entire essential system in a hospital including the life safety and the critical branches. The ground fault on the substation feeder opened the substation breaker, the generator started, and the ground fault was transferred onto the generator. Why not allow GFP for this piece of equipment so that the ground fault could be cleared before the substation breaker opens? GFP should never be put ahead of a fire pump. Please see the sketch I have provided.
Note: Supporting Material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement:

The proposal provides inadequate substantiation. The equipment system is an essential branch of the emergency power supply system. Equipment such as vacuum pumps; ventilation systems for isolation rooms, operating rooms and delivery rooms; supply/exhaust systems for laboratory rooms; etc.; are essential for life safety and are required to be on the equipment system. This equipment should not be disconnected from both the normal and alternate power sources because of an arcing fault.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-29 Log #1421 NEC-P15 **Final Action: Reject**
(517-17(C))

Submitter: Edward Joseph Ptaszynksi, Jr., University of Michigan Construction Service

Recommendation:

Revise text to read as follows:
When equipment ground-fault protection is first installed, each level shall be performance tested to ensure compliance with 517.17(B) (add) (All ground-fault protection equipment shall be tested at manufacture specifications to ensure proper working condition.)

Substantiation:

This request is from my request to have 2 GFCI receptacles retested at the hospital bathrooms when my wife was in. I got the number for hospital maintenance and called to inform them. The reply I got was "testing for GFCI receptacles is not until December this year". This leaves the possibility of a patient getting injured or killed, if we don't change this part of the Code.

Panel Meeting Action: Reject

Panel Statement:

The substantiation relates to GFCI protection, which is entirely different from the ground-fault protection in the proposal. The existing language in 230.95(C) requires testing.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-30 Log #3404 NEC-P15 **Final Action: Accept in Principle**
(517-18)

Submitter: Lee A. Mickael, Great River Medical Center

Recommendation:

Add new text to read as follows:
517.18(D) Psychiatric Locations. Receptacles located within the areas of psychiatric wards, rooms, bathrooms, or areas shall be listed tamper resistant or shall employ a listed tamper resistant cover.

Substantiation:

The present code allows the placement of non-tamper resistant GFCIs to be installed in bathrooms and dining rooms of Psychiatric wards as these are not patient care areas as defined by the code. But these are areas where patients are able to access the GFCIs without being seen and could pose a shock hazard.

Panel Meeting Action: Accept in Principle

Add new text to read as follows:
"517.18(D) Psychiatric Locations. Receptacles located within psychiatric wards, rooms, bathrooms, dining, or other patient areas shall be listed tamper resistant or shall employ a listed tamper resistant cover."

Panel Statement:

The panel modified the proposed text to clarify the submitter's intent.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-31 Log #1359 NEC-P15 **Final Action: Reject**
(517-18(A) Exception No. 2)

Submitter: J. Kevin Vogel, Crescent Electrical Supply

Recommendation:

Rewrite entirely:
Exception No. 2: Requirements of 517.18(A) shall not apply to:
a. Patient bed locations in clinics, medical offices, dental offices or outpatient facilities.
b. Psychiatric, substance abuse or rehabilitation hospitals.
c. Sleeping rooms of nursing homes and limited care facilities that meet the requirements of 517.10(B)(2).

Substantiation:

The present wording is clumsy. The proposed wording eliminates the awkward semicolons and presents the wording in a clearer manner without altering the meaning.

Panel Meeting Action: Reject

Panel Statement:

The present language in the NEC is sufficient and appropriate.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-32 Log #1388 NEC-P15 **Final Action: Reject**
(517-18(B))

Submitter: Fred White, New York State Veterans Home

Recommendation:

Add a new paragraph to 517.18(B) following the FPN:
Where receptacles are installed behind the bed, the receptacle shall be located to prevent the bed from contacting any attachment plug that may be installed, or the receptacle shall be provided with a suitable guard.

Substantiation:

The need to protect receptacles located behind beds in patient locations is much more critical than it is at bed locations at guestrooms of hotels and motels. The physical damage conditions are similar and protection as is provided in 210.60(B) (last sentence) for guestrooms of hotels and motels should also be considered for health care facilities. See substantiation for Proposal 2-219 (210-60, Page 133, 1998 NEC ROP).

Panel Meeting Action: Reject

Panel Statement:

This is an impossible requirement to enforce. Every bed has a different configuration and it would mean matching a bed to the design of the facility and then never changing. The Code is not intended as a design specification.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-33 Log #3403 NEC-P15 **Final Action: Accept in Principle**
(517-18(C))

Submitter: Lee A. Mickael, Great River Medical Center

Recommendation:

Revise text to read as follows:
517.18(C) Pediatric Locations. Receptacles located within the ~~patient care~~ areas of pediatric wards, rooms, bathrooms, or areas shall be listed tamper resistant or shall employ a listed tamper resistant cover.

Substantiation:

The present code allows the placement of non-tamper resistant GFCIs to be installed in bathrooms and play rooms of pediatric wards as these are not patient care areas as defined by the code. But these are areas where children are able to access the GFCIs without being seen and could pose a shock hazard.

Panel Meeting Action: Accept in Principle

Change 517.18(C) to read as follows:
"517.18(C) Pediatric Locations. Receptacles located within the rooms, bathrooms, playrooms, activity rooms, and patient care areas of pediatric wards shall be listed tamper resistant or shall employ a listed tamper resistant cover."

Panel Statement:

The panel modified the proposed text to clarify the submitter's intent.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-34 Log #1389 NEC-P15 **Final Action: Reject**
(517-19(B)(3))

Submitter: Fred White, New York State Veterans Home

Recommendation:

Add a new (3) to 517.19(B) as follows:
(3) Receptacle Protection. Where receptacles are installed behind the bed, the receptacle shall be located to prevent the bed from contacting any attachment plug that may be installed, or the receptacle shall be provided with a suitable guard.

Substantiation:

The need to protect receptacles located behind beds in patient locations is much more critical than it is at bed locations at guestrooms of hotels and motels. The physical damage conditions are similar and protection as is provided in 210.60(B) (last sentence) for guestrooms of hotels and motels should also be considered for health care facilities. See substantiation for Proposal 2-219 (210-60, Page 133, 1998 NEC ROP).

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 15-32 (Log #1388).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-35 Log #1952 NEC-P15 **Final Action: Reject**
(517-19(B)(2))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(2) Receptacle Requirements. The receptacles required in 517.19(B)(1) shall be permitted to be of the single or duplex types or a combination of both. All receptacles, whether six or more, shall be listed "hospital grade" and so identified. Each receptacle shall be grounded to the reference grounding point by means of an insulated copper equipment ~~grounding~~ bonding conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-1 (Log #2453o).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

SMITH: See my Comment on Affirmative on Proposal 15-1.

15-35a Log #CP1501 NEC-P15 **Final Action: Accept**
(517-19(C))

Submitter: Code-Making Panel 15

Recommendation:

Revise the second sentence of 517.19(C) to read:
"The patient equipment grounding point, where supplied, shall be permitted to contain one or more listed grounding and bonding jacks."

Substantiation:

The current terminology "listed for the purpose" has been identified by the TCC as a usability issue. The expected "purpose" is not stated and the intent is not clear.
The recommended text explains the purpose of the device and clarifies the specific listing that is required.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-35b Log #CP1502 NEC-P15 **Final Action: Accept**
(517-19(E))

Submitter: Code-Making Panel 15

Recommendation:

Revise 517.19(E) to read:
"(E) Additional Protective Techniques in Critical Care Areas (Optional). Isolated power systems shall be permitted to be used for critical care areas, and, if used, the isolated power system equipment shall be listed as isolated power equipment. The isolated power system shall be designed and installed in accordance with 517.160."

Substantiation:

The current terminology "listed for the purpose" has been identified by the TCC as a usability issue. The expected "purpose" is not stated and the intent is not clear.
The recommended text explains the purpose of the device and clarifies the specific listing which is required.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-36 Log #1953 NEC-P15 **Final Action: Reject**
(517-19(G))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(G) Special-Purpose Receptacle Grounding. The equipment ~~grounding~~ bonding conductor for special-purpose receptacles, such as the operation of mobile X-ray equipment, shall be extended to the reference grounding points of branch circuits for all locations likely to be served from such receptacles. Where such a circuit is served from an isolated ungrounded system, the grounding conductor shall not be required to be run with the power conductors; however, the equipment ~~grounding~~ bonding terminal of the special-purpose receptacle shall be connected to the reference grounding point.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-1 (Log #2453o).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

SMITH: See my Comment on Affirmative on Proposal 15-1.

15-36a Log #CP1503 NEC-P15 **Final Action: Accept**
(517-20(B))

Submitter: Code-Making Panel 15

Recommendation:

Change text of 517.20(B) to read:
"(B) Isolated Power Systems. Where an isolated power system is utilized, the isolated power equipment shall be listed as isolated power equipment, and the isolated power system shall be designed and installed in accordance with 517.160."

Substantiation:

The current terminology "listed for the purpose" has been identified by the TCC as a usability issue. The expected "purpose" is not stated and the intent is not clear.
The recommended text explains the purpose of the device and clarifies the specific listing that is required.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-37 Log #2365 NEC-P15 **Final Action: Reject**
(517-22 (New))

Submitter: Brendan A. Foley, EATON CUTLER-HAMMER

Recommendation:

Add new section 517.22 to read as follows:
517.22 Arc-Fault Circuit Interrupter Protection. Arc-Fault Circuit Interrupter Protection shall be required for the branch circuits that supply 125-volt, single phase, 15- and 20 ampere outlets installed in the bedrooms of nursing homes and limited care facilities where these areas are used exclusively as patient sleeping rooms.

Substantiation:

517.10(B)(2) states that II (Wiring and Protection) does not apply to areas of nursing homes and limited care facilities wired in accordance with Chapters 1 through 4 of this code where these areas are used exclusively as patient sleeping areas. Chapter 2 (210-12) requires that the branch circuits that supply 125-volt, single-phase, 15- and 20-ampere outlets installed in dwelling unit bedrooms shall be protected by an arc-fault circuit interrupter listed to provide protection of the entire branch circuit. However, it is probable that the areas used exclusively as patient sleeping areas in nursing homes and limited care facilities do not receive this 210-12 protection because they may not be recognized as dwelling unit bedrooms. The intent of this code change, therefore, is to ensure that areas used exclusively as patient sleeping areas in nursing homes and limited care facilities indeed receive the same fire safety protection as dwelling unit bedrooms. Since 517.10(A) applies to patient care areas of all health care facilities, the proposal is written to specifically identify nursing homes and limited care facilities. Here it must be noted that the definitions of nursing homes and limited care facilities show that we are dealing with the protection of people with incapacities. On the one hand, the fire safety of these people is improved over the safety of people in dwelling units by the presence of supervisory personnel and different construction technologies. One the other hand, fire safety becomes even more critical in nursing homes and limited care facilities because of the patients incapacities. AFCIs are available and effective (1, 2, 3) and, just as these devices are required for dwelling unit bedrooms in 210.12, these devices should also be required to enhance the fire safety of the areas of nursing homes and limited care facilities that are used exclusively as patient sleeping areas.
References:
1. "Preventing Home Fires: Arc Fault Circuit Interrupters or AFCIs", August 16, 2002. Available on the CPSC website at www.cpsc.gov/CPSCPUB/PUBS/afci.html
2. "The Consumer Product Safety Commission", J. Lardear, NEC Digest, Volume 1, pages 38-44, August/September 2002
3. "AFCI Inquiry and Report", prepared by the Consumer Product Safety Task Force of the National Association of State Fire Marshals, August 1, 2002. Available on the NASFM website at www.firemarshals.org/issues/home/electrical_fires
Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement in Proposal 15-14 (Log #2830).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-38 Log #1281 NEC-P15 (517-25) **Final Action: Accept in Principle in Part**

Submitter: David H. Kendall, Carlon, Lamson & Sessions

Recommendation:

Add new text to read as follows:
517.25 Scope. The essential electrical system for these facilities shall comprise a system capable of supplying a limited amount of lighting and power service, which is considered essential for life safety and orderly cessation of procedures during the time normal electrical service is interrupted for any reason. This includes clinics, medical and dental offices, outpatient facilities, nursing homes, limited care facilities, hospitals, and other health care facilities serving patients.
The essential electrical system shall meet the requirements of Article 700, except as amended by Article 517. The essential electrical system shall supply alternate power to a limited number of prescribed functions vital to the protection of life and patient safety and shall have automatic restoration of electrical power within 10 seconds of power interruption.
FPN: For information as to the need for an essential electrical system, see NFPA 99-1999, Standard for Health Care Facilities.

Substantiation:

This text was deleted from the definition of emergency system in Section 517-3 of the 1999 NEC. By deleting this important link to the requirements in Article 700, the user of the Code is now required to comply with requirements in Article 517 and requirements in Article 700 that differ. For example, Article 517 does not permit some nonessential loads to be added to the essential electrical system, whereas Section 700.5 permits load shaving, load shedding, and load pickup of these loads.

Panel Meeting Action: Accept in Principle in Part

Add a new 517.26 to read as follows:
"517.26 Application of Other Articles. The essential electrical system shall meet the requirements of Article 700, except as amended by Article 517."

Panel Statement:

For clarity, the panel relocated the first sentence of the proposed text to be added to new 517.26. The second sentence is presently covered under 517.31.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

DUNCAN: This proposed change does not meet the requirements of the NEC style manual 4.1.1 because it does not permit references to entire NEC articles.

15-39 Log #2810 NEC-P15 (517-25) **Final Action: Accept in Principle**

Submitter: Henry A. Jenkins, Wake County

Recommendation:

Add a second paragraph to 517.25 to immediately follow the first paragraph to read as follows:
The essential electrical system shall meet the requirements of Article 700, except as amended by Article 517. The essential electrical system shall supply alternate power to a limited number of prescribed functions vital to the protection of life and patient safety and shall have automatic restoration of electrical power within 10 seconds of power interruption.

Substantiation:

This text was deleted from the definition of emergency system in 517-3 of the 1999 NEC. By deleting this important link to the requirements in Article 700, the user of the Code is now required to comply with requirements in Article 517 and requirements in Article 700 that may differ. For example, Article 517 does not permit some nonessential loads to be added to the essential electrical system, whereas 700.5 and 701.6 permits load shaving, load shedding, and load pickup of these loads. 517.30(D), last sentence, states this but this is not also stated in Articles 700 and 701 so it could be implied that the user must comply also with 700.5 and 700.6

Panel Meeting Action: Accept in Principle

Panel Statement:

See the panel action and statement on Proposal 15-38 (Log #1281), which satisfies the submitter's intent.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-40 Log #35 NEC-P15 **Final Action: Accept in Principle**
(517-30(C)(3))

NOTE: The following proposal consists of Comment 17-23 on Proposal 17-35 in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 17-35 was:
Revise text to Section 517-30(c)(3) as follows:
"The wiring of the emergency system of a hospital shall be mechanically protected installation in nonflexible metal raceway, or shall be with Type MI cable. When limited to feeder circuits, Type MC having a welded corrugated sheath shall be permitted. Where installed as branch circuit conductors serving patient care areas, the installation shall comply with the requirements of Section 517-13."

Submitter: Joseph A. Ross, Ross Seminars

Recommendation:

Revise Section 517-30(c)(3) as follows:
(3) Mechanical Protection of the Emergency System. The wiring of the emergency system of a hospital shall be mechanically protected by installation in nonflexible metal raceways.
Where the hospital building is above 23 m (75 ft) in height, emergency feeder circuit wiring shall be in accordance with the conditions of Section 700-9(d)(1) of this Code.

Substantiation:

It is to be noted that over the years, no other Code Making Panel has been as diligent as Code Making Panel 17 in the pursuit to provide a high-level of protection for emergency conductors. The Panel Statement specifies, "The panel has chosen to accomplish this (protection) by requiring nonflexible metallic raceway systems, MI or in encasement of concrete."
Section 700-9(d) includes additional requirements for emergency systems for buildings above 75 ft in height and provides a laundry list of occupancy classes and a hospital building is conspicuously absent. Section 700-9(d)(1) provides additional listed and other protective methods that are not included in Section 517-30(c)(3) and, therefore, are not permitted.
Code Making Panel 17 may opt for other text, other than this proposal, to include additional protective methods, but hospital buildings cannot continue through another cycle of the Code and be the only type building excluded from the occupancy classes. If anything, hospital buildings should provide a high-level of protection of emergency systems more so than any other building.

Panel Meeting Action: Accept in Principle

Panel Statement:

Section 700.9(D) refers to fire protection and not to mechanical protection. The panel action and statement in Proposal 15-38 (Log #1281) would require the installation to comply with Article 700 for fire protection and would address the submitter's concerns.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-41 Log #310 NEC-P15 **Final Action: Reject**
(517-30(C)(3))

Submitter: Paul Aga, Power City Electric

Recommendation:

Add in 2005 Code 517.30(C)(3):
"Where installed as branch circuit conductors serving patient care areas, the installation shall comply with the requirements of Section 517.13."
Also adopt to WAC 296.46A.517 (2002 Code).

Substantiation:

In patient care areas that are existing, requiring emergency outlets to be added, can't be installed without extreme measures if flexible raceways can't be used.

Panel Meeting Action: Reject

Panel Statement:

It is not the panel's intent to allow all wiring methods outlined in 517.13. Some would not provide sufficient mechanical protection.
The reference to WAC 296.46A.517 is not appropriate, as it does not comply with 4-3.3 of the NFPA Regulations Governing Committee Projects.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-42 Log #2695 NEC-P15 **Final Action: Accept in Principle**
(517-30(C)(3))

Submitter: Phil Simmons, Simmons Electrical Services / Rep. National Armored Cable Manufacturers Assn.

Recommendation:

Revise existing Section 517.30(C)(3) as follows:
(3) Mechanical Protection of the Emergency System. The wiring of the emergency system of a hospital shall be mechanically protected by installation in nonflexible metal raceways, or shall be wired with Type MI cable or listed Type MC cable or listed Type AC cable.

Substantiation:

Type AC and MC cables that are listed provide more than adequate physical and mechanical protection for the emergency system of health care facilities. The fact finding study that accompanies this proposal shows Type AC and MC cables provide excellent protection from penetration by nails and screws. This protection is superior to some of the wiring methods presently accepted in some of the exceptions.
In addition, please review the level of protection required in the UL product safety standard for Type AC and Type MC cable. As can be seen, Type AC and MC cables are extremely robust, sturdy and offer more than adequate protection from physical damage.
Note: Supporting material is available for review at NFPA Headquarters.

Panel Meeting Action: Accept in Principle

Replace the existing 517.30(C)(3) with the following:
"(3) Mechanical Protection of the Emergency System. The wiring of the emergency system in a hospital shall be mechanically protected. The following wiring methods shall be permitted:
(1) Nonflexible metal raceways, Type MI cable, or Schedule 80 rigid nonmetallic conduit. Nonmetallic raceways shall not be used for branch circuits that supply patient care areas.
(2) Where encased in not less than 50 mm (2 in.) of concrete, Schedule 40 rigid nonmetallic conduit or flexible nonmetallic raceways listed for installation in concrete. Nonmetallic raceways shall not be used for branch circuits that supply patient care areas.
(3) Flexible metal raceways and metal sheathed cable assemblies as follows:
(a) When used in listed prefabricated medical headwalls,
(b) In listed office furnishings,
(c) Where fished into existing walls or ceilings, not otherwise accessible and not subject to physical damage, or
(d) Where necessary for flexible connection to equipment. Where installed as branch circuits in patient care areas, the installation shall comply with the requirements of 517.13(A) and (B).
(4) Flexible power cords of appliances or other utilization equipment connected to the emergency system.
(5) Secondary circuits of Class 2 or Class 3 communication or signaling systems.
Delete Exceptions No. 1 through No. 5."
Retain fine print note.

Panel Statement:

The panel reworded Section 517.30(C)(3) to provide information for wiring in existing patient care areas.
Additionally, the new language replaces existing exceptions 1 through 5 with positive statements, and incorporates the essence of Proposals 15-42 through 15-46.
Types AC and MC cables that are listed provide adequate physical and mechanical protection for the emergency system of health care facilities. The panel limits these wiring methods only to existing installations where it is impractical to install nonflexible metal raceway.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

WHITE: Add the word "Listed" before Flexible metal raceways and metal sheathed cable assemblies as follows:.

15-44 Log #3111 NEC-P15 **Final Action: Accept in Principle**
(517-30(C)(3) Exception No. 3 (New))

Submitter: Thomas J. Garvey, State of Wisconsin

Recommendation:

Revise Exception No. 3 to read: "Schedule 80 rigid nonmetallic conduit shall be permitted, except for branch circuits serving patient care areas. Schedule 80 rigid shall not be permitted to be used in locations prohibited by other areas of this code.

Substantiation:

The existing text is interpreted to preclude the use of Schedule 80 conduit for feeders on the emergency system.

Panel Meeting Action: Accept in Principle

Panel Statement:

See panel action and statement in Proposal 15-42 (Log #2695).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-43 Log #2994 NEC-P15 **Final Action: Accept in Principle**
(517-30(C)(3) Exception No. 3 and Exception No. 4)

Submitter: Monte Ewing, State of Wisconsin

Recommendation:

Revise as follows:
Exception No.3: Other than branch circuits that serve patient care areas and where prohibited elsewhere in this code, Schedule 80 rigid nonmetallic conduit shall be permitted.
Exception No. 4: Other than branch circuits that serve patient care areas and where prohibited elsewhere in this code, where encased in not less than 50 mm (2 in.) of concrete, Schedule 40 rigid nonmetallic conduit or electrical nonmetallic tubing shall be permitted.

Substantiation:

There is a problem with this section in that there is no separation between feeder wiring and branch circuit wiring both of which are the emergency system. It now looks like nonmetallic raceways cannot be used as feeders where the branch circuits serve patient care areas. The change will clarify that a schedule 80 (or 40 w/concrete) raceway installed for the feeder (located out of the patient care area) and EMT into the patient care area is permitted.

Panel Meeting Action: Accept in Principle

Panel Statement:

See panel action and statement in Proposal 15-42 (Log #2695).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-45 Log #2504 NEC-P15 **Final Action: Accept in Principle**
(517-30(C)(3) Exception No. 4)

Submitter: George W. Flach, Nat'l Armored Cable Mfrs' Assn. (NACMA)

Recommendation:

Revise Exception No. 4 to include Jacketed Interlocked Armored Type MC cable as follows:
Exception No. 4: Where encased in not less than 50 mm (2 in.) of concrete, Schedule 40 rigid nonmetallic conduit ~~or,~~ electrical nonmetallic tubing, or jacketed interlocked armored Type MC cable shall be permitted if the branch circuits do not serve patient care areas.

Substantiation:

Metal Clad cables provide greater mechanical protection than other Chapter 3 cable wiring methods that are excluded by this section. Metal-sheathed cables are inherently suitable for more severe mechanical environments by virtue of their metallic outer covering. Mechanical Protection of the emergency system is an appropriate application for metal-sheathed cables where encased in not less than 50 mm (2 in.) of concrete.

Panel Meeting Action: Accept in Principle

Panel Statement:

See panel action and statement in Proposal 15-42 (Log #2695).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-46 Log #3114 NEC-P15 **Final Action: Accept in Principle**
(517-30(C)(3) Exception No. 4 (New))

Submitter: Thomas J. Garvey, State of Wisconsin

Recommendation:

Replace Exception No. 4 with: "Where encased in not less than 50 mm (2 in.) of concrete, Schedule 40 rigid nonmetallic conduit or electrical nonmetallic conduit shall be permitted, except for branch circuits serving patient care areas."

Substantiation:

The existing text is interpreted to prohibit the use of Schedule 40 rigid nonmetallic conduit and electrical nonmetallic tubing as an emergency system feeder, even if encased in concrete.

Panel Meeting Action: Accept in Principle

Panel Statement:

See panel action and statement in Proposal 15-42 (Log #2695).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-47 Log #1684 NEC-P15 **Final Action: Accept**
(517-34(C) (New))

TCC Action:

The Technical Correlating Committee directs that the NFPA 99 reference be added to the recommended text as shown in the affirmative comment on vote.

Submitter: Burton R. Klein, Burton Klein Associates

Recommendation:

Add new 517.34(C) to read as follows:
(C) AC Equipment for Nondelayed Automatic Connection. Generator accessories, including but limited to, the transfer fuel pump, electrically operated louvers, and other generator accessories essential for generator operation, shall be arranged for automatic connection to the alternate power source.

Substantiation:

To correlate with NFPA 99-2002, section 4.4.2.2.3.3, on same subject. Topic is performance related, but since subpar. (B) and (C) in 517.3.4 are also included in NFPA 70 via the NFPA Extract Policy, inclusion of this text should be considered in order for subject to be complete and not raise confusion by readers as to whether or not it is required.

Panel Meeting Action: Accept

Panel Statement:

This material is directly extracted from 4.4.2.2.3.3 of NFPA 99-2002. The NFPA extract policy requires direct reference to the source NFPA Code or Standard.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

MORGAN: Editorial comment: This is an extract from NFPA 99 and the reference needs to be added to the end of the recommended language: [NFPA 99, 4.4.2.2.3.3.]

15-48 Log #1667 NEC-P15 **Final Action: Accept**
(517-35(B)(4))

TCC Action:

The Technical Correlating Committee directs that the NFPA 99 reference be added to the recommended text as shown in the affirmative comment on vote.

Submitter: Burton R. Klein, Burton Klein Associates

Recommendation:

Add to 517.35 a new 517.35(B)(4) to read:
"(B)(4) A battery system located on the premises."

Substantiation:

1. To correlate with NFPA 99-2002, section 4.4.1.2, which permits a battery system.
2. To correlate with 517.45(B) and (C) that references NFPA 99-1999, section 13-3.3.2.1 and 13-3.3.2.2, which in turn references section 3-4.1 in NFPA 99, permitting the use of a battery system (Same for 2002 edition of NFPA 99.)
3. The text in question is extracted text from NFPA 99, Chapter 4 (on performance requirements for essential electrical systems), thus initiating use of NFPA's Extract Policy.
4. The text in question is causing confusion in the field as to whether NFPA 70 permits a battery system to be used as a source for Type 1 essential electrical systems.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Explanation of Negative:

Comment on Affirmative:

MORGAN: Editorial comment: The proposal is to add language extracted from NFPA 99. The complete extracted language and reference should be added. 517.35(B)(4). A battery system located on the premises shall meet all the requirements of Article 700. [NFPA 99, 4.4.1.2]

15-49 Log #1382 NEC-P15 **Final Action: Reject**
(517-42, 517.44, 517.45, 517.60, 517.61, 517.160)

Submitter: Richard Fransen, Daiken America, Inc.

Recommendation:

Delete "NFPA 99" wherever used in mandatory code language.

Substantiation:

Paragraph 4.2 of the 2001 NEC Style Manual prohibits direct reference to another NFPA standard in mandatory code language.
"4.2 References to Other Standards. References to other standards shall not be in mandatory Code text. References to product standards shall be in an informative annex. References to other Standards shall be in the Fine Print Notes."

Panel Meeting Action: Reject

Panel Statement:

The NFPA extract policy requires direct reference to the source NFPA Code or Standard. FPNs do not present mandatory language. The paragraphs referenced by the submitter are in accordance with the extract policy.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-50 Log #2720 NEC-P15 **Final Action: Reject**
(517-45)

Submitter: Patrick Weldon Apple Valley, MN

Recommendation:

Add text to read as follows:
517.45 Essential Electrical Systems for Other Health Care Facilities.
(A) Essential Electrical Distribution. The essential electrical distribution system shall be a battery or generator system. [NFPA 99, 13.3.3.2]
(B) Electrical Life Support Equipment. Where electrical life support equipment is required, the essential electrical distribution system shall be as described in 517.30 through 517.35. [NFPA 99, 13.3.2.1]
(C) Critical Care Areas. Where critical care areas are present, the essential electrical distribution system shall be described in 517.30 through 517.35. [NFPA 99, 13.3.3.2.2]
(D) Connections. The essential electrical system shall supply power for the following:
1. Task illumination that is related to the safety of life and that is necessary for the safe cessation of procedures in progress
2. All anesthesia and resuscitative equipment used in areas where inhalation anesthetics are administered to patients, including alarm and alerting devices.
(E) Power Systems. Battery systems shall be installed in accordance with the requirements of Article 700, and generator systems shall be as described in 517.30 through 517.35.

Substantiation:

Add now subsection (D), relocate old subsection (D) to subsection(E).
During the reorganization of Article 517 for the 2002 code cycle, Section 517.50 of previous code editions was eliminated. The requirement of task illumination for the safe cessation of procedures in progress does not exist in 517.45, or at best, is very unclear. Most procedure rooms are not by definition "critical care areas". This proposal would restore the safety that was ensured in other editions of the NEC to such health care areas such as dental offices, doctor offices and other similar health care facilities with procedure rooms. Not all jurisdictions adopt, nor do most electrical inspectors have the authority to enforce NFPA 99 requirements.

Panel Meeting Action: Reject

Panel Statement:

The panel removed this requirement for the 2002 Code because it did not want to mandate procedure rooms that are not critical care areas nor have life support equipment to comply with the requirements of the essential electrical system.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-50a Log #CP1504 NEC-P15 **Final Action: Accept**
(517-61(A)(2))

Submitter: Code-Making Panel 15

Recommendation:

Change 517.61(A)(2) to read as follows:
"(2) Design and Installation. Where an isolated power system is utilized, the isolated power equipment shall be listed as isolated power equipment, and the isolated power system shall be designed and installed in accordance with 517.160."

Substantiation:

The current terminology "listed for the purpose" has been identified by the TCC as a usability issue. The expected "purpose" is not stated and the intent is not clear.
The recommended text explains the purpose of the device and clarifies the specific listing that is required. In the interest of clarity, the reference to Part VII has been replaced with a reference to 517.160.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-51 Log #1954 NEC-P15 **Final Action: Reject**
(517-61(B)(6))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(6) 250-Volt Receptacles and Attachment Plugs Rated 50 and 60 Amperes. Receptacles and attachment plugs rated 250 volts, for connection of 50-ampere and 60-ampere ac medical equipment for use above hazardous (classified) locations shall be arranged so that the 60-ampere receptacle will accept either the 50-ampere or the 60-ampere plug. Fifty-ampere receptacles shall be designed so as not to accept the 60-ampere attachment plug. The attachment plugs shall be of the 2-pole, 3-wire design with a third contact connecting to the insulated (green or green with yellow stripe) equipment ~~grounding~~ bonding conductor of the electrical system.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-1 (Log #2453o).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

SMITH: See my Comment on Affirmative on Proposal 15-1.

15-52 Log #1955 NEC-P15 **Final Action: Reject**
(517-61(C)(3))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(3) 250-Volt Receptacles and Attachment Plugs Rated 50 and 60 Amperes. Receptacles and attachment plugs rated 250 volts, for connection of 50-ampere and 60-ampere ac medical equipment for use in other-than-hazardous (classified) locations shall be arranged so that the 60-ampere receptacle will accept either the 50-ampere or the 60-ampere plug. Fifty-ampere receptacles shall be designed so as not to accept the 60-ampere attachment plug. The attachment plugs shall be of the 2-pole, 3-wire design with a third contact connecting to the insulated (green or green with yellow stripe) equipment ~~grounding~~ bonding conductor of the electrical system.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-1 (Log #2453o).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

SMITH: See my Comment on Affirmative on Proposal 15-1.

15-52a Log #CP1505 NEC-P15 **Final Action: Accept**
(517-63(E))

Submitter: Code-Making Panel 15

Recommendation:

Change 517.63(E) to read as follows:
"(E) Location of Isolated Power Systems. Where an isolated power system is utilized, the isolated power equipment shall be listed as isolated power equipment. Isolated power equipment and its grounded primary feeder shall be permitted to be located in an anesthetizing location, provided it is installed above a hazardous (classified) location or in an other-than-hazardous (classified) location."

Substantiation:

The current terminology "listed for the purpose" has been identified by the TCC as a usability issue. The expected "purpose" is not stated and the intent is not clear.
The recommended text explains the purpose of the device and clarifies the specific listing that is required.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-52b Log #CP1508 NEC-P15 **Final Action: Accept**
(517-64(F), FPN)

Submitter: Code-Making Panel 15

Recommendation:

Remove the last sentence of the 517.64(F) FPN.

Substantiation:

The last sentence of the 517.64(F) FPN refers to an outdated edition of NFPA 99 and adds no value.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-53 Log #2216 NEC-P15 (517-160) **Final Action: Reject**

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:

517.160 Isolated Power Systems.

(A) Installations.

(1) Isolated Power Circuits. Each isolated power circuit shall be controlled by a switch that has a disconnecting pole in each isolated circuit conductor to simultaneously disconnect all power. Such isolation shall be accomplished by means of one or more transformers having no electrical connection between primary and secondary windings, by means of motor generator sets, or by means of suitably isolated batteries.

(2) Circuit Characteristics. Circuits supplying primaries of isolating transformers shall operate at not more than 600 volts between conductors and shall be provided with proper overcurrent protection. The secondary voltage of such transformers shall not exceed 600 volts between conductors of each circuit. All circuits supplied from such secondaries shall be ungrounded and shall have an approved overcurrent device of proper ratings in each conductor. Circuits supplied directly from batteries or from motor generator sets shall be ungrounded and shall be protected against overcurrent in the same manner as transformer-fed secondary circuits. If an electrostatic shield is present, it shall be connected to the reference grounding point. [NFPA 99, 3.3.2.2.1]

(3) Equipment Location. The isolating transformers, motor generator sets, batteries and battery chargers, and associated primary or secondary overcurrent devices shall not be installed in hazardous (classified) locations. The isolated secondary circuit wiring extending into a hazardous anesthetizing location shall be installed in accordance with 501.4.

(4) Isolation Transformers. An isolation transformer shall not serve more than one operating room except as covered in (a) and (b).

For purposes of this section, anesthetic induction rooms are considered part of the operating room or rooms served by the induction rooms.

(a) Induction Rooms. Where an induction room serves more than one operation room, the isolated circuits of the induction room shall be permitted to serve single receptacles in several patient areas where the following apply:

(1) The receptacles are reserved for supplying power to equipment requiring 150 volts or higher, such as portable X-ray units.

(2) The receptacles and mating plugs are not interchangeable with the receptacles on the local isolated power system. [NFPA 99, 122.4.1.2.6(d), 12.4.1.2.6(e)]

(5) Conductor Identification. The isolated circuit conductors shall be identified as follows:

(1) Isolated Conductor No. 1 — Orange

(2) Isolated conductor No. 2 — Brown

For 3-phase systems, the third conductor shall be identified as yellow. Where isolated circuit conductors supply 125-volt, single-phase, 15- and 20-ampere receptacles, the orange conductor(s) shall be connected to the terminal(s) on the receptacles that are identified in accordance with 200.10(B) for connection to the ~~grounded~~ earth circuit conductor.

(6) Wire-Pulling Compounds. wire-pulling compounds that increase the dielectric constant shall not be used on the secondary conductors of the isolated power supply.

FPN No. 1: It is desirable to limit the size of the isolation transformer to 10 kVA or less and to use conductor insulation with low leakage to meet impedance requirements.

FPN No. 2: Minimizing the length of branch-circuit conductors and using conductor insulations with a dielectric constant less than 3.5 and insulation resistance constant greater than 6100 megohm-meters (20,000 megohm-ft.) at 16°C (60°F) reduces leakage from line to ground, reducing the hazard current.

(B) Line Isolation Monitor.

(1) Characteristics. In addition to the usual control and overcurrent protective devices, each isolated power system shall be provided with a continually operation line isolation monitor that indicates total hazard current. the monitor shall be designed so that a green signal lamp, conspicuously visible to persons in each area served by the isolated power system, remains lighted when the system is adequately isolated from ground. An adjacent red signal lamp and an audible warning signal (remote if desired) shall be energized when the total hazard current (consisting of possible resistive and capacitive leakage currents) from either isolated conductor to ground reaches a threshold value of 5 mA under nominal line voltage conditions. The line moni-

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The term "grounded" is clearly defined as being connected to earth or some conducting body that serves in place of the earth. Changing the term "grounded" to "earth" would not add any clarity. Other international standards have multiple definitions for earth and earthing. This topic requires a uniform application throughout the Code. The panel recommends that the TCC forward this proposal to Panel 5 for comment and action.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-54 Log #27 NEC-P15 (518) **Final Action: Accept in Principle**

NOTE: The following proposal consists of Comment 15-22 on Proposal 15-11 in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 15-11 was:

[Text of (May 2001) Proposal 15-11 is shown on page 2406]

Submitter: James R. Quiter, Rolf Jensen & Assoc., Inc.

Recommendation:

Revise the title of Article 518 as follows:
Article 518 - ~~Places of~~ Assembly Occupancies
Revise 518-1 as follows:
518-1. Scope. This article covers all buildings or portions of buildings or structures designed or intended for the ~~assembly~~ gathering together of 100 or more persons for deliberation, worship, entertainment, eating, drinking, amusement, awaiting transportation, or similar uses.
Revise 518-2(a) as follows:
(a) Examples. Assembly occupancies ~~Places of assembly~~ shall include, but not be limited …
Also, change "place of assembly" to "assembly occupancy" in 240-2, 333-4, 336-5(a), 518-3(a), 640-3(e), and 770-21 (2 locations).

Substantiation:

I serve as Chair of the NFPA Technical Correlating Committee on Safety to Life (TCC). At its September 26-27, 2000 meeting, the TCC discussed NEC Proposal 15-11 and drafted this comment. I am submitting the comment in my name, in lieu of that of the TCC, because there was not sufficient time to letter ballot the TCC prior to the October 27 comment closing date. The NFPA regulations addressing the submittal of comments to technical committees/panels outside one's own project require letter balloting by the committee that wants to submit the comment.

The current language of 518-1 is not restrictive enough in scope to accomplish its intent. The loosely defined phrase "for the ASSEMBLY of 100 or more persons" is deficient in not specifying the purpose for which the persons have assembled. Via the current wording, a space/area with 100 desks and 100 chairs in an office building would be subject to the provisions of Article 518, yet this doesn't appear to be the intent of Article 518. From the list of examples in 518-2(a), which acknowledges via its wording that the list of examples is not all inclusive, it appears that the provisions of Article 518 are meant to apply to groups of 100 or more persons if the people have gathered together for purposes that the Life Safety Code and the model building codes refer to as constituting an assembly occupancy. It appears that Article 518 is not meant to apply to all gatherings of 100 persons or more regardless of those persons' reason for gathering.

The wording revisions proposed would accomplish two things:

1. The new wording will clarify the intent of the scope of Article 518; the current wording is unclear.
2. The new wording will create consistency in terminology among three premier documents within NFPA's arsenal of codes for the built environment - NFPA 70 NEC, NFPA 101 Life Safety Code, and NFPA 5000 (proposed) Building Code. None of these documents should attempt to function in a vacuum without consideration of the others. We owe it to our constituency to work toward consistency and avoid conflicting language.

Panel Meeting Action: Accept in Principle

Panel Statement:

The submitter's intent was satisfied by Proposals 15-57 (Log #939), 15-60 (Log #938), and 15-63 (Log #937).

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16 Negative: 1

Explanation of Negative:

WHITE: "Places of assembly occupancies" is clear and precise. To change, will confuse the end user.

Comment on Affirmative:

SMITH: I agree with the Panel's decision to Accept in Principle. The new term 'assembly occupancy' and definition may not correlate to all other building codes. The Technical Correlating Committee should be involved in Title and Scope changes.

VANNICE: Proposal 15-64a also satisfies the submitter's intent. Other sections in the submitter's request are not under the purview of CMP 15.

15-55 Log #28 NEC-P15 (518) **Final Action: Accept in Principle in Part**

NOTE: The following proposal consists of Comment 15-23 on Proposal 15-11a in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 15-11a was:
Delete 518-2(a) and renumber 518-2(b) and (c) accordingly. Retain the current title "518.2 General Classification".

Submitter: James K. Lathrop, Koffel Assoc., Inc.

Recommendation:

Accept proposal as modified below:
Revise 518 to read as follows:
Article 518 - ~~Places of~~ Assembly Occupancies
Revise 518-1 as follows:
518-1 Scope. This article covers all buildings or portions of buildings or structures designed or intended for the ~~assembly~~ gathering together of 100 or more persons for such purposes as deliberation, worship, entertainment, eating, drinking, amusement, awaiting transportation, or similar purposes.
Delete 518-2(a) and renumber 518-2(b).

Substantiation:

Without the change suggested above deleting the list would be a significant change in the scope of the document with no justification. This is more than just deleting a list. It is changing the total scope of the Article. Without the list, the Code will be worse, not better. However, by properly defining an assembly use, as is defined in the Life Safety Code and all the model building codes and in the proposed NFPA 5000, deleting the list will not be as problematic.

Without the suggested revision the Panel is now saying that this article applies to factories, open plan office buildings, open dormitory prisons and military barracks, stores, open plan schools, and large warehouses and distribution facilities. Where is the justification for this significant increase in scope?

If one follows the history of the NEC since 1975, when Article 518 first went into the code, it has never been substantiated that "Place of Assembly" in the NEC is any different than "Place of Assembly" in the Life Safety Code or the model building codes. Although the other codes eventually modernized the term to "assembly occupancies" the basic definition was the same. When I was Chief Life Safety Engineer for NFPA, I often discussed this article with the NEC staff due to the fact that NEC used 100 vs. the Life Safety Code 50 people. We repeatedly came to the same conclusion that was not a conflict because the NEC was just using a larger number for wiring purposes (similar to the 100 the Life Safety Code used for panic/fire exit hardware.) It was never discussed that the NEC meant something totally different from the Life Safety Code.

Quoting from the scope of Article 518 in the 1975 NEC: "This article covers all buildings or that part of a building or structure designed or intended for use by 100 or more persons for assembly purposes, such as dining, meeting, entertainment, lectures, bowling, worship, dancing or exhibition, and includes museums, gymnasiums, armories, group rooms, mortuaries, skating rinks, pool rooms, places of awaiting transportation, places for deliberation (court rooms), places for sporting events, and similar purposes." It does not say any place you gather together 100 or more people. The intent has always been to apply to the gathering together of 100 or more people for assembly purposes.

As pointed out by the Panel the list is just that a list. Is not all inclusive. However, every use on the list is an assembly use. How does the Panel now say that non-assembly uses will be included? Where is the justification to extend this beyond the uses that all model codes include in the assembly category?

In summary, the Panel is trying to significantly increase the scope of the article through the deletion of a list. Although deleting lists is usually a good idea, the base definition must be proper. As is remaining in the NEC, the base requirement without the list is not adequate and has not been justified by the Panel.

Panel Meeting Action: Accept in Principle in Part

Panel Statement:

The submitter's intent was satisfied by Proposals 15-57 (Log #939), 15-60 (Log #938), and 15-63 (Log #937).

The panel rejects the submitter's recommendation to remove the list of examples in 518.2(A), as the list adds clarity.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16 Negative: 1

Explanation of Negative:

WHITE: If you change this, it will change the scope of this article with no justification.

Comment on Affirmative:

SMITH: I agree with the Panel's decision to Accept in Principle and Part. See my comment on Proposal 15-54.

15-56 Log #29 NEC-P15 (518) **Final Action: Reject**

NOTE: The following proposal consists of Comment 15-24 on Proposal 15-11 in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. [See Proposal 15- (Log #27)]

Submitter: Patricia Horton, Allied Tube & Conduit

Recommendation:

Continue to reject this proposal.

Substantiation:

Rejection of this proposal is right in line with the Code-Making Panel 15 interpretation of the intent of Article 518 over the years. The Panel has been especially astute in recognizing that the NEC charge is to deal with electrical issues, including ALL hazards arising from the use of electricity. The NFPA Board of Directors acknowledged years ago that those hazards include fire hazards. The Panel has long included the increased risks that exist where over 100 persons are intended to be present. In the interest of aiding in their continued assessment of the nonmetallic wiring methods that are not permitted by Article 518, comments on Article 336 and Article 331, as well as back-up documents are forwarded as part of this comment and comment on 15-11a. Also included is a comment to Proposal 7-145 developed by the NFPA 3-story Task Group as the basic response to proposed expanded use of NM Cable. These documents should be helpful to Code-Making Panel 15 in their continuing review of this issue.
Note: Supporting Material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement:

It is necessary to make the definition and scope of assembly occupancy consistent with NFPA 101 and 5000. It is the panel's intent to revise the wording of Proposal 15-11 from the previous cycle with the wording resulting from panel action and statement in Proposals 15-57 (Log #939), 15-60 (Log #938), and 15-63 (Log #937) of the current cycle.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16 Negative: 1

Explanation of Negative:

WHITE: Rejection of this will keep the integrity of this article.

15-57 Log #939 NEC-P15 (518) **Final Action: Accept**

TCC Action:

The Technical Correlating Committee advises that Article titles are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee Accepts the Panel Action.

Submitter: Donald J. Talka, Underwriters Laboratories

Recommendation:

Revise text to read as follows:
Article 518 - ~~Places of~~ Assembly Occupancies.

Substantiation:

During the last code cycle the panel voted to hold comment 15-22 on proposal 15-11. The chair of CMP 15 was directed by the TCC to form a task group to review held comment 15-22 made to proposal 15-11, submitted during the 2002 code cycle, and to formulate a proposal to clarify the working of the scope of Article 518. A task group consisting of members of CMP 15, NFPA 101, and NFPA 5000 was formed and the matter was appropriately discussed and acted upon. The task group is of the opinion that the definition of an assembly occupancy should be consistent in the Building Code, NFPA 5000, the Life Safety Code, NFPA 101, and the National Electrical Code. NFPA 1, NFPA 101 and NFPA 5000 define an assembly occupancy as described above. In addition, NFPA 1, NFPA 101, and NFPA 5000 make reference to NFPA 70 for the electrical aspects of a building. These four codes are referring to the same structures. In order to effect proper cross reference it is necessary to have consistent language in each of the codes.

Panel Meeting Action: Accept

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16 Negative: 1

Explanation of Negative:

WHITE: "Places of Assembly Occupancies" is clear and defined in the scope of 518-1. To change this, will only confuse the end user.

Comment on Affirmative:

SMITH: I agree with the Panel's decision to Accept. See my comment on Proposal 15-54.

15-60 Log #938 NEC-P15Meeting Action: Accept in Principle (518-1) **Final Action: Reject**

TCC Action: Reject

The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee "Rejects" the Panel Action.

The Panel needs to clarify the Panel Action on this Proposal and correlate the revisions of 518.1 with the panel action on Proposal 15-58. The panel has included the words "assembly or" in this action, but deleted similar words in the action on 15-58.

The Technical Correlating Committee also notes that the panel action is not clear as to what portions of Articles 520, 525 and 530 are applicable if the installation also falls under the scope ofArticle 518. The panel needs to be specific as to what portions of the other articles apply or modify Article 518. This action will be considered by the Panel as a Public Comment.

Submitter: Donald J. Talka, Underwriters Laboratories

Recommendation:

Revise text to read as follows:

518.1 Scope. Except as required in Articles 520, 525, and 530, this article covers all buildings or portions of buildings or structures designed or intended for the ~~assembly or~~ gathering together of 100 or more persons for such purposes as deliberation, worship, entertainment, eating, drinking, amusement, awaiting transportation, or similar purposes.

Substantiation:

During the last code cycle the panel voted to hold comment 15-22 on proposal 15-11. The chair of CMP 15 was directed by the TCC to form a task group to review held comment 15-22 made to proposal 15-11, submitted during the 2002 code cycle, and to formulate a proposal to clarify the working of the scope of Article 518. A task group consisting of members of CMP 15, NFPA 101, and NFPA 5000 was formed and the matter was appropriately discussed and acted upon. The task group is of the opinion that the definition of an assembly occupancy should be consistent in the Building Code, NFPA 5000, the Life Safety Code, NFPA 101, and the National Electrical Code. NFPA 1, NFPA 101 and NFPA 5000 define an assembly occupancy as described above. In addition, NFPA 1, NFPA 101, and NFPA 5000 make reference to NFPA 70 for the electrical aspects of a building. These four codes are referring to the same structures. In order to effect proper cross reference it is necessary to have consistent language in each of the codes.

Panel Meeting Action: Accept in Principle

Revise Section 518.1 text to read as follows:

"518.1 Scope. Except as required in Articles 520, 525, and 530, the provisions of this article shall apply to electrical construction and installation criteria in all buildings or portions of buildings or structures designed or intended for the assembly or gathering together of 100 or more persons for such purposes as deliberation, worship, entertainment, eating, drinking, amusement, awaiting transportation, or similar purposes."

Panel Statement:

The panel reworded the scope to add clarity.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16 Negative: 1

Explanation of Negative:

WHITE: Taking the word "Assembly" out of 518-1 scope opens up the rest of the article for more interpretations by the Authority Having Jurisdiction and the people using the code.

Comment on Affirmative:

SMITH: I agree with the Panel's decision to Accept in Principle. See my comment on Proposal 15-54.

VANNICE: I agree with the concept of aligning this article with NFPA 101, NFPA 5000 and other NFPA documents. A historical search would result in the knowledge that this article was split off from Article 520, Theaters and Assembly Halls, for the purpose of separating the places of public assembly without the special theater conditions from those with the special theater conditions.

My historical perspective also causes me to voice a concern. Some people believe that since Article 518 covers Assembly Occupancies as in the Life Safety Code, it can only deal with life safety issues evolving around egress. For example, only toxicity and fire spread issues that allow sufficient time for evacuation can be considered. I contend that there is other safety issues that must be addressed pertaining to the casual assembly of large numbers of the general public. For example, issues around reducing the likelihood of having to evacuate due to complications of these special environments, and reducing exposure to shock are also appropriate. This concept is supported by a letter from NFPA's Mr. Arthur Cote, a portion of which quoted in the May 2001 ROC under action 15-24 is as follows: "the scope clearly states that it (CMP) shall have the primary responsibility for preparing documents on minimizing the risk of electrical shock and as a potential ignition source of fires and explosions."

15-58 Log #30 NEC-P15Meeting Action: Accept in Principle in Part (518-1, 518-2(a)) **Final Action: Reject**

TCC Action: Reject

The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal and correlate the revisions to 518.1 and 518.2 with the panel actions on Proposals 15-60 and 15-63. The panel has accepted different language for the same sections in this proposal and in proposals 15-60 and 15-63. This action will be considered by the Panel as a Public Comment.

The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee "Rejects" the panel action on 518.1 until the correlation issues with Proposal 15-60 are resolved.

NOTE: The following proposal consists of Comment 15-26 on Proposal 15-11 in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. [See Proposal 15-54 (Log #27)]

Submitter: James K. Lathrop, Koffel Assoc., Inc.

Recommendation:

Accept proposal as originally submitted.

Substantiation:

The panel statement is without technical justification and inconsistent with other NFPA documents. It states "They are buildings or portions of buildings or structures designed or intended for the assembly of 100 or more persons anywhere for any reason, except where modified elsewhere by the NEC." Is the panel now saying that factories, open plan office buildings, open dormitory prisons and military barracks, stores, open plan schools, and large warehouses and distribution facilities are now Places of Assembly? If so, where is the justification for this significant increase in scope.

If one follows the history of the NEC since 1975, when Article 518 first went into the code, it has never been substantiated that "Place of Assembly" in the NEC is any different than "Place of Assembly" in the Life Safety Code or the model building codes. Although the other codes eventually modernized the term to "assembly occupancies" the basic definition was the same. When I was Chief Life Safety Engineer for NFPA, I often discussed this article with the NEC staff due to the fact that the NEC used 100 vs the Life Safety Code 50 people. We repeatedly came to the same conclusion that this was not a conflict because the NEC was just using a larger number for wiring purposes (similar to the 100 the Life Safety Code uses for panic/fire exit hardware.) It was never discussed that the NEC meant something totally different from the Life Safety Code.

Quoting from the scope of Article 518 in the 1975 NEC: "This article covers all buildings or that part of a building or structure designed or intended for use by 100 or more persons for assembly purposes, such as dining, meeting, entertainment, lectures, bowling, worship, dancing or exhibition, and includes museums, gymnasiums, armories, group rooms, mortuaries, skating rinks, pool rooms, places of awaiting transportation, places for deliberation (court rooms), places for sporting events, and similar purposes." It does not say any place you gather together 100 or more people. The intent has always been to apply to the gathering together of 100 or more people for assembly purposes.

By the way, a building defined by NFPA in its glossary of terms as: "Building: Any structure used or intended for supporting or sheltering any use or occupancy." Therefore an open platform is a building since it is a structure that is supporting a use or occupancy. However, this is not a significant issue and if the panel wishes to accept in principle but retain "building or structure" there is no objection. That is not a justification for rejecting the whole proposal.

As pointed out by the Panel the list is just that a list. Is not all inclusive. However, every use on the list is an assembly use. How does the panel now say that non-assembly uses will be included? Where is the justification to extend this beyond the uses that all model codes include in the assembly category.

In the last four paragraphs of the Panel statement the panel lays out a very good reason for the elimination of Article 518. The Panel does an excellent job of explaining that the requirements are based on the number of people and not the electricity. Why does the gathering together of 100 people, regardless of the reason, make electricity, or the wiring system behave any differently? The Panel clearly lays it out; "Possible electrical induced hazards include".

Fire - no different based on the number of people - the wiring methods and the electricity do not behave differently.

Smoke - is a different type of smoke given off due to the number of people?

Toxicity - why is this different, is the toxicity different if a wiring method burns in a hospital or a school verses an assembly use?

Structural Integrity - Is the Panel saying that structural integrity is more important in an assembly use than in a high rise?

Burns, shocks, explosions, blinding flashes, and electrocutions - this is totally independent of the number of people. Where does the fire record show this to be different based on the building containing an assembly use?

In summary, the Panel is trying to significantly increase the scope of the article through its Panel statement. The Panel must provide significant justification for such action. Since the Panel statement can be considered part of the developmental record, the statement must be withdrawn regardless of action on this comment.

Panel Meeting Action: Accept in Principle in Part

Revise the title of Article 518 as follows:

Article 518 — ~~Places of~~ Assembly Occupancies

Revise 518-1 as follows:

518-1. Scope. This article covers all buildings or portions of buildings ~~or structures~~ designed or intended for the ~~assembly~~ gathering together of 100 or more persons for such purposes as deliberation, worship, entertainment, eating, drinking, amusement, awaiting transportation, or similar purposes.

Revise 518-2(a) as follows:

518-2(a) Examples. ~~Places of a~~ Assembly occupancies shall include, but not be limited to, the following:

Armories

Assembly halls

Auditoriums

~~Auditoriums~~
~~Auditoriums within~~
~~Business establishments~~
~~Mercantile establishments~~
~~Other occupancies~~
~~Schools~~
Bowling lanes
~~Church chapels~~
Club rooms
College and university classrooms, 100 persons and over
Conference rooms
Courtrooms
Dance halls
Dining facilities
Drinking establishments
Exhibition halls
Gymnasiums
Mortuary chapels
Multipurpose rooms
Museums
Passenger stations and terminals of air, surface, underground, and marine public transportation facilities
~~Places of awaiting transportation~~
Places of religious worship
Pool rooms
Recreation piers
Restaurants
Skating rinks
Libraries

Also: change "Place of assembly" to "assembly occupancy" in 240-2, 333-4, 336-5(a), 518-3(a), 640-3(e), and 770-21 (2 locations). Do not change it in 700-1 FPN No. 3 since it is not used in the same context and is a good example of why it should be changed in Article 518.

Panel Statement:

The submitter's intent was satisfied by Proposals 15-57 (Log #939), 15-60 (Log #938), and 15-63 (Log #937).

The panel rejects the submitter's recommended changes to the list of examples in 518.2(A). It is the panel's intent to revise the wording of Proposal 15-11 from the previous cycle with the wording resulting from panel action and statement in Proposals 15-57 (Log #939), 15-60 (Log #938), and 15-63 (Log #937) of the current cycle.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16 Negative: 1

Explanation of Negative:

WHITE: By eliminating the examples, you will create a greater hazard to the wiring methods of 518 without justification.

Comment on Affirmative:

SMITH: I agree with the Panel's decision to Accept in Principle and Part. See my comment on Proposal 15-54.

15-59 Log #31 NEC-P15 **Final Action: Reject**
(518-1 and 518-2(a))

NOTE: The following proposal consists of Comment 15-27 on Proposal 15-11 in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. [See Proposal 15-54 (Log #27)]

Submitter: Michael I. Callanan, International Brotherhood of Electrical Workers

Recommendation:

Continue to reject this proposal.

Substantiation:

The Panel statement is correct "The NEC does define Places of Assembly". The scope in section 518-1 and the examples listed in 518-2 provide the user with the necessary information for proper application of Article 518.

This comment represents the official position of the International Brotherhood of Electrical Workers Codes & Standards Committee.

Panel Meeting Action: Reject

Panel Statement:

It is necessary to make the definition and scope of assembly occupancy consistent with NFPA 101 and 5000. It is the panel's intent to revise the wording of Proposal 15-11 from the previous cycle with the wording resulting from panel action and statement in Proposals 15-57 (Log #939), 15-60 (Log #938) and 15-63 (Log #937) of the current cycle.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16 Negative: 1

Explanation of Negative:

WHITE: The NEC already defines Places of Assembly in the scope of 518-1. The list of examples serves to help the end user.

15-61 Log #32 NEC-P15 **Final Action: Reject**
(518-2)

NOTE: The following proposal consists of Comment 15-29 on Proposal 15-11a in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. [See Proposal 15-55 (Log #28)]

Submitter: Patricia Horton, Allied Tube & Conduit

Recommendation:

Accept this proposal in principle, but add back a charging paragraph as noted by Mr. Vannice in his comment, and as noted by the Technical Correlating Committee. New paragraph to read as follows:

(a) Places of Assembly. Places of assembly shall include all buildings or portions of buildings or structures designed or intended to be occupied by 100 or more persons at any given time.

Leave "Multiple Occupancies (b), and Theatrical Areas (c)," as contained in the 1999 NEC.

Substantiation:

The decision to delete this list will clarify the long expressed intent of Code-Making Panel 15. Section (a) has always clearly stated the list is examples only, and not all inclusive. The reasoning contained in the Panel statement for 15-11 certainly provided their overall thinking. Documentation in support of our comments on 15-11, 15-11a, 15-16, 15-17, and 15-18 has been provided as a package to the Code-Making Panel as overall information on the nonmetallic wiring methods that are regulated in Article 518. This is provided for the record and further edification of the Panel. For detailed information readers of the ROC are referred to comments on Proposal 7-145.

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

Panel Meeting Action: Reject

Panel Statement:

It is necessary to make the definition and scope of assembly occupancy consistent with NFPA 101 and 5000. It is the panel's intent to revise the wording of Proposal 15-11a from the previous cycle with the wording resulting from the panel action and statement in Proposals 15-57 (Log #939), 15-60 (Log #938), and 15-63 (Log #937) of the current cycle.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16 Negative: 1

Explanation of Negative:

WHITE: Eliminating the list will only confuse the end user.

15-62 Log #33 NEC-P15 (518-2) **Final Action: Accept in Principle in Part**

NOTE: The following proposal consists of Comment 15-30 on Proposal15-11a in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. [See Proposal 15-55 (Log #28)]

Submitter: Michael I. Callanan, International Brotherhood of Electrical Workers

Recommendation:

Reject this proposal.

Substantiation:

Deleting the list of examples will not help the user of this code. In fact the user of this code will be confused by this action. Removal of the examples listed will decrease the usability of Article 518.
The text in 518-2a clearly states "Places of assembly shall include, but not be limited to, the following:" informing the user that the list of examples is not all-inclusive.

This comment represents the official position of the International Brotherhood of Electrical Workers Codes & Standards Committee.

Panel Meeting Action: Accept in Principle in Part

Delete 518-2(a) and renumber 518-2(b) and (c) accordingly. Retain the current title "518.2 General Classification"

Panel Statement:

The panel accepts the submitter's recommendation to retain a list of examples in 518.2(A). The panel has revised the list of examples in Proposal 15-63.

It is necessary to make the definition and scope of assembly occupancy consistent with NFPA 101 and 5000. It is the panel's intent to revise the wording of Proposal 15-11a from the previous cycle with the wording resulting from the panel action and statement in Proposals 15-57 (Log #939), 15-60 (Log #938) and 15-63 (Log #937) of the current cycle.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 15 Negative: 2

Explanation of Negative:

HEFTER: I concur with Mr. Vannice's Explanation of Negative Vote, and Mr. Morgan's Comment on Affirmative Vote. The last paragraph of the panel's action deletes text that the rest of the action was modifying. This appears to be a transcription error. If deleted, my vote would revert to the affirmative.

VANNICE: I agree with the panel action and the panel statement except for the last paragraph. The paragraph "Delete 518-2(a)..." is a statement of the original proposal and negates the rest of the panel statement above. This comment is intended to correct the obvious typographical error and not vote down the panel action. The Technical Correlating Committee should correct the error in which case my vote would then change to the affirmative.

Comment on Affirmative:

MORGAN: Last line of Panel Statement seems to be in conflict with action 15-63. ~~"Delete 518.29(a) and renumber 518.2(b) and (c) accordingly. Retain the current title "518.2 General Classification."~~ (Note: Proposal 15-63 was accepted by the Panel and retains the existing paragraph numbering.)

15-63 Log #937 NEC-P15 **Final Action: Accept**
(518-2(A) and (B))

TCC Action:

The Technical Correlating Committee directs that the Panel clarify the Panel Action on this Proposal and correlate the revisions of 518.2 with the panel action on Proposal 15-58. The list accepted by the action on this proposal is not consistent with the list contained in the action on Proposal 15-58. This action will be considered by the Panel as a Public Comment.

Submitter: Donald J. Talka, Underwriters Laboratories

Recommendation:

Revise text to read as follows:
518.2 General Classification.
(A) Examples. ~~Places of~~ Assembly Occupancies shall include, but not be limited to the following:

Insert Table Here

(Table shown on page 2741)

(B) Multiple Occupancies. Where an assembly occupancy forms a portion of a building containing other occupancies, Article 518 only applies to that portion of the building considered an assembly occupancy. Occupancy of any room or space for assembly purposes by less than 100 persons in a building of other occupancy, and incidental to such other occupancy, shall be classified as part of the other occupancy and subject to the provisions applicable thereto.

Substantiation:

During the last code cycle the panel voted to hold comment 15-22 on proposal 15-11. The chair of Code-Making Panel 15 was directed by the Technical Correlating Committee to form a task group to review held comment 15-22 made to proposal 15-11, submitted during the 2002 code cycle, and to formulate a proposal to clarify the working of the scope of Article 518. A task group consisting of members of Code-Making Panel 15, NFPA 101, and NFPA 5000 was formed and the matter was appropriately discussed and acted upon. The task group is of the opinion that the definition of an assembly occupancy should be consistent in the Building Code, NFPA 5000, the Life Safety Code, NFPA 101, and the National Electrical Code. NFPA 1, NFPA 101 and NFPA 5000 define an assembly occupancy as described above. In addition, NFPA 1, NFPA 101, and NFPA 5000 make reference to NFPA 70 for the electrical aspects of a building. These four codes are referring to the same structures. In order to effect proper cross reference, it is necessary to have consistent language in each of the codes.

Panel Meeting Action: Accept

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16 Negative: 1

Explanation of Negative:

WHITE: Eliminating "Places of" will only confuse the end user. If you eliminate some of the places on the list, you will confuse the issue.

Comment on Affirmative:

MORGAN: Recommended language and arrangement seems to conflict with 15-62. I assume that the Panel intended language in this proposal to be used.

VANNICE: This table of examples is confusing because the indents keep disappearing. "Auditoriums within" and its associated indented "Business establishments", "Mercantile establishments", "Other occupancies" and "Schools" has been deleted leaving only "Auditoriums". "Church chapels" has been replaced by "Places of religious worship". "And drinking" has been added to "Dining facilities". The first paragraph of (B) was added to clarify the situation covered by the "Auditoriums within" which was removed.

Having been involved with the editing of the list of examples during several Code cycles, I was in favor of removing the list and replacing it with the reasoning behind selecting items to put on the list. Since removing the list is not what is desired I, offer some background reasoning derived from draft language in the proposed NFPA 5000 during the last Code cycle, and found in action 15-22 of the May 2001 ROC. "Places of assembly (assembly occupancies) are characterized by the presence or potential presence of crowds with attendant panic hazard in case of fire or other emergencies. They are generally or occasionally open to the public, and the occupants, who are present voluntarily, are not ordinarily subject to discipline or control. Such buildings or structures are ordinarily occupied by able-bodied persons and are not used for sleeping purposes."

15-64 Log #1738 NEC-P15 (518-3) **Final Action: Reject**

TCC Action:

The Technical Correlating Committee acknowledges that the issue as presented by the submitter is under the scope of Article 527 covered by Code-Making Panel 3. The Technical Correlating Committee directs that this proposal be sent to Code-Making Panel 3 for possible action in Article 527. This action will be considered by Code-Making Panel 3 as a Public Comment.

Submitter: Marcelo M. Hirschler, GBH International

Recommendation:

Add text to read as follows:
518.3 Other Articles.
(A) Hazardous (Classified) Areas. Electrical installations in hazardous (classified) areas located in places of assembly shall comply with Article 500.
(B) Temporary Wiring. In exhibition halls used for display booths, as in trade shows, the temporary wiring shall be installed in accordance with Article 527. Decorative lighting as described in 527.5 and used for holiday lighting and similar purposes shall be listed. Flexible cables and cords approved for hard or extra-hard usage shall be permitted to be laid on floors where protected from contact by the general public. The ground-fault circuit-interrupter requirements of 527.6 shall not apply.
Exception: Where conditions of supervision and maintenance ensure that only qualified persons will service the installation, flexible cords or cables identified in Table 400.4 for hard usage or extra-hard usage shall be permitted in cable trays used only for temporary wiring. All cords or cables shall be installed in a single layer. A permanent sign shall be attached to the cable tray at intervals not to exceed 7.5 m (25 ft). The sign shall read
CABLE TRAY FOR TEMPORARY WIRING ONLY
(C) Emergency Systems. Control of emergency systems shall comply with Article 700.

Substantiation:

* Decorative lighting can be a severe source of fire when placed in contact with, or close proximity to, natural or artificial combustible vegetation. In fact, it has been shown that the vast majority of fire losses associated with Christmas tree fires are actually caused by faulty or inadequate decorative lighting. UL has recently developed UL 588 (Standard for Seasonal and Holiday Decorative Products), issued in August 2000, to address this problem (often caused by non-compliant lights). Thus, it behooves the NEC to require that any decorative lights used in temporary installations should be listed (both when used in natural or in artificial trees and when used simply as lighted decorations).
* NFPA statistics for 1988 show: (a) that the leading cause of Christmas tree fires and property damage was short circuit or ground fault (21%), (b) that, in this category, electrical failure other than short circuit ranked second in number of fires, injuries and property damage with the exception of the "other known" category, and (c) that cords and plugs were the leading type of equipment involved in the ignition of Christmas trees.
* It is important to point out that the National Electrical Code does not, as yet, require the listing of decorative lighting, to a large extent because UL 588 has not been available in its present form until recently.
* Fire statistics by the NFPA show that on average in the United States there were 400 fires a year (between 1993 and 1997) in which a Christmas tree was the item first ignited. Those fires accounted for 14 fire fatalities per year, 79 fire injuries per year and a yearly property damage of 17.5 million dollars. The same NFPA fire statistics also show that, in the same period, there were 32,400 fires a year in which electrical wire or cable insulation was the item first ignited, resulting in 144 fire fatalities per year, 754 fire injuries per year and a yearly property damage of 275.5 million dollars. Thus, Christmas tree fires cause a greater amount of damage (both in terms of victims and of cost) than most electrical fires.
* The NFPA web site contains the following recommendation: "When decorating Christmas trees, always use safe tree lights. (Some lights are designed only for indoor or outdoor use, but not both.) Larger tree lights should also have some type of reflector rather than a bare bulb and all lights should be listed by a testing laboratory."
* There have also been recommendations from a large number of organizations that all tree lights should be listed. A simple web site search brings up, among others: the US Fire Administration (an entity of the Federal Emergency Management Agency, 500 C Street, SW Washington, D.C. 20472), the National Safety Council (A Membership Organization Dedicated to Protecting Life and Promoting Health, 1121 Spring Lake Drive, Itasca, IL), US Department of Agriculture, various universities (including University of Illinois, @ Urbana-Champaign, University of Nebraska, University of California @ Berkeley, and so on), various authorities having jurisdiction and, of course, Underwriters Laboratories.
* Decorative lighting is often used as temporary lighting, as recognized in section 527.3 (B) of the NEC, where time constraints are imposed for such lights.
* Decorative lighting is often used as temporary lighting, as recognized in section 527.3 (B) of the NEC, where time constraints are imposed for such lights.
* The following Table (taken from NFPA data between 1980 and 1988) compares the likelihood of having a fire fatality when a fire starts on a particular product. In other words, how likely is a fire starting on a Christmas tree going to lead to a fatality. We can get that information by comparing the number of fires to the number of fire fatalities, and it shows that every 26 fires starting on a Christmas tree lead to a fatality. This is a poor record, as only two of the other products on the list are worse: clothing that is being worn by a person (at 8 fires per fatality) and upholstered furniture (at 25 fires per fatality). At the other end of the spectrum, with fires from plants and trees, there is a fire fatality every 871 fires, and with other decorations, there is a fatality every 450 fires. It is important to keep pointing out that Christmas tree fires really usually mean decorative light fires.
* Of course, the same NFPA data also shows that several other products are more likely to result in fires. For example, fires are 90 times more likely to start on mattresses or bedding than on Christmas trees, and 13 times more likely to start on curtains and drapes than on Christmas trees. However, looking at deaths from fires, products such as decorations, toys and games and plants and trees are much less deadly than Christmas trees (which really means decorative lights): a fire starting in any other decoration is 10 times less likely to lead to a fire fatality than one starting on a Christmas tree.

****Insert NEC Tb 518.3 L1738 Here****

(Table shown on page 2741)

* Proposals associated with this issue are also being sent to articles 410, 520 and 527, and coordination with those panels would probably be an important task.
Note: Supporting Material is available for review at NFPA headquarters.

Panel Meeting Action: Reject
Panel Statement:
The panel acknowledges the need for the listing of decorative temporary lighting but this does not fall within the responsibility of Panel 15. A similar proposal has been submitted to Panel 3 for their action.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17
Comment on Affirmative:
SMITH: I agree that this proposal should be rejected; however, the Technical Correlating Committee should send this proposal to CMP-18. This requirement is for decorative lighting as described by the submitter and is covered in Article 410.

15-64a Log #CP1506 NEC-P15 **Final Action: Accept**
(518-3(A))

Submitter: Code-Making Panel 15
Recommendation:
Within 518.3(A), change from "places of assembly" to "assembly occupancies".
Substantiation:
This action is to establish consistency with actions and statements in Proposals 15-57 (Log #939), 15-60 (Log #938) and 15-63 (Log #937).
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-65 Log #1741 NEC-P15 **Final Action: Reject**
(518-4)

TCC Action:
It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 3 for comment.
Submitter: Marcelo M. Hirschler, GBH International / Rep. Fire Retardant Chemicals Association, Plenum Cable Association, and Vinyl Institute EOTS
Recommendation:
Revise text to read as follows:
518.4 Wiring Methods.
(A) and (B) to stay unchanged
(C) Spaces with Finish Rating. Electrical nonmetallic tubing and rigid nonmetallic conduit shall be permitted to be installed in club rooms, college and university classrooms, conference and meeting rooms in hotels or motels, courtrooms, drinking establishments, dining facilities, restaurants, mortuary chapels, museums, passenger stations and terminals of air, surface, underground, and marine public transportation facilities, libraries, and places of religious worship where the following apply:
(1) The electrical nonmetallic tubing or rigid nonmetallic conduit is installed concealed within walls, floors, and ceilings where the walls, floors, and ceilings provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies.
(2) The electrical nonmetallic tubing or rigid nonmetallic conduit is installed above suspended ceilings where the suspended ceilings provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies.
Electrical nonmetallic tubing and rigid nonmetallic conduit are not recognized for use in ~~other space used for environmental air~~ plenums, including ceiling cavity plenums and raised floor plenums, in accordance with 300.22 (C).
FPN: A finish rating is established for assemblies containing combustible (wood) supports. The finish rating is defined as the time at which the wood stud or wood joist reaches an average temperature rise of 121∞C (250∞F) or an individual temperature rise of 163∞C (325∞F) as measured on the plane of the wood nearest the fire. A finish rating is not intended to represent a rating for a membrane ceiling

Substantiation:

[Text of Proposal 15-65 substantiation is shown on page 2407]
Panel Meeting Action: Reject
Panel Statement:
The proposed change does not improve consistency, readability, or enforceability. Section 300.22(B) already restricts the type of wiring methods that may be used in plenum spaces. Paragraph (C), Other Space Used for Environmental Air, gives a clear description of the spaces where use of ENT and RNC is restricted. The substantiation does not give adequate evidence that a change should be made.
Similar proposals have been made to Panels 3 and 16 and have been rejected.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-66 Log #1956 NEC-P15 (518-4(A)) **Final Action: Reject**

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(A) General. The fixed wiring methods shall be metal raceways, flexible metal raceways, nonmetallic raceways encased in not less than 50 mm (2 in.) of concrete, Type MI, MC, or AC cable containing an insulated equipment ~~grounding~~ bonding conductor sized in accordance with Table 250.122.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-1 (Log #2453o).

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

Comment on Affirmative:

SMITH: See my Comment on Affirmative on Proposal 15-1.

15-67 Log #2666 NEC-P15 (518-4(B)) **Final Action: Accept**

Submitter: Phil Simmons, Simmons Electrical Services

Recommendation:

Revise existing Section 518.4(B) as follows:
(B) Nonrated Construction. In addition to the wiring methods of (A), nonmetallic-sheathed cable, Type AC cable, electrical nonmetallic tubing, and rigid nonmetallic conduit shall be permitted to be installed in those buildings or portions thereof that are not required to be of fire-rated construction by the applicable building code.

Substantiation:

As presently worded, this section limits the wiring methods in the nonrated portions of places of assembly to the methods of (B). The wiring methods in (A) should also be permitted.

Panel Meeting Action: Accept

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-68 Log #3062 NEC-P15 **Final Action: Accept**
(518-4(C))

Submitter: William A. Wolfe, Steel Tube Institute of North America

Recommendation:

Delete locations in this section as follows:
(C) Spaces with Finish Rating. Electrical nonmetallic tubing and rigid nonmetallic conduit shall be permitted to be installed in club rooms, ~~college and university classrooms,~~ conference and meeting rooms in hotels or motels, courtrooms~~, drinking establishments,~~ dining facilities, restaurants, mortuary chapels, museums, ~~passenger stations and terminals or air, surface, underground, and marine public transportation facilities,~~ libraries, and places of religious worship where the following apply:

Substantiation:

[Text of Proposal 15-68 substantiation is shown on page 2417]

Panel Meeting Action: Accept

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16 Negative: 1

Explanation of Negative:

SMITH: The submitter and others have used as part of their substantiation a reference to the fire at Dusseldorf Airport in 1996. It is implied that the fire was caused or aided by the use of ENT or RNC as wiring methods. The fire report listed eight primary causal factors and five additional factors that contributed to this deadly fire. Electrical wiring is not even mentioned among these thirteen factors. Such things as carelessness, lack of sprinkler systems, poor communication, and other human factors are specifically mentioned.

The NEC has hundreds of places where materials and methods of installation are permitted, but for some reason a designer chooses material or methods that meet and exceed the requirements. The NEC is a minimum standard that is "essentially free from hazard." The designer must make decisions with input from the client regarding efficiency, safety, costs, etc. So the submitter's statement that "it is the duty of the NEC Committees to assure that...as much protection as possible is provided" is misleading. Such a statement of philosophy would necessarily amend much of the NEC. To design and build in "as much protection as possible" is the prerogative of the owner and their designer. 'Protection' and 'safety' are inherently vague and relative terms. How safe can one afford to be?

This issue of whether or not to use ENT or RNC in certain applications will continue to go back and forth until this is considered. Enough tests have been done to show that ENT and RNC can be safely installed and operated. The only evidence to the contrary tends to fall into two categories: 1)"'what if" arguments, using speculation and scare tactics such as the Dusseldorf incident, or 2) "better than" arguments, using comparisons of nonmetallic raceway to metallic raceway.

Argument #1 is not valid technical substantiation to withhold the use of a wiring method that has been used safely for decades. Where is the evidence that this wiring method itself is unsafe? None has been submitted. What about evidence submitted to the contrary by Panel members during past Code cycles? For example, "The NFPA Annual Fire Loss Report indicates that in the locations where ENT and RNC are now used there has been a decrease not an increase in fires."

Argument #2 may be true but that alone should not eliminate other safe alternatives. Yes, steel is stronger than plastic; but giving one the permission to use plastic does not forbid the designer from using steel. Actually, ENT has been shown to meet the physical property requirements of NEMA and UL for listing in terms of crushing resistance, impact resistance and tensile.

So now it is proposed that three types of occupancies be deleted altogether without any specific substantiation. Do ENT and RNC know where they are installed? Do they know the difference between the approved "dining facilities" and the unapproved "drinking establishments", or between the approved classroom in a "place of religious worship" and the unapproved "college and university classroom"? the obvious answer is 'no'. There is no technical difference between the approved and proposed unapproved occupancies.

The submitter raises the question of toxicity from the perspective of the 1980's. A recent NFPA Toxicity Technical Advisory Committee found that NM cable is not the toxicity problem once thought. The work of this Committee as well as the NM Cable Task Group has resulted in the expansion in the use of NM cable. Their findings are documented at NFPA Headquarters. In 518.4(C), the issue is ENT and RNC behind a 15-minute finish rating. The evidence for a safe installation in these occupancies abounds. Therefore, this proposal should be rejected.

Comment on Affirmative:

VANNICE: Some of these changes are appropriate because they are not assembly occupancies or are not in the current form used earlier in the article.

I still have concerns around the viability of maintaining the integrity of the finish rating in museums which are continually being reconfigured.

WHITE: This section should be eliminated to be consistent with NFPA 101 and NFPA 5000. These wiring methods are not suitable for places of assembly because of the fire hazards.

15-69 Log #3029 NEC-P15 **Final Action: Reject**
(518-4(D) (New))

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 6 for consideration of action in Article 310. This action will be considered by Code-Making Panel 6 as a Public Comment.

Submitter: William A. Wolfe, Steel Tube Institute of North America

Recommendation:

Add a new Section as follows:
518.4(D). Installed in Thermal Insulation. Where ENT or RNC is installed in thermal insulation, the conductor insulation rating shall be 90°C. The ampacity shall be in accordance with 310.15 but in no case shall the ampacity be de-rated less than the following:
(a) 1-3 conductors: 70% of values in Table 310.16
(b) 4-6 conductors: 50% of values in Table 310.16
(c) 7-9 conductors: 40% of values in Table 310.16

Substantiation:

In reviewing the changes that have occurred in the 2002 NEC for the permitted uses of ENT, we discovered that the safety issue of overheating of conductors has been overlooked for both ENT and RNC. Test data submitted by a major producer as substantiation for a 1999 Code proposal needs to be examined for its safety impact.

There is often thermal insulation inside walls and in concealed spaces of floor/ceiling assemblies. According to a 1996 UL Fact-Finding Report (File E73317, Project 96NK29786) for Lamson & Sessions/Carlon, when ENT and RNC are installed wrapped in thermal insulation both the conductors inside and the RNC reach temperatures in excess of insulation rated at 90 degrees C when the Ampacity is that specified by the NEC. UL had planned to use a test current of 80% of that number. They discovered that the ampacity had to be lowered to the following percentages of the NEC ampacity in order to not exceed a temperature of 90oC: Trade Size 1/2: 70%; Trade Sizes 3/4 - 2: 50%. Rigid Nonmetallic Conduit (RNC) was the same except for Trade Size 2 which had to be lowered to 40%. The UL Report compares results of unwrapped vs. wrapped ENT/RNC when the same tests currents are applied: there was as much as a 95% increase in raceway temperature and a 71% increase in the temperature of the conductor insulation in the wrapped samples.

We realize that installation in thermal insulation can differ according to many factors, and the response may not be as great as when RNC is wrapped in insulation. However, some of the tests came within 8 - 10 points of reaching the 60oC wire insulation limit with no wrap and with the substantially reduced ampacity. The NEC should specify these de-rating factors much as it has long required 90oC insulation for NM cable.

The requirement to use 90oC conductors is based on the fact that even with the substantial de-rating, all the conductors exceeded a temperature of 60oC in the thermal wrap test.

There is no doubt that without the suggested de-rating, temperatures will substantially deform the conduit and place more stress at support points as the temperatures sometimes can exceed the temperature in which nonmetallic conduit is permitted to be installed for similar reasons. This is of particular concern due to the possibility that recent changes may lead to more installation in metal stud construction. This information supplements 310.10 FPN (3) and aids enforcement.

The UL Fact Finding Report was referenced in Proposal 3-141 that the producer submitted for the 1999 NEC to allow the use of ENT in "other spaces used for environmental air" where wrapped in insulation (failed). The proposal included the de-rating factors shown above and the substantiation stated:

"The UL Fact Finding Report also describes the excessive conductor insulation temperatures that were recorded when the circuits were operated at the ampacities permitted by Note 8, Notes to Ampacity Tables of 0 to 2000 Volts. The proposal specifies the adjustment factors necessary to keep the conductor insulation temperature at acceptable levels, based on ampacities cited in the UL Fact Finding Report."

The Summary in the UL Fact Finding Report States that: The electrical heat tests performed on the ENT and RNMC wiring systems wrapped with insulation required an adjustment factor to reduce the current values necessary to bring the temperatures on the conductors below the 90oC insulation rating (See Table 3)." Table 3 lists the de-rating factors shown in our proposal above.

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

Panel Meeting Action: Reject

Panel Statement:

The responsibility for determining conductor ampacity rests with Panel 6. The panel recommends that the TCC forward this proposal to Panel 6 for comment and action.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-70 Log #3063 NEC-P15 **Final Action: Reject**
(518-4(D) (New))

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 6 for consideration of action in Article 310. This action will be considered by Code-Making Panel 6 as a Public Comment.

Submitter: William A. Wolfe, Steel Tube Institute of North America

Recommendation:

Add a new Section as follows:
518.4(D). Installed in Thermal Insulation. Where ENT or RNC is installed in thermal insulation, the conductor insulation rating shall be 90°C. The ampacity shall be in accordance with 310.15 but in no case shall the ampacity be de-rated less than the following:
(a) 1-3 conductors: 70% of values in Table 310.16
(b) 4-6 conductors: 50% of values in Table 310.16
(c) 7-9 conductors: 40% of values in Table 310.16

Substantiation:

In reviewing the changes that have occurred in the 2002 NEC for the permitted uses of ENT, we discovered that the safety issue of overheating of conductors has been overlooked for both ENT and RNC. Test data submitted by a major producer as substantiation for a 1999 Code proposal needs to be examined for its safety impact.

There is often thermal insulation inside walls and in concealed spaces of floor/ceiling assemblies. According to a 1996 UL Fact-Finding Report (File E73317, Project 96NK29786) for Lamson & Sessions/Carlon, when ENT and RNC are installed wrapped in thermal insulation both the conductors inside and the ENT/RNC reach temperatures in excess of insulation rated at 90 degrees C when the Ampacity is that specified by the NEC. UL had planned to use a test current of 80% of that number. They discovered that the ampacity had to be lowered to the following percentages of the NEC ampacity in order to not exceed a temperature of 90oC: ENT Trade Size 1/2: 70%; Trade Sizes 3/4 - 2: 50%. Rigid Nonmetallic Conduit (RNC) was the same except for Trade Size 2 which had to be lowered to 40%. The UL Report compares results of unwrapped vs. wrapped ENT/RNC when the same tests currents are applied: there was as much as a 95% increase in raceway temperature and a 71% increase in the temperature of the conductor insulation in the wrapped samples.

We realize that installation in thermal insulation can differ according to many factors, and the response may not be as great as when ENT/RNC are wrapped in simulation. However, some of the tests came within 8 - 10 points of reaching the 60oC wire insulation limit with no wrap and with the substantially reduced ampacity. The NEC should specify these de-rating factors much as it has long required 90oC insulation for N/M cable.

The requirement to use 90oC conductors is based on the fact that even with the substantial de-rating, all the conductors exceeded a temperature of 60oC in the thermal wrap test.

There is no doubt that without the suggested de-rating, temperatures will substantially deform the conduit and place more stress at support points as the temperatures sometimes can exceed the temperature in which nonmetallic conduit is permitted to be installed for similar reasons. This is of particular concern due to the possibility that recent changes may lead to more installation in metal stud construction. This information supplements 310.10 FPN (3) and aids enforcement.

The UL Fact Finding Report was referenced in Proposal 3-141 that the producer submitted for the 1999 NEC to allow the use of ENT in "other spaces used for environmental air" where wrapped in insulation (failed). The proposal included the de-rating factors shown above and the substantiation stated:

"The UL Fact Finding Report also describes the excessive conductor insulation temperatures that were recorded when the circuits were operated at the ampacities permitted by Note 8, Notes to Ampacity Tables of 0 to 2000 Volts. The proposal specifies the adjustment factors necessary to keep the conductor insulation temperature at acceptable levels, based on ampacities cited in the UL Fact Finding Report."

The Summary in the UL Fact Finding Report States that: The electrical heat tests performed on the ENT and RNMC wiring systems wrapped with insulation required an adjustment factor to reduce the current values necessary to bring the temperatures on the conductors below the 90oC insulation rating (See Table 3)." Table 3 lists the de-rating factors shown in our proposal above.

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

Panel Meeting Action: Reject

Panel Statement:

See the panel action and statement on Proposal 15-69 (Log #3029).

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-71 Log #1957 NEC-P15 (518-5) **Final Action: Reject**

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
518.5 Supply. Portable switchboards and portable power distribution equipment shall be supplied only from listed power outlets of sufficient voltage and ampere rating. Such power outlets shall be protected by overcurrent devices. Such overcurrent devices and power outlets shall not be accessible to the general public. Provisions for connection of an equipment ~~grounding~~ bonding conductor shall be provided. The neutral of feeders supplying solid-state, 3-phase, 4-wire dimmer systems shall be considered a current-carrying conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-1 (Log #2453o).

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

Comment on Affirmative:

SMITH: See my Comment on Affirmative on Proposal 15-1.

15-72 Log #2495 NEC-P15 (519) **Final Action: Reject**

Submitter: Kevin C. Shultz, P.E., Walt Disney World Co.

Recommendation:

[Text of Proposal 15-72 substantiation is shown on page 2418]

Substantiation:

The permanent "theme" or "amusement" park industry has experienced tremendous growth over the past 50 years, with most of the growth occurring over the past two decades. In 1950, there were fewer than 50 theme park sites in the United States; today there are 450 and counting. A theme park brings together a unique combination of rides, show elements, transportation, theaters, standard facilities, live shows and new technologies. This combination presents a unique challenge: Which electrical codes and standards should be used to develop the supporting electrical systems?

The standard facilities, theaters, projection rooms and stages have a long history of acceptable electrical design practices and are regulated by specific sections of the National Electrical Code. Transportation systems have their own regulations. But where do the permanent ride and show electrical systems fall? Article 525 of the National Electrical Code only addresses portable rides. Permanent rides are not a facility, but usually reside in or around one. The standard components used for the design of the ride and show systems are more closely related to industrial processes, such as those regulated by NFPA 79, than those defined within the National Electrical Code.

This inability to classify the ride and show systems presents challenges for design engineers and inspectors. If the National Electrical Code is not applied, what is the baseline for acceptance by the authority having jurisdiction? If the National Electrical code is applied, standard industrial control products cannot be used due to limitations on component voltage ratings and power supplies presented in Article 725. The resultant design would include more components, wiring transition boxes, and interposing relays without any improvement in the reliability or safety of the system. The majority of these integrated systems will also require the authority having jurisdiction to approve alternative materials and methods not currently addressed in the National Electrical Code in order to insure orderly shutdown.

One solution to this dilemma would be to modify Article 525 of the National Electrical Code or NFPA 79, but these are industry specific. Modification of these existing standards may force changes to established practices that are not necessary; Therefore it is proposed that we add a new article to the National Electrical Code that specifically addresses the electrical systems for the rides and shows of this rapidly growing, unique industry. This article will be based on design standards and practices recognized by NFPA, as shown in the supporting documentation. The result will be a nationally recognized minimum standard for designers and inspectors alike.

Panel Meeting Action: Reject

Panel Statement:

The submitter requested a recognized minimum standard for designers and inspectors. The NEC is intended to be an installation Code rather than a design manual.

The proposal is very limited in scope in that it only addresses the control circuits of permanent amusement attractions. There are many other electrical considerations of permanent amusement attractions that should be addressed. There are many articles of the Code and other documents that provide the necessary guidance in the installation of permanent amusement attractions.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-73 Log #1600 NEC-P15 (520–Bundled) **Final Action: Accept**

TCC Action:

It was the action of the Technical Correlating Committee that this proposal be forwarded to Code-Making Panel 1 for consideration of action in Article 100 and to Code-Making Panel 6 and Code-Making Panel 12 for comment. If Code-Making Panel 6 and Code-Making Panel 12 agree that the definition is acceptable for 310 and 640.8, Code-Making Panel 1 should consider the addition in Article 100. For the processing of the Report on Proposals, the Technical Correlating Committee directs that the definition remain in Article 520, the moving of the definition can occur in the Report on Comments stage if the panels concur. This action will be considered by Code-Making 1 as a public comment.

The Technical Correlating Committee also notes that Code-Making Panel 1 has, at present, rejected the addition of the definition to Article 100 in Proposal 1-67.

Submitter: David Shapiro, Safety First Electrical Contracting, Consulting, and Safety Education

Recommendation:

Remove definition of "Bundled" to Article 100.

Substantiation:

Neither the term nor the definition is unique to Article 520, as it's found in 310. Therefore it belongs in 100.

Panel Meeting Action: Accept

Panel Statement:

It is the panel's understanding that the definition of "Bundled" is to be relocated to Article 100.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-74 Log #3407 NEC-P15 **Final Action: Reject**
(520-5)

Submitter: Richard D. Thompson, Thompson Associates

Recommendation:

Add a new paragraph (X) as follows:
(X) Ground-Fault Circuit-Interrupter for Personnel Protection.
Within the Scope of this Article, temporary outdoor installations, where unprotected from rain, shall have the electrical service protected with a special purpose ground-fault circuit-interrupter system.
Exception: Egress lighting shall not be connected to the load side of a ground-fault circuit-interrupter system.

Substantiation:

Recently, a new technology has evolved allowing Ground-Fault Circuit-Interrupter devices to protect at higher currents and voltages. Several models have received UL listing, and Underwriters Laboratories is presently revising UL 943 (Class C, D, E) to accommodate this new technology. These devices have now been identified by UL as "Special Purpose Ground-Fault Circuit Interrupters." Such devices can now protect at current levels up to 400-amperes and at 480-volts. These devices are available for both single phase and poly-phase circuits. The device will respond correctly to a ground leakage current waveform with "pure DC" to "DC+AC with harmonics" frequency components. The design is such that a single unit can be installed at the purpose entrance point thereby protecting all receptacle outlets downstream of that point.

As a member of the U.S. Institute for Theatre Technology's National Electrical Code Committee, I observed over the years a number of proposals by individuals not fully understanding theatrical lighting practices calling for the installation of GFCI devices on all stage lighting units. At that time, it was not only impractical from an economic standpoint where a typical concert may have over 1000 lighting units, but technically only spotlights in the 500 to 3000 watt size could be protected with a GFCI receptacle or circuit breaker. Lighting units on a typical show may exceed 10,000 watts 120-volts single phase. The majority of lighting units are also controlled by a solid state dimmer system where the devices then available could not accept the harmonics and would either be inoperative or cause excessive nuisance tripping. With these limitations of the then technology, the practicality of protecting all electrical circuits was repeatedly rejected by CMP 15.

These installations are typically the outdoor concerts often seen in stadiums, parks or an open field. Because of the high power demands created by these venues, portable generators are most often employed. Using the advanced GFCI system, this device can be attached to the electrical output thus protecting all circuits of any wattage or amperage downstream.

This proposal also addresses the installation where a roof or other means of protection would be installed and would prevent exposure to a wet location thereby not requiring GFCI protection.

The Exception is to ensure that the electrical circuits use for egress lighting remain active at all times. Since the egress (audience) lighting may be needed in an emergency, the possibility of being tripped by a GFCI device should be avoided at all times.

Panel Meeting Action: Reject

Panel Statement:

The panel recognizes that there are advances in technology. However, it is premature to require these devices at this time. The substantiation has failed to illustrate that these new classes of GFCI devices can cope with harmonic current waveforms and resultant neutral overcurrent found in applications covered by Article 520.

The panel needs to have the following questions answered to further evaluate this proposal:

1) What is this new "special purpose GFCI" system and how does it function? How is it different from current standard Class A GFCIs?

2) What special purpose does it provide? Is this special purpose suitable for theatrical applications and the harmonics and electrical noise typically present?

3) Does this new system operate with different trip curves? If so, how much additional protection will this device provide in this application over current requirements?

4) Is this new technology currently available from multiple unrelated sources?

5) Is this new technology a listed device or a listed system? If a system, what are the other required elements?

6) Will this equipment function without false tripping in a theatrical application with its many long feeder and branch circuit conductors? Will it function with the many single-phase solid-state dimmers set at different intensities as is common in theatrical dimming systems?

7) How does this feeder GFCI coordinate with the current Class A branch circuit GFCI that in some cases is also required by Article 680?

8) How is the application matched and coordinated with the special purpose GFCI?

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

Comment on Affirmative:

VANNICE: It is my understanding that this proposal was also submitted several places in Chapters 1 through 4. If any of those proposals are accepted and it is determined that this technology is not suitable for this application, it may be necessary to add the appropriate paragraphs exempting this application from the general requirements. Also, see panel statement to 15-96.

15-75 Log #1959 NEC-P15 **Final Action: Reject**
(520-5(A))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
520.5 Wiring Methods. (A) General. The fixed wiring method shall be metal raceways, nonmetallic raceways encased in at least 50 mm (2 in.) of concrete, Type MI cable, MC cable, or AC cable containing an insulated equipment ~~grounding~~ bonding conductor sized in accordance with Table 250.122.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-1 (Log #2453o).

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

Comment on Affirmative:

SMITH: See my Comment on Affirmative on Proposal 15-1.

15-76 Log #1739 NEC-P15 **Final Action: Reject**
(520-5(C) (New))

TCC Action:

The Technical Correlating Committee acknowledges that the issue as presented by the submitter is under the scope of Article 527 covered by Code-Making Panel 3. The Technical Correlating Committee directs that this proposal be sent to Code-Making Panel 3 for possible action in Article 527. This action will be considered by Code-Making Panel 3 as a public comment.

Submitter: Marcelo M. Hirschler, GBH International / Rep. Fire Retardant Chemicals Association

Recommendation:

Add text to read as follows:
520.5 Wiring Methods.
(A) General. The fixed wiring method shall be metal raceways, nonmetallic raceways encased in at least 50 mm (2 in.) of concrete, Type MI cable, MC cable, or AC cable containing an insulated equipment grounding conductor sized in accordance with Table 250.122.
Exception: Fixed wiring methods shall be as provided in Article 640 for audio signal processing, amplification, and reproduction equipment, in Article 800 for communication circuits, in Article 725 for Class 2 and Class 3 remote-control and signaling circuits, and in Article 760 for fire alarm circuits.
(B) Portable Equipment. The wiring for portable switchboards, stage set lighting, stage effects, and other wiring not fixed as to location shall be permitted with approved flexible cords and cables as provided elsewhere in Article 520. Fastening such cables and cords by uninsulated staples or nailing shall not be permitted.
(C) Temporary Wiring. Decorative lighting as described in 527.5 and used for holiday lighting and similar purposes shall be listed.
(~~C~~ D) Nonrated Construction. Nonmetallic-sheathed cable, Type AC cable, electrical nonmetallic tubing, and rigid nonmetallic conduit shall be permitted to be installed in those buildings or portions thereof that are not required to be of fire-rated construction by the applicable building code.

Substantiation:

* Decorative lighting can be a severe source of fire when placed in contact with, or close proximity to, natural or artificial combustible vegetation. In fact, it has been shown that the vast majority of fire losses associated with Christmas tree fires are actually caused by faulty or inadequate decorative lighting. UL has recently developed UL 588 (Standard for Seasonal and Holiday Decorative Products), issued in August 2000, to address this problem (often caused by non-compliant lights). Thus, it behooves the NEC to require that any decorative lights used in temporary installations should be listed (both when used in natural or in artificial trees and when used simply as lighted decorations).
* NFPA statistics for 1988 show: (a) that the leading cause of Christmas tree fires and property damage was short circuit or ground fault (21%), (b) that, in this category, electrical failure other than short circuit ranked second in number of fires, injuries and property damage with the exception of the "other known" category, and (c) that cords and plugs were the leading type of equipment involved in the ignition of Christmas trees.
* It is important to point out that the National Electrical Code does not, as yet, require the listing of decorative lighting, to a large extent because UL 588 has not been available in its present form until recently.
* Fire statistics by the NFPA show that on average in the United States there were 400 fires a year (between 1993 and 1997) in which a Christmas tree was the item first ignited. Those fires accounted for 14 fire fatalities per year, 79 fire injuries per year and a yearly property damage of 17.5 million dollars. The same NFPA fire statistics also show that, in the same period, there were 32,400 fires a year in which electrical wire or cable insulation was the item first ignited, resulting in 144 fire fatalities per year, 754 fire injuries per year and a yearly property damage of 275.5 million dollars. Thus, Christmas tree fires cause a greater amount of damage (both in terms of victims and of cost) than most electrical fires.
* The NFPA web site contains the following recommendation: "When decorating Christmas trees, always use safe tree lights. (Some lights are designed only for indoor or outdoor use, but not both.) Larger tree lights should also have some type of reflector rather than a bare bulb and all lights should be listed by a testing laboratory."
* There have also been recommendations from a large number of organizations that all tree lights should be listed. A simple web site search brings up, among others: the US Fire Administration (an entity of the Federal Emergency Management Agency, 500 C Street, SW Washington, D.C. 20472), the National Safety Council (A Membership Organization Dedicated to Protecting Life and Promoting Health, 1121 Spring Lake Drive, Itasca, IL), US Department of Agriculture, various universities (including University of Illinois, @ Urbana-Champaign, University of Nebraska, University of California @ Berkeley, and so on), various authorities having jurisdiction and, of course, Underwriters Laboratories.
* Decorative lighting is often used as temporary lighting, as recognized in section 527.3 (B) of the NEC, where time constraints are imposed for such lights.
* Decorative lighting is often used as temporary lighting, as recognized in section 527.3 (B) of the NEC, where time constraints are imposed for such lights.
* The following Table (taken from NFPA data between 1980 and 1988) compares the likelihood of having a fire fatality when a fire starts on a particular product. In other words, how likely is a fire starting on a Christmas tree going to lead to a fatality. We can get that information by comparing the number of fires to the number of fire fatalities, and it shows that every 26 fires starting on a Christmas tree lead to a fatality. This is a poor record, as only two of the other products on the list are worse: clothing that is being worn by a person (at 8 fires per fatality) and upholstered furniture (at 25 fires per fatality). At the other end of the spectrum, with fires from plants and trees, there is a fire fatality every 871 fires, and with other decorations, there is a fatality every 450 fires. It is important to keep pointing out that Christmas tree fires really usually mean decorative light fires.
* Of course, the same NFPA data also shows that several other products are more likely to result in fires. For example, fires are 90 times more likely to start on mattresses or bedding than on Christmas trees, and 13 times more likely to start on curtains and drapes than on Christmas trees. However, looking at deaths from fires, products such as decorations, toys and games and plants and trees are much less deadly than Christmas trees (which really means decorative lights): a fire starting in any other decoration is 10 times less likely to lead to a fire fatality than one starting on a Christmas tree.

****Insert NEC Tb 518.3 L1739 Here****

(Table shown on page 2741)

* Proposals associated with this issue are also being sent to articles 410, 520 and 527, and coordination with those panels would probably be an important task.
Note: Supporting Material is available for review at NFPA headquarters.

Panel Meeting Action: Reject

Panel Statement:

The panel acknowledges the need for listing of decorative temporary lighting, but this does not fall within the responsibility of Panel 15. A similar proposal has been submitted to Panel 3 for their action.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-77 Log #3408 NEC-P15 (520-10) **Final Action: Reject**

Submitter: Richard D. Thompson, Thompson Associates

Recommendation:

Revise this Section as follows:
520.10 Portable Equipment. Portable stage and studio lighting equipment and portable power distribution equipment listed for dry locations shall be permitted for temporary use outdoors, provided the equipment is supervised by qualified personnel while energized and barriered from the general public. Installations, where unprotected from rain, shall have the electrical service protected with a special purpose ground-fault circuit-interrupter system.

Substantiation:

Recently, a new technology has evolved allowing Ground-Fault Circuit-Interrupter devices to protect at higher currents and voltages. Several models have received UL listing, and Underwriters Laboratories is presently revising UL 943 (Class C, D, E) to accommodate this new technology. These devices have now been identified by UL as "Special Purpose Ground-Fault Circuit Interrupters." Such devices can now protect at current levels up to 400-amperes and at 480-volts. These devices are available for both single phase and poly-phase circuits. The device will respond correctly to a ground leakage current waveform with "pure DC" to "DC+AC with harmonics" frequency components. The design is such that a single unit can be installed at the purpose entrance point thereby protecting all receptacle outlets downstream of that point.
As a member of the U.S. Institute for Theatre Technology's National Electrical Code Committee, I observed over the years a number of proposals by individuals not fully understanding theatrical lighting practices calling for the installation of GFCI devices on all stage lighting units. At that time, it was not only impractical from an economic standpoint where a typical concert may have over 1000 lighting units, but technically only spotlights in the 500 to 3000 watt size could be protected with a GFCI receptacle or circuit breaker. Lighting units on a typical show may exceed 10,000 watts 120-volts single phase. The majority of lighting units are also controlled by a solid state dimmer system where the devices then available could not accept the harmonics and would either be inoperative or cause excessive nuisance tripping. With these limitations of the then technology, the practicality of protecting all electrical circuits was repeatedly rejected by CMP 15.
These installations are typically the outdoor concerts often seen in stadiums, parks or an open field. Because of the high power demands created by these venues, portable generators are most often employed. Using the advanced GFCI, system this device can be attached to the electrical output thus protecting all circuits of any wattage or amperage downstream.

Panel Meeting Action: Reject

Panel Statement:

The panel recognizes that there are advances in technology. However, it is premature to require these devices at this time. The substantiation has failed to illustrate that these new classes of GFCI devices can cope with harmonic current waveforms and resultant neutral overcurrent found in applications covered by Article 520.
The panel needs to have the following questions answered to further evaluate this proposal:
1) What is this new "special purpose GFCI" system and how does it function? How is it different from current standard Class A GFCIs?
2) What special purpose does it provide? Is this special purpose suitable for theatrical applications and the harmonics and electrical noise typically present?
3) Does this new system operate with different trip curves? If so, how much additional protection will this device provide in this application over current requirements?
4) Is this new technology currently available from multiple unrelated sources?
5) Is this new technology a listed device or a listed system? If a system what are the other required elements?
6) Will this equipment function without false tripping in a theatrical application with its many long feeder and branch circuit conductors. Will it function with the many single-phase solid-state dimmers set at different intensities as is common in theatrical dimming systems.
7) How does this feeder GFCI coordinate with the current Class A branch circuit GFCI that in some cases is also required by Article 680.
8) How is the application matched and coordinated with the special purpose GFCI?
The proposed use of listed "dry location" equipment outside in a wet location is not consistent with Code's requirement to utilize equipment according to the listing instructions.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

Comment on Affirmative:

VANNICE: See my Comment on Affirmative on Proposal 15-74.

15-78 Log #2241 NEC-P15 (520-25) **Final Action: Reject**

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:

520.25 Dimmers. Dimmers shall comply with 520.25(A) through (D).

(A) Disconnection and Overcurrent Protection. Where dimmers are installed in ungrounded conductors, each dimmer shall have overcurrent protection not greater than 125 percent of the dimmer rating and shall be disconnected from all ungrounded conductors when the master or individual switch or circuit breaker supplying such dimmer is in the open position.

(B) Resistance- or Reactor-Type Dimmers. Resistance or series reactor-type dimmers shall be permitted to be placed in either the ~~grounded~~ earth or the ungrounded conductor of the circuit. where designed to open either the supply circuit to the dimmer or the circuit controlled by it, the dimmer shall then comply with 404.1. Resistance- or reactor-type dimmers placed in the ~~grounded~~ earth neural conductor of the circuit shall not open the circuit.

(C) Autotransformer-Type Dimmers. The circuit supplying an autotransformer-type dimmer shall not exceed 150 volts between conductors. The ~~grounded~~ earth conductor shall be common to the input and output circuits.

FPN: See 210.9 for circuits derived from autotransformers.

(D) Solid-State-Type Dimmers. The circuit supplying a solid-state dimmer shall not exceed 150 volts between conductors unless the dimmer is listed specifically for higher voltage operation. Where a ~~grounded~~ earth conductor supplies a dimmer, it shall be common to the input and output circuits.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-53 (Log #2216).

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-79 Log #1606 NEC-P15 (520-25(B)) **Final Action: Accept in Principle**

Submitter: David Shapiro, Safety First Electrical Contracting, Consulting, and Safety Education

Recommendation:

On line 6, change "404.1" to "Article 404".

Substantiation:

The NFPA Style Manual's purpose is to serve consistency, but, above all, intelligibility and user-friendliness. Since 404.1 is the Scope section, referring to it says that Article 404 applies, but says so in an unnecessarily-obtuse manner.

Panel Meeting Action: Accept in Principle

Change "404.1" to "404.2(B)" in 520.25(B).

Panel Statement:

This panel has provided the correct reference.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-80 Log #1958 NEC-P15 (520-25(D)) **Final Action: Reject**

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(D) Solid-State-Type Dimmers. The circuit supplying a solid-state dimmer shall not exceed 150 volts between conductors unless the dimmer is listed specifically for higher voltage operation. Where a grounded conductor supplies a dimmer, it shall be common to the input and output circuits. Dimmer chassis shall be connected to the equipment ~~grounding~~ bonding conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-1 (Log #2453o).

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

Comment on Affirmative:

SMITH: See my Comment on Affirmative on Proposal 15-1.

15-81 Log #1326 NEC-P15 (520-27(C)) **Final Action: Accept**

Submitter: National Electrical Code Technical Correlating Committee

Recommendation:

1. Replace the term "computing" with the term "calculating" in the following sections:
520.27(C).

2. Replace the term "computation" with the term "calculation" in the following sections:
520.27(C) FPN.

Substantiation:

This proposal is the result of an effort by the NEC Usability Task Group to standardize the language throughout the NEC relative to the use of the terms computed and calculated. After analyzing the usage, the group agreed that the term "calculated" was the best term for use throughout the NEC. This is one in a series of proposals to standardize on the term calculated.

The term "calculate" and its derivatives is presently used in the article title, section titles, and throughout portions of the existing article. Other Articles of the NEC such as for calculating conductor ampacties (under engineering supervision), calculating the size of enclosures, and in Annex D use the term calculate. Additionally, the term "calculate" is more commonly used in other NFPA codes and standards e.g. NFPA 70E, arc flash calculation. Adversely, the term "computation" has a connotation of using a computer, although "load calculations" are frequently determined using a calculator. It appears that the term "computation" was used more frequently beginning with the 1975 NEC based on an editorial revision project.

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-82 Log #1960 NEC-P15 (520-51) **Final Action: Reject**

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:

520.51 Supply. Portable switchboards shall be supplied only from power outlets of sufficient voltage and ampere rating. Such power outlets shall include only externally operable, enclosed fused switches or circuit breakers mounted on stage or at the permanent switchboard in locations readily accessible from the stage floor. Provisions for connection of an equipment ~~grounding~~ bonding conductor shall be provided. The neutral of feeders supplying solid-state, 3-phase, 4-wire dimmer systems shall be considered a current-carrying conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-1 (Log #2453o).

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

Comment on Affirmative:

SMITH: See my Comment on Affirmative on Proposal 15-1.

15-83 Log #2242 NEC-P15 (520-53) **Final Action: Reject**

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:

[Text of Proposal 15-83 recommendation is shown on page 2420]

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-53 (Log #2216).

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-84 Log #1961 NEC-P15 **Final Action: Reject**
(520-53(H)(2))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(2) Single-Conductor Cables. Single-conductor portable supply cable sets shall not be smaller than 2 AWG conductors. The equipment ~~grounding~~ bonding conductor shall not be smaller than 6 AWG conductor. Single-conductor grounded neutral cables for a supply shall be sized as per 520.53(O)(2). Where single conductors are paralleled for increased ampacity, the paralleled conductors shall be of the same length and size. Single-conductor supply cables shall be grouped together but not bundled. The equipment ~~grounding~~ bonding conductor shall be permitted to be of a different type, provided it meets the other requirements of this section, and it shall be permitted to be reduced in size as permitted by 250.122. Grounded (neutral) and equipment ~~grounding~~ bonding conductors shall be identified in accordance with 200.6, 250.119, and 310.12. Grounded conductors shall be permitted to be identified by marking at least the first 150 mm (6 in.) from both ends of each length of conductor with white or gray. Equipment ~~grounding~~ bonding conductors shall be permitted to be identified by marking at least the first 150 mm (6 in.) from both ends of each length of conductor with green or green with yellow stripes. Where more than one nominal voltage exists within the same premises, each ungrounded conductor shall be identified by system.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-1 (Log #2453o).

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

Comment on Affirmative:

SMITH: See my Comment on Affirmative on Proposal 15-1.

15-85 Log #1962 NEC-P15 **Final Action: Reject**
(520-53(K)(2) and (3))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(2) Line connectors are of the listed sequential-interlocking type so that load connectors shall be connected in the following sequence:
a. Equipment ~~grounding~~ bonding conductor connection
b. Grounded circuit conductor connection, if provided
c. Ungrounded conductor connection, and that disconnection shall be in the reverse order
(3) A caution notice shall be provided adjacent to the line connectors indicating that plug connection shall be in the following order:
a. Equipment ~~grounding~~ bonding conductor connectors

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-1 (Log #2453o).

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

Comment on Affirmative:

SMITH: See my Comment on Affirmative on Proposal 15-1.

15-86 Log #948 NEC-P15 **Final Action: Accept**
(520-68(A)(2))

Submitter: James M. Daly, General Cable

Recommendation:

Delete the word "severe" in the first sentence.

Substantiation:

There is no distinction between "physical damage" and "severe physical damage" in the Code; and cords for portables should not be subjected to any physical damage.
3.2.5.4 of the 2001 NEC Style Manual also shows "protection against physical damage" as the preferred terminology.
3.2.1 of the 2001 NEC Style manual states that "The NEC shall not contain references or requirements that are unenforceable or vague." The term "severe" is subjective and vague and should not be used if it can be avoided.

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-86a Log #CP1507 NEC-P15 **Final Action: Accept**
(520-68(A)(2))

Submitter: Code-Making Panel 15

Recommendation:

Change 520.68(A)(2) as follows:
"(2) Stand Lamps. Listed, hard usage cord shall be permitted to supply stand lamps where the cord is not subject to physical damage and is protected by an overcurrent device rated at not over 20 amperes."

Substantiation:

An obsolete term, "reinforced cord", should be replaced with current product terminology.

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-87 Log #2982 NEC-P15 **Final Action: Reject**
(520-81)

Submitter: Steve Vietor, 5th Year JATC Class

Recommendation:

Revise as follows:
All metal raceways and metal-sheathed cables shall be grounded. The metal frames and enclosures of all equipment, stripper poles, including border lights and portable luminaires (lighting fixtures), shall be grounded. Grounding, where used, shall be in accordance with Article 250.

Substantiation:

Stripper poles used by exotics dancer are made of metal, because of the use of luminaires on stage all metal poles shall be grounded.

Panel Meeting Action: Reject

Panel Statement:

Section 520.81 refers to Article 250, which identifies grounding requirements. There is no need to list additional items in this section.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-88 Log #1607 NEC-P15 **Final Action: Reject**
(525-3(1))

Submitter: David Shapiro, Safety First Electrical Contracting, Consulting, and Safety Education

Recommendation:

Add to title, after "...Water Sufficient for Immersion".

Substantiation:

How substantial a body of water should this apply to? The issue is not whether a person could dip a hand or get a splash but whether he or she could get at least partly soaked. A bird-size fountain does not require swimming pool-type protection; a fountain-type ride or ride accessory large enough to at least partially immerse a person, even a child, does. The proposed language clarifies this.

Panel Meeting Action: Reject

Panel Statement:

The electrical hazards related to wet human skin exist without whole or partial immersion. The requirements of 525.3(D) appropriately reference Article 680. "Sufficient" is a vague term and does not comply with the NEC Manual of Style.
The submitter inappropriately referenced 525-3(1).

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-89 Log #2498 NEC-P15 (525-3(B)) **Final Action: Reject**

Submitter: Kevin C. Shultz, P.E., Walt Disney World Co.

Recommendation:

Revise text to read as follows:
(B) Permanent Structures. Articles 518, 519, and 520 shall apply to wiring in permanent structures.

Substantiation:

This proposal references a new article being proposed (Article 519 Control Circuits for Permanent Amusement Attractions) which specifies the requirements and scope for installing control circuits of a permanent amusement attraction where the conditions of maintenance and supervision ensure that qualified persons service the systems. Currently, engineers and designers, pull requirements from both the NEC and NFPA 79. The scope of NFPA 79, however does not include permanent amusement attractions. The proposed change and the new article will provide a nationally recognized minimum standard for designers and inspectors to use for this growing industry.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-72 (Log #2495).

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-90 Log #1628 NEC-P15 (525-3(D)) **Final Action: Reject**

Submitter: David Shapiro, Safety First Electrical Contracting, Consulting, and Safety Education

Recommendation:

Add to title, after "...Water more than 1.5 m (5 ft) in at least one dimension."

Substantiation:

Referral to 680 does not make fully clear how substantial a body of water this should apply to, because people act differently at fairs than elsewhere. This is an alternate location for affirming that the issue is not whether a person could dip a hand or get a splash but whether he or she could get at least partly soaked. A bird-size fountain does not require swimming pool-type protection; a fountain-type ride or ride accessory large enough to at least partially immerse a person, even a child, does.

Panel Meeting Action: Reject

Panel Statement:

When the water is less than 1.5 m (5 ft) in at least one dimension, the hazard of electrocution still exists. The requirements of 525.3(D) appropriately reference Article 680. Panel 17, responsible for Article 680, has the expertise to determine the requirements for installations with contained volumes of water.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-91 Log #3171 NEC-P15 (525-10) **Final Action: Accept in Principle**

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and the entire text of 525.10, 11 and 12. The material contains references to Chapters 2 and 4 for specific equipment. However, 90.3 already requires that Chapters 1 through 4 apply generally to all installations and the NEC Style Manual indicates that references should not be made where they are already covered by 90.3 The panel should review the entire need for these sections and consider only including material that provides for differences with the Chapter 1 through 4 material. This action will be considered by the panel as a public comment.

Submitter: Eric Stromberg, The Dow Chemical Company

Recommendation:

Replace the title of 525.10 with "Transformers". Move (A) to 525.9.

Substantiation:

525.10 is titled "Separately Derived Systems". (A) is titled "Generators". Whereas, within the context of this article, generators are probably the sole source of energy, they don't have to be. They might be connected as a source of emergency power. In this case, they may not be separately derived (depending on the type of transfer switch). The new section II would look like this:
II. Power sources
525.9 Generators...
525.10 Transformers...
525.11 Services...

Panel Meeting Action: Accept in Principle

Change Article 525, Part II. to read as follows:
"II. Power Sources
525.10 Generators. Generators shall comply with the requirements of Article 445.
525.11 Transformers. Transformers shall comply with the applicable requirements of 240.4(A), (B)(3), and (C); 250.30; and Article 450.
525.12 Services. Services shall be installed in accordance with the applicable requirements of Article 230 and, in addition, shall comply with 525.12(A) and (B).
(A) Guarding. Service equipment shall not be installed in a location that is accessible to unqualified persons, unless the equipment is lockable.
(B) Mounting and Location. Service equipment shall be mounted on a solid backing and be installed so as to be protected from the weather, unless of weatherproof construction."

Panel Statement:

This action addresses the submitter's concerns and adds clarity. The action is consistent with the NEC Manual of Style.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16 Negative: 1

Explanation of Negative:

MORGAN: The title "Separately Derived Systems" before paragraph (A) Generators, should not be removed from the text. Generators are almost always the sole source of power at the venues covered in Article 525. When installed as a separately derived system (as defined in Article 100), it is extremely important that a generator installation meet the requirements of 250.20(D) and 250.30. Removal of the title "Separately Derived Systems" could lead installers and inspection authorities to a wrong conclusion, that generators in Article 525 are not considered as separately derived, even if they meet the description in Article 100.

15-92 Log #2676 NEC-P15 **Final Action: Accept in Principle**
(525-10(A))

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be reconsidered and correlated with the action on Proposal 15-91. See Technical Correlating Committee action on Proposal 15-91. This action will be considered by the Panel as a Public Comment.

Submitter: Phil Simmons, Simmons Electrical Services

Recommendation:

Revise existing Section 525.10(A) as follows:
(A) Generators. Generators shall comply with the requirements of Article 445 and 250.30.

Substantiation:

It is quite common for generators to supply power for electrical equipment, concessions and amusement rides under the scope of the Article 525. In many of these locations, the generator(s) are the only source of supply. In other cases, an electrical utility supplies a service installed according to Article 230.

The electrical system produced by the generator(s) is not an electrical service as defined by Article 100. As a result, grounding of the separately derived system produced by the generator should be in accordance with Section 250.30. This section covers grounding requirements for separately derived systems. Adding this requirement will bring this section into harmony with 525.10(B) where grounding of transformers must comply with the grounding requirements of 250.30.

Panel Meeting Action: Accept in Principle

Revise existing 525.10(A) as follows:

"(A) Generators. Generators shall comply with the requirements of Article 445 and, as applicable, Sections 250.30 or 250.34."

Panel Statement:

This satisfies the submitter's intent and recognizes the need to address the grounding of portable and vehicle mounted generators.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 16 Negative: 1

Explanation of Negative:

SMITH: The proposal does no harm; however, the proposed addition of text does not add any new requirements that are not part of the present Code requirements. The reference to Article 445 and 250.30 or 250.34 is not necessary because the requirements of Chapters 1-4 already apply, except as amended by articles in Chapter 5.

15-93 Log #3409 NEC-P15 **Final Action: Reject**
(525-10(C))

Submitter: Richard D. Thompson, Thompson Associates

Recommendation:

Add the following paragraph as new text.
(C) Multi Derived Systems. Where there are more than one generator or transformer providing electrical power, all generators or transformers shall be connected to a common grounding source; or the rides, stands, games or other electrically conductive structures, where the electrical service is from different sources, shall be separated by a minimum distance of 12 ft (3 meters).

Substantiation:

In a typical carnival setup, there can be more than one generator supplying various rides. If each generator is appropriately grounded at its location, there can be an electrical potential difference should the resistance (ohmic value) of the grounds be different. Therefore, there exists a potential electrical hazard should a ride being supplied from one generator have a fault. A person touching it and another ride supplied by another generator or source with a better ground can become the path of least resistance. Thereby causing the person to receive an electrical shock, and depending on the degree of the fault, possible electrocution.

Panel Meeting Action: Reject

Panel Statement:

Article 525, Part IV, and 525.23 adequately address the issues raised by the submitter.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 15 Negative: 2

Explanation of Negative:

MORGAN: Where more than one derived system (generator or transformer), provides power to a common area, all systems should be bonded together to prevent possible electric shock from touch or step potential differences. This is a well-established requirement in 250.58, where more than one AC system supplies power to a building or structure. The same protection should be afforded to persons enjoying rides, games or other attractions at venues covered in Article 525. This submittal should be Accepted in Principle, with some minor language modification. This submittal has raised safety issues that are not, in my view, adequately covered by Part IV of Article 525, or Section 525.23.

WHITE: The potential for accident exists. Connecting to a common ground will eliminate this potential.

15-94 Log #53 NEC-P15 (525-18) **Final Action: Accept**

NOTE: The following proposal consists of Comment 15-59 on Proposal 15-50a in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This comment was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE. The recommendation in Proposal 15-50a was:

[Text of (May 2001) Proposal 15-50a shown on page 2421]

Comment 15-59 received the following Technical Correlating Committee Note:
The Technical Correlating Committee directs that Proposal 15-50a and Comment 15-59

Submitter: Technical Correlating Committee National Electrical Code

Recommendation:

The Technical Correlating Committee directs that the Action on this Proposal be rewritten to comply with the NEC Style Manual. This action will be considered by the Panel as a Public Comment.

Substantiation:

This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Change 525.23 in its entity to read as follows:

"525.23 Ground-Fault Circuit-Interrupter (GFCI) Protection.

(A) Where GFCI Protection is Required.

(1) 125-volt, single-phase, 15- and 20- ampere non-locking type receptacles used for disassembly and reassembly or readily accessible to the general public.

(2) Equipment that is readily accessible to the general public and supplied from a 125-volt, single-phase, 15- or 20- ampere branch circuit.

(B) Where GFCI Protection is Not Required. Receptacles which only facilitate quick disconnecting and reconnecting of electrical equipment shall not be required to be provided with GFCI protection. These receptacles shall be of the locking type.

(C) Where GFCI Protection is Not Permitted. Egress lighting shall not be protected by a GFCI."

Panel Statement:

The panel accepts the direction of the TCC and makes the required changes to comply with the NEC Manual of Style. This was original to the submitter's Comment 15-59 on Proposal 15-50a. This also addresses the concern of the submitter in Proposal 15-95.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-95 Log #3418 NEC-P15 (525-23) **Final Action: Accept in Principle**

Submitter: Malinda Joyce Sampson, Minnesota Electricity Board

Recommendation:

Revise as follows:

525.23 Ground-Fault Circuit-Interrupter (GFCI) Protection for Personnel. ~~(B) Appliance Receptacles. Receptacles supplying items, such as cooking and refrigeration equipment, that are incompatible with ground-fault circuit-interrupter devices shall not be required to have ground-fault circuit-interrupter protection.~~

~~(C)~~ (B) Other receptacles.

Substantiation:

Listed appliances are allowed to have no more than .001 ampere of current leakage to ground when manufactured. This NEC allowance for appliances that are "incompatible" with ground-fault circuit-interrupters permits exhibitors and concessionaires to use cooking and refrigeration appliances with leakage current high enough to cause electric shock. These appliances may be located in areas accessible to the public.

Panel Meeting Action: Accept in Principle

Panel Statement:

The action and statement in Proposal 15-94 (Log #53) addresses the submitter's concern.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-96 Log #3410 NEC-P15 **Final Action: Reject**
(525-23(D))

Submitter: Richard D. Thompson, Thompson Associates

Recommendation:

Add a new paragraph (D).
(D) Portable Rides, Games and Amusement Structures.
All amusement rides, "wet rides," games and conductive structures shall be protected by special purpose ground-fault circuit-interrupters where subject to wet locations.

Substantiation:

Recently, a new technology has evolved allowing the Ground-Fault Circuit-Interrupter devices to protect at higher currents and voltages. Several models have received UL listing, and Underwriters Laboratories is presently revising UL 943 (Class C, D, E) to accommodate this new technology. Such devices can now protect at current levels up to 400-amperes and at 480-volts. These devices are available for both single phase and poly-phase circuits, the device will respond correctly to a ground leakage current waveform with "pure DC" to "DC+AC with harmonics" frequency components. The design is such that a single unit can be installed at the service entrance point thereby protecting all rides, games, and structures downstream of that point.

The amusement ride industry, has for sometime, been presented with a problem in protecting both personnel as well as the public from electric shock. Many carnival's temporary setups include what is known as a "wet ride," this may be a small boat ride in a portable pool, or a water slide where the public slides down an undulating ramp on which a film of water "lubricates" the ride experience. In addition, most rides, and games involve multiple lighting fixtures from flood lights, chasing incandescent lamps, to flashing fluorescent fixtures. Many hundreds of lamps or fixtures can be found on a single ride. And, any of which can be subject to failure and create a possible fault situation. In addition, these special amusement structures (as identified in NFPA 101) are exposed to the weather. While it is customary not to energize the ride during or immediately after a rain storm, it remains a potential shock exposure when there is fog or morning dew blanketing the ride.

Up until now, there has been no effective means for protecting persons from possible electric shock caused by defective pumps, motors, lighting fixtures or other electrical equipment. Note too, that this equipment is portable in nature and is often moved from place to place two to three times a week. Each time it is disassembled, moved, and reassembled, presents the potential problem of something going wrong. For piece of mind to the carnival owner and operator, the installation of the new special purpose GFCI devices either as a part of the ride or at the generator trailer protecting all equipment connected thereto would provide a level of safety sorely needed.

Panel Meeting Action: Reject

Panel Statement:

The submitter failed to provide data substantiating that there is a problem sufficient to mandate the use of this device. The current Code does not preclude the use of this device in this application.

The submitter also failed to indicate which class of special purpose GFCI is suitable for the identified application. The coordination of the protective device to the application is of concern to the panel. The panel is not aware of any listed special purpose GFCIs.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

Comment on Affirmative:

VANNICE: See my Comment on Affirmative on Proposal 15-74.

15-97 Log #58 NEC-P15 **Final Action: Reject**
(525-25(E) (New))

NOTE: The following proposal consists of Proposal 15-59 in the 2001 May Meeting National Electrical Code Committee Report on Proposals. This proposal was held for further study during the processing of the 2002 NATIONAL ELECTRICAL CODE.

Submitter: Tom Dunn, Outdoor Amusement Business Assn.

Recommendation:

Add paragraph (e) to read as follows:
(e) Flexible Cords or Cables. Where flexible cords or cables are used and are not subject to physical damage, they shall be permitted to be listed for hard usage. When used outdoors, flexible cords and cables shall also be listed for wet locations and shall be sunlight resistant.

Substantiation:

Refer to proposal to change 525-13(a).
Where flexible cords or cables are used as part of the wiring within a ride, concession, or attraction, hard-usage listing is sufficient.

Panel Meeting Action: Reject

Panel Statement:

This is presently and appropriately covered in 525.20(A).

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-98 Log #1963 NEC-P15 **Final Action: Reject**
(525-31)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
525.31 Equipment Grounding. All equipment requiring grounding shall be grounded by an equipment ~~grounding~~ bonding conductor of a type and size recognized by 250.118 and installed in accordance with Article 250. The equipment ~~grounding~~ bonding conductor shall be bonded to the system grounded conductor at the service disconnecting means or, in the case of a separately derived system such as a generator, at the generator or first disconnecting means supplied by the generator. The grounded circuit conductor shall not be connected to the equipment ~~grounding~~ bonding conductor on the load side of the service disconnecting means or on the load side of a separately derived system disconnecting means.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-1 (Log #2453o).

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

Comment on Affirmative:

SMITH: See my Comment on Affirmative on Proposal 15-1.

15-99 Log #2243 NEC-P15 **Final Action: Reject**
(525-31)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
525.31 Equipment Grounding. all equipment requiring grounding shall be grounded by an equipment grounding conductor of a type and size recognized by 250.118 and installed in accordance with Article 250. The equipment grounding conductor shall be bonded to the system ~~grounded~~ earth conductor at the service disconnecting means or, in the case of a separately derived system such as a generator, at the generator or first disconnecting means supplied by the generator. The ~~grounded~~ earth circuit conductor shall not be connected to the equipment grounding conductor on the load side of the service disconnecting means or on the load side of a separately derived system disconnecting means.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-53 (Log #2216).

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-100 Log #3411 NEC-P15 **Final Action: Reject**
(525-31, FPN)

Submitter: Richard D. Thompson, Thompson Associates

Recommendation:

Add the following FPN:
FPN: Portable amusement rides and games will have the neutral and ground bonded at the service entrance.

Substantiation:

It has been brought to our attention that many carnival operators or manufacturers of amusement rides and games have misinterpreted this paragraph and paragraph 525.30. We have found on a recent investigation numerous rides and games having the neutral and ground bonded at the ride's or game's disconnect switch to satisfy this Code bonding requirement. However, the Code requires that bonding point be at the "service entrance" or first disconnect. These points are usually located at a transformer or a trailer mounted generator of a separately derived system. Service to the rides and games is then distributed from the transformer or generator by portable feeder cables and portable power distribution systems.

Panel Meeting Action: Reject

Panel Statement:

The submitter's proposed fine print note does not add any clarity.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

3-106 Log #1841 NEC-P03 **Final Action: Reject**
(526 (New))

Submitter: David Shapiro, Safety First Electrical Contracting, Consulting, and Safety Education

Recommendation:

Add a new article to read as follows:

XXX.1 Scope. This article shall apply to historic structures that qualify for the National Register or similar listings or satisfy comparable local criteria. It shall apply both to restoration of wiring systems that were in place at one time in a structure and to extension of historically-appropriate wiring.

XXX.2 When historic structures are maintained or restored for educational or similar purposes, methods and materials that are forbidden under current NEC rules may, in some cases, be utilized in general occupancies.

XXX.3 Conditions Under Which Permitted. Such methods and materials shall be permitted under the following conditions:

1. They are in compliance with wiring rules in force at the time the structure was built.
2. Competent persons will supervise all use of the electrical system.
3. Suitable barriers or guards will be employed to keep nonqualified persons away from any parts of the electrical system that might pose shock hazard if they were readily accessible.
4. GFCI protection is provided for all parts of the installation that are not in compliance with the currently-adopted version of the NEC. Where the intrinsic nature of equipment is such that it would trip a Class A GFCI, GFCI protection of a lesser class may be employed.

FPN: The ground fault protective device need not be in the equipment's vicinity.

XXX.4. Conditions Under Which Not Permitted. This permission does not extend to the following special occupancies: Places of Assembly, Health care Facilities, and Hazardous (Classified) Locations.

XXX.5. Classification.

1) Simulated Structures. Structures that historically served as or that are constructed to simulate historical dwellings, places of assembly, or other occupancies that normally entail satisfying special requirements, but that the Authority Having Jurisdiction is satisfied will not be used to fulfill the special functions of such occupancies, shall not be required to satisfy the requirements associated with those occupancies.

2) Simulated Purposes. Areas within structures that historically served as or that are constructed to simulate special-purpose areas such as kitchens, bathrooms, or bathrooms, but that the Authority Having Jurisdiction is satisfied will not be used for those purposes, shall not be required to satisfy the requirements associated with those.

XXX.6. Nonfunctional Wiring. Where historically-accurate wiring is desired, but not required to be functional, it shall not have to comply with the rules associated with building wiring. However, it shall be kept sufficiently separate that it is not at risk of contact with the functional wiring. If the appearances of the two systems are not unmistakably distinct, all enclosures of the functional wiring shall be marked, inside or out, so as to identify them as containing potentially live conductors.

Substantiation:

At present, preservationists must rely on Special Permission or a lack of inspection to permit historically-accurate wiring. There is very little guidance for jurisdictional inspectors to use in keeping NEC requirements from getting in the way of preserving our heritage. Some say inspectors just need to apply common sense, but I challenge the adjective, "just." If an AHJ is to simply put aside code rules because it makes sense to him or her, there should be an equal right to add demands that aren't in the code, without justifying them except by "It makes sense to me." The current interpretation of 90.4 says the electrical community's consensus does not support either concept.

The NFPA Committee on Libraries, Museums and Historic Building's 1970 booklet, Protecting Our Heritage: A Discourse on Fire Protection and Prevention in Historic Buildings and Landmarks tells you to replace any components of the electrical system that are either deteriorated or not as safe as what the NEC currently requires. However, in recent years, the historic value of older wiring systems has begun to be appreciated.

W. Brown Morton III, Professor of Historic Preservation at Mary Washington College in Fredericksburg, Virginia, formerly Chief of the Technical Preservation Services Division of the National Park Service's Historical Preservation Program, underscored that in a recent interview. Morton developed the first federal standards for historic preservation, and presently is concerned that electrical systems are being left out.

Even the NFPA document referenced above suggests that it may be permissible to conceal some manual "fire alarm boxes" where trained employees will be stationed at all times ready to access them. Similarly here,the combination of full-time supervision by competent persons, barriers, and GFCI protection should serve as a reasonable alternative to a vast 90.4 determination. Where equipment would defeat even the limited ground fault protection offered by an AFCI or heat tracing-type GFPE, it may be too unsafe to power up even under supervision.

Panel Meeting Action: Reject

Panel Statement:

This proposed new Article is unnecessary since the information contained is already permissible based upon current text in the NEC or the wiring that is in place was in compliance with the NEC when it was installed. There are many methods of providing protection for older equipment without enclosures that may have exposed live parts. As suggested barriers or guards can be installed to prevent ready access to the live parts but again this is already permitted in the present NEC. Nonfunctional wiring does not have to comply with the NEC since it is not functioning as a live electrical system. Any permission to provide variances to the NEC can be accomplished using 90.4 as a special permission.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

3-107 Log #2771 NEC-P03 **Final Action: Reject**
(527)

TCC Action:

See Technical Correlating Committee Note on 3-108.

Submitter: Edwin S. Kramer, Doppler Effect

Recommendation:

Revise as follows:
No specific text required, renumbering of article only.
Move 527 away from the historic Entertainment Industry articles (517, 520, 525, 530 & 540).

Substantiation:

The "Entertainment Industry" articles have historically been grouped together. 520, 530 and 540 for over 50 years, with 518 added more then 25 years ago. 525 the newest "Entertainment Industry article was added in 1996.

In the Entertainment Industry, the most common wiring method is the use of portable cords and cables. Electrical Equipment is commonly moved and repositioned, either as a show, circus or carnival moves from town to town or as different scenes are shot in film or TV production.

Putting the Temporary Wiring article in the midst of the portable wire using "Entertainment Industry" portion of the code creates an area of confusion. Which rules apply to an installation, if it is only going to last a few weeks, has lots of long runs of wires, and is in a theater or studio? With theater, circuses, film & TV studios and temporary wiring articles together, it seems that the part on temporary wiring applies in Entertainment Industry venues.

Adding to the confusion, some manufacturers of portable power distribution systems and components, which are extensively used throughout the Entertainment Industry, have begun to market similar equipment to the construction trades as construction site temporary wiring systems. Someone unfamiliar with the theatrical industries seeing equipment similar to what they've seen on construction sites used for portable power distribution in a theater combined with the close proximity of these articles could reasonably conclude that the Entertainment Industry wiring is a kind of temporary wiring and that the rules of 527 apply.

Panel Meeting Action: Reject

Panel Statement:

The NEC Technical Correlating Committee (TCC) has jurisdiction over location of articles within the NEC. CMP 3 cannot relocate Article 527 without specific direction to do so by the NEC TCC.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

3-108 Log #2774 NEC-P03 **Final Action: Reject**
(527)

TCC Action:

The Technical Correlating Committee advises that Article numbering is the responsibility of the Technical Correlating Committee. The Technical Correlating Committee directs that Article 527 be renumbered as Article 590.

Submitter: Roger Lattin Lake View Terrace, CA

Recommendation:

Move text as follows:
Move 527 from in between 525 and 530. Please move above 550 to its own Section 560.

Substantiation:

518, 525, and 530 involve portable power not temporary power. Placing 527 in between 525 and 530 causes confusion. Some people will think that the current placement of 527 means that the special occupancies detailed in 525 and 530 fall under temporary power rules rather than the correct classification of portable power. Moving the article from 305 was a good idea, but placing it in between 525 and 530 was not.

Panel Meeting Action: Reject

Panel Statement:

The NEC Technical Correlating Committee (TCC) has jurisdiction over location of articles within the NEC. CMP-3 cannot relocate Article 527 without specific direction to do so by the NEC TCC.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

3-109 Log #2725 NEC-P03 **Final Action: Reject**
(527-2)

Submitter: Frank Martucci Fort Lee, NJ

Recommendation:

After existing material add:
(C) Equipment connected by cord and plug. Exposed noncurrent carrying metal parts of cord-and-plug connected equipment likely to become energized shall be redundantly grounded.
(a) Two grounding conductors shall be installed in cord, and cord sets, with the branch circuit conductors supplying the unfixed equipment in all areas.
(b) Component grounding poles. Cord connectors and attachment plugs shall be provided with two separate wiring sites at the existing grounding pole. Cord female connectors, and male attachment plugs shall be designed so that only the grounding pole can be wired with two conductors.
(c) Hospital grade components shall be used on all cords and cordsets.

Substantiation:

The grounded environment of construction sites places what worker in an environment as dangerous as a bathtub.
Should an electrical device suddenly become energized the worker will be electrocuted, or seriously injured if a survivable shock causes falls from ladders or scaffolds.
The April 1995 issue of the IBEW Journal reported that 106 workers were electrocuted on construction sites in 1992 and many workers were seriously injured from shocks as little as 3 milliamperes.
They died despite the use of GFCIs and elaborate assured grounding programs.
And they will continue to die, or suffer serious indirect injury from shock, unless NEMA and NFPA corrects the hazardous design defects in all line and extension cords.
To properly protect the construction worker, it is important the grounding conductor is properly sized, as mandated in Article 250-95 of the original code available in codebooks published before 1999.
Likewise, to prevent micro-shock, it is essential that the equipment grounding conductor shall be adjusted (larger) in size to compensate for voltage drop proportionately according to circular mil area, as mandated in Article 250-95.
Both of these code mandates have been violated with exceptions that gravely compromise construction workers safety.
Exception No. 1 permits a tiny, rarely tested, severely undersized, 7 ampacity grounding conductor to protect workers on 20-ampere branch circuits.
Exception No. 2 allows the grounding conductor to be no larger than the circuit conductors and, to this day, no cord, or cordset, except mine, has ever been adjusted to compensate for voltage drop, the primary cause of the non fatal, painful, shocks that cause workers to fall off scaffolds and ladders.
(Name deleted), in his June 24th, 2002 testimony in support of the World Trade Center NIST investigation stated the NFPA is involved in developing scientifically based consensus codes, and standards, that provide for our electrical and fire safety.
In no way were these exceptions developed as a standard according to the scientifically based method extolled by (name deleted).
An exemption that modifies an existing scientifically based consensus standard should contain adjustments that will compensate for any changes that may compromise electrical safety.
If there is a need to reduce the size of the protective grounding conductor, and abolish the mandate for larger grounding conductors than circuit conductors, simply add another similar sized grounding conductor in all cords and cordsets.
The second, redundant, grounding conductor will ameliorate, if not, eliminate, any hazard due to cord down sizing and also provide the extra copper required to prevent line drop.
And there is a dire need for two grounding conductors in all cords in order to provide a safeguard that prevents human wiring errors from causing electrocutions and current to flow through metal raceways.
Try as you many, there is no other way to correct this hazardous defect except with two conductors. If code panels scientifically test the present system they will learn, as I did, that four of six ways to wire cord components can cause shock, electrocution, and current to flow through inappropriate and metal raceways.
I discovered this heinous design defect on March 15, 1956l. A patient was electrocuted because a qualified factory worker wired a plug with reversed green and white conductors and a qualified electrician wired an explosion-proof wall outlet with reversed black and white conductors. Make the test of the wiring hazard and discover how even a wall outlet, wired with reversed polarity, can kill.
The patient died, not because of a ground fault in an electrical device but because of wiring faults made by skilled, experienced, well supervised, workers.
To prevent any further electrocutions, especially after two harrowing days of interrogation by the homicide division, and a severe reprimand from my supervisor for not covering it up, I initiated a new cord-and-plug connected grounding system for the protection of all patients.
I replaced the three conductor cords on all medical devices with four conductor cords so as to provide a second ground path that prevented miswired components from ever causing shock or electrocution. A second grounding outlet was installed next to existing outlets. I have photos of wall outlets and cardiac care patient centers I designed and installed, should you request them.
The system required costly changes so I designed a system that only requires a second wiring site at the ground pole of existing cord components. A second grounding conductor in all cords is all that is required to save thousands of lives each and every year for about the cost of a few cups of coffee.
I suggest code panels make a scientific based test of the present standard and see why it should never have been adopted in the first place.
Then test my system and see how every design defect in the cord-and-plug grounding system has been corrected.
Does my standard compensate for reductions in the grounding conductor? Yes
Does my standard ensure grounding integrity during massive shorts? Yes
Does my standard adjust in size to compensate for voltage drop? Yes
Does my standard prevent massive current to flow through raceways? Yes
Does my standard prevent shock or electrocution due to miswired cords? Yes
I guarantee my standard will save lives with the same offer I made in Denver at the NFPA annual meeting. I will give one thousand dollars to the first code panel member who can wire a four-conductor cord to each of the four wiring sites of my components so as to cause an electrocution or massive current to flow thorough inappropriate steel screws, connectors, and raceways.
And, I also offer one thousand dollars to the first code panel member who can prove miswired grounding components of existing cords,

and cordsets, will NOT cause shock, electrocution, or massive current to flow through raceways.
Text of entire substantiation is available at NFPA headquarters.
Note: Supporting Material is available for review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement:

Any change that must be done in requiring redundant grounding in cords must be done by CMP-6, which covers Article 400, CMP-5, which covers grounding and bonding, and CMP-17, which covers cord-connected appliances. CMP-3 does not have jurisdiction over these issues.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

3-110 Log #1337 NEC-P03 **Final Action: Reject**
(527-2(C) (New))

Submitter: Mark T. Rochon, City of Salem Electrical Department / Rep. Municipality-Wide Inspector

Recommendation:

Add paragraph (C) to read as follows:
All outdoor equipment, fittings, boxes and the like shall be raintight and suitable for the location.
Exception: Temporary weather proof structure to enclose equipment.

Substantiation:

Contractors are constantly installing indoor equipment outside because it is temporary during the period of construction, which does result in added electrical hazards such as lighting larger power outlets, and also violates the listing of the equipment.

Panel Meeting Action: Reject

Panel Statement:

The requirement stated in section 527.2(A) precludes the need for the submitter's proposed new section 527.2(C). Section 527.2(A) states that unless specifically modified by this article, all other requirements of this code for permanent wiring shall apply to temporary wiring installations. Sections 110.3(A), 312.2(A), 314.15(A), 406.8(B), 408.6, 408.17 and 410.4(A) address the installation of electrical equipment in wet locations.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

3-111 Log #910 NEC-P03 **Final Action: Reject**
(527-4(B))

Submitter: Samuel B. Friedman, General Cable

Recommendation:

Revise 527.4(B) to read as follows and delete the exception.

(B) Feeders. ~~Feeders shall be protected as provided in Article 240. They~~ Feeders shall originate in an approved distribution center. They ~~Conductors shall be permitted within cable assemblies or within~~ shall be permitted to be: ~~multiconductor~~

(1) Multiconductor cords and cables of a type identified in Table 400.4 for hard usage or extra-hard usage.

(2) Single conductor cords and cables size 8 AWG and larger of a type identified in Table 400.4 for hard usage or extra-hard usage.

(3) Single insulated conductors size 14 AWG and larger as listed in Table 310.13 or Table 400.4, when installed for the purposes specified in 527.3(C), and where accessible only to qualified persons.

For the purpose of this section, Type NM and Type NMC cables shall be permitted to be used in any dwelling, building, or structure without any height limitation.

~~Exception: Single insulated conductors shall be permitted where installed for the purposes(s) specified in 527.3(C), where accessible only to qualified persons.~~

Substantiation:

The first sentence was deleted in accordance with 4.1.1 of the NEC Style Manual, which states that: "References shall not be made to an entire article unless additional conditions are specified." Article 240 applies to all electrical installations including temporary installations.

Section 527.4(B) does not permit single conductors to be used as feeders for temporary installations. The only place where there is mention of single conductors is in the Exception to 527.4(B). However, this Exception is limited to temporary service for emergencies and tests at which time a qualified person is required to be present. There are applications in the code (e.g. 525.20(A) & (B)) where single conductors from Table 400.4 can be used for more permanent installations so why not for temporary applications? A minimum size was chosen for use without supervision for mechanical reasons.

Unless specifically prohibited or modified in Article 527, any of the wiring methods in Chapter 3 can be used for temporary installations so there is no need to specify "cable assemblies".

The Exception was converted into positive text as (3) in accordance with 3.1.4 of the NEC Style Manual. A minimum conductor size for use as power lead was defined and the applicable tables were referenced.

Panel Meeting Action: Reject

Panel Statement:

The requirement to provide overcurrent protection based upon some of the requirements in Article 240 should be retained since there may be those who want to delete protection in some temporary installations and this reinforces the need for protection. Multiconductor cords or cables based on Table 400.4 can already be installed so this part of the proposal is not new as indicated. There has been no technical substantiation provided for the particular sizes indicated in items (2) and (3) of the proposal.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

3-112 Log #1181 NEC-P03 (527-4(B)) **Final Action: Accept in Part**

TCC Action:

The Technical Correlating Committee directs that Code-Making Panel 3 reconsider the panel action based on the action taken on Proposal 7-99. The Technical Correlating Committee notes that 334.10 has been deleted by the action on proposal 7-99. This action will be considered by the Code-Making Panel as a public comment.

NOTE: This Proposal originates from Tentative Interim Amendment 02-1 issued by the Standards Council on Oct 3, 2002.

Submitter: Richard P. Owen, City of St. Paul, Minnesota

Recommendation:

1. Revise section 527.4(B) to read as follows:

(B) Feeders. Feeders shall be protected as provided in Article 240. They shall originate in an approved distribution center. Conductors shall be permitted within cable assemblies or within multiconductor cords or cables of a type identified in Table 400.4 for hard usage or extra-hard usage. For the purpose of this section, Type NM and Type NMC cables shall be permitted to be used in any dwelling, building, or structure without any height limitation or limitation by building construction type as described in 334.10(3).

2. Revise section 527.4(C) to read as follows:

(C) Branch Circuits. All branch circuits shall originate in an approved power outlet or panelboard. Conductors shall be permitted within cable assemblies or within multiconductor cord or cable of a type identified in Table 400.4 for hard usage or extra-hard usage. All conductors shall be protected as provided in Article 240. For the purposes of this section, Type NM and Type NMC cables shall be permitted to be used in any dwelling, building, or structure without any height limitation or limitation by building construction type as described in 334.10 (3).

Substantiation:

Submitter's Reason: I am writing to request consideration of a Tentative Interim Amendment (TIA) to the 2002 National Electrical Code to correct what I believe to be an inadvertent consequence of a change in Section 334.10(3). This change affects the use of Nonmetallic-Sheathed Cable for use in temporary Installations as covered in Article 527. As the NEC now stands, the use of nonmetallic-sheathed cable as temporary branch circuits or feeders would be prohibited in Types III, IV & V buildings unless the temporary wiring is concealed behind a barrier with a 15-minute fire-rated finish. Since this is an unworkable solution, and also since temporary installations are held to a lesser standard of installation because they are temporary I would propose additional language be added to two sections in article 527 that would clarity that for purposes of temporary installations, the fire-rated finish would not be required. I believe the wording would also help to limit misinterpretation regarding use of Nonmetallic-sheathed cable as a temporary installation where it should not be used, such as hazardous installations and other areas where it was never intended to be used.

Emergency Nature: Having been in the electrical industry for over 25 years as both an electrician and an inspector, I have seen the wide use of nonmetallic-sheathed cable as a temporary wiring system, and do not believe that the change in Article 334 should prohibit its use in certain building types for temporary installations. I also believe this proposed change warrants consideration as an emergency change and should be processed as a TIA for the betterment of the industry as a whole. This request for processing a TIA is strictly on my own initiative and I am not implying support by any organization of which I may be a member.

Panel Meeting Action: Accept in Part

Accept the changes to the last sentence of 527.4(B) and (C) only.

Panel Statement:

Only the changes in the last sentence of each section are accepted. The remainder of the text in the proposal was not accepted since there may be other changes to be made in these sections. Also the exceptions were not included in the final text and they must remain as part of the text.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

3-114 Log #2667 NEC-P03 (527-4(B)) **Final Action: Accept in Principle in Part**

Submitter: Phil Simmons, Simmons Electrical Services

Recommendation:

Revise existing Section 527.4(B) as follows:

(B) Feeders. Overcurrent protection ~~Feeders~~ shall be ~~protected as~~ provided in accordance with Article 240. Feeder conductors ~~They~~ shall originate in a listed ~~an approved~~ distribution center. Conductors shall be permitted within cables included in Chapter 3 ~~assemblies~~ or within multiconductor cords or cables of a type identified in Table 400.4 for hard usage or extra-hard usage. For the purpose of this section, Type NM and Type NMC cables shall be permitted to be used in any dwelling, building, or structure without any height limitation.

Retain the existing exception.

Substantiation:

The proposed changes to the first sentence are intended to be editorial.

Listed power outlets and panelboards are readily available. Therefore, the words "an approved" (acceptable to the authority having jurisdiction) should be replaced by "a listed."

The term "cable assemblies" has been confusing for some time. Is this something made on the job or in someone's basement? Listed cables (are these the cable assemblies intended by this section?) of a wide variety are readily available and should be used.

The phrase "included in Chapter 3" is proposed to be added to the third sentence to clarify that the phrase "cable assemblies" is not intended to include "homemade" cable assemblies such as twisting or cabling individual insulated conductors together to make a "cable assembly."

Panel Meeting Action: Accept in Principle in Part

Accept the proposed changes to the first sentence with the additional change to delete the words "Article 240" and insert "240.4, 240.5, 240.100, and 240.101. Reject the remainder of the proposal.

Panel Statement:

The insertion of the specific references provides compliance with Section 4.1 of the NEC Style Manual to provide specific references within a section rather than a reference to an entire article. These references cover overcurrent protection for conductors, cables and cords, and overcurrent protection for over 600 volt applications.

Requiring listing or approval of the distribution center is better left to the discretion of the AHJ since there may be distribution equipment in service that is not listed or is not totally complete but must be used for temporary power until the new equipment can be installed.

The proposed reference to "cables included in Chapter 3" was not accepted since there are cable assemblies used for temporary lighting strings and receptacle power that are not Chapter 3 wiring methods and are used throughout the industry for temporary wiring.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

3-113 Log #1527 NEC-P03 **Final Action: Accept in Principle**
(527-4(B) & (C))

TCC Action:

The Technical Correlating Committee directs that Code-Making Panel 3 reconsider the panel action based on the action taken onProposal 7-99. The Technical Correlating Committee notes that 334.10 has been deleted by the action on proposal 7-99. This action will be considered by the Code-Making Panel as a public comment.

Submitter: James M. Daly, General Cable

Recommendation:

Revise the last sentence in both 527.4(B) and (C) as follows:
For the purpose of this section, type NM and Type NMC cables shall be permitted to be used in any dwelling, building, or structure without any ~~height limitation~~ building construction type limitation and the requirements in 334.10(3) that the cable be concealed in other structures shall not apply.

Substantiation:

After the completion of the 2002 Code cycle, the NFPA Standards Council, at their July 13, 2001 meeting, accepted Proposal 7-137 to expand the use of NM cable. In doing so, they also accepted the additional restrictions in 334.10(2) and (3) on NM cable that were included in that proposal without realizing the impact those restrictions had on temporary installations.
The initial portion of 334.10 in the 2002 now reads:
"334.10 Uses Permitted.
Type NM, Type NMC, and type NMS cables shall be permitted to be used in the following:
(1) One- and two-family dwellings.
(2) Multifamily dwellings permitted to be of Types III, IV, and V construction except as prohibited in 334.12.
(3) Other structures permitted to be of Types III, IV, and V construction except as prohibited in 334.12. Cables shall be concealed within walls, floors, or ceilings that provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies.
FPN No. 1: Building constructions are defined in NFPA 220-1999, Standard on Types of Buildings Construction, or the applicable building code, or both.
FPN No. 2: See Annex E for determination of building types [NFPA 220 Table 3-1]."
Sections 527.4(B) and (C) both contain the statement "For the purpose of this section, Type NM and Type NMC cables shall be permitted to be used in any dwelling, building, or structure without any height limitation."
However, 527.2(A) states "Except as specifically modified in this article, all other requirements of this Code for permanent wiring shall apply to temporary wiring installations."
Based on this revised text, NM cable can only be used as open or exposed wiring in temporary installations in one- and two-family dwellings and multifamily dwellings of Types III, IV, and V construction.
NM cable cannot be used in temporary installations in any other structure, regardless of the height, unless it complies with 334.10(3) and is "concealed within walls, floors, or ceilings that provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies."
Since Article 527 does not specifically exempt NM cable from this requirement, it must be complied with. NM cable cannot even be used in temporary installation in a one-story strip mall unless it is concealed; not very practical for temporary installations.
Since the Standards Council action occurred after the Code cycle was completed, there was no way that Panel 3 or the Technical Correlating Committee could correct this conflict.
TIA 700 was processed and issued to remove the building construction Type limitation but the TIA did not remove the requirement in 334.10(3) that the cable be "concealed within walls, floors, or ceilings that provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies."
Acceptance of this proposal will permit the use of Type NM cable in temporary installations as previously permitted in the 1999 and prior Codes. There was no technical substantiation provided to support this limitation on Type NM cable in temporary installations. It was inadvertently incorporated into the Code when the standards Council accepted the proposal for expanded use of NM cable.
Also, since the height limitation was removed from 334.10 by the Standards Council action, there is no longer any need to exempt the height limitation in 527.4(B) and (C).

Panel Meeting Action: Accept in Principle

Panel Statement:

Providing the assurance that there isn't a height limitation where using NM cable is necessary to ensure that everyone understands this issue clearly. The submitter's concerns are addressed by the Panel Action in Proposal 3-112.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

3-115 Log #237 NEC-P03 (527-4(C)) **Final Action: Reject**

Submitter: James M. Daly, General Cable

Recommendation:

Revise 527(4)(C) to read as follows and delete the Exception.

(C) Branch Circuits. All branch circuits shall originate in an approved power outlet or panelboard. ~~Conductors shall be permitted within cable assemblies or within multiconductor~~ Multiconductor cords or cables of a type identified in Table 400.4 for hard usage or extra-hard usage shall be permitted for branch circuit wiring. ~~All conductors shall be protected as provided in Article 240.~~ For the purposes of this section, Type NM and type NMC cables shall be permitted to be used in any dwelling, building, or structure without any height limitation.

Branch circuits installed for the purposes specified in 527.3(B) or (C) shall be permitted to be ~~run~~ installed as single insulated conductors using insulated conductors listed in Table 310.13 or Table 400.4. Where the wiring is installed in accordance with 527.3(B):

(1) The voltage to ground shall not exceed 150 volts
(2) The wiring shall not be subject to physical damage
(3) The conductors shall be supported on insulators at intervals of not more than 3.0 m (10 ft)
(4) For festoon lighting, the conductors shall be arranged so that excessive strain is not transmitted to the lampholders.

~~Exception: Branch circuits installed for the purposes specified in 527.3(B) or (C) shall be permitted to be run as single insulated conductors. Where the wiring is installed in accordance with 527.3(B), the voltage to ground shall not exceed 150 volts, the wiring shall not be subject to physical damage, and the conductors shall be supported on insulators at intervals of not more than 3.0 m (10 ft) or, for festoon lighting, the conductors shall be arranged so that excessive strain is not transmitted to the lampholders.~~

Substantiation:

Unless specifically prohibited or modified in Article 527, any of the wiring methods in Chapter 3 can be used for branch circuits in temporary installations so there is no need to specify "cable assemblies".

The third sentence was deleted in accordance with 4.1.1 of the NEC Style Manual, which states that "References shall not be made to an entire article unless additional conditions are specified." Article 240 applies to all electrical installations including temporary installations.

The Exception was converted into positive text in accordance with 3.1.4 of the NEC Style Manual and the requirements were converted into a list in accordance with 3.3.2 of the NEC Style Manual. The applicable tables for the single conductors were also specified.

Panel Meeting Action: Reject

Panel Statement:

The deletion of the cable assemblies was not accepted since there are cable assemblies used for temporary lighting strings and receptacle power that are not Chapter 3 wiring methods and are used throughout the industry for temporary wiring.

The deletion of the sentence referencing Article 240 was not accepted since providing specific requirements for overcurrent protection is a reminder to persons using Article 527 that both feeders and branch circuits must still have proper protection for the conductors, cords, and cables. Section 4.1 of the NEC Style Manual requiring specific references was satisfied in a previous proposal.

The conversion of the exception to positive text was not accepted since Section 3.1.4 permits the Panel to make the decision whether the information is expressed more effectively as an exception or as positive text. This permissive text is much clearer as an exception.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

3-116 Log #2696 NEC-P03 (527-4(C)) **Final Action: Accept in Principle in Part**

Submitter: Phil Simmons, Simmons Electrical Services / Rep. National Armored Cable Manufacturers Assn.

Recommendation:

Revise existing Section 527.4(C) as follows:

(C) Branch Circuits. All branch circuits shall originate in a listed ~~an approved~~ power outlet or panelboard. Conductors shall be permitted within cables included in Chapter 3 ~~assemblies~~ or within multiconductor cord or cable of a type identified in Table 400.4 for hard usage or extra-hard usage. ~~All~~ Conductors shall be protected from overcurrent as provided in Article 240. Conductors in flexible cord or cable shall be protected from overcurrent in accordance with 400.5. For the purposes of this section, Type NM and Type NMC cables shall be permitted to be used in any dwelling, building, or structure without any height limitation.

Retain the existing exception.

Substantiation:

Listed power outlets and panelboards are readily available. Therefore, the words "an approved" (acceptable to the authority having jurisdiction) should be replaced by "a listed."

The term "cable assemblies" has been confusing for some time. Is this something made on the job or in someone's basement? Listed cables (are these the cable assemblies intended by this section?) of a wide variety are readily available and should be used.

The proposal also intends to simplify the references for overcurrent protection of flexible cords rather than the circular reference through Article 240.

Panel Meeting Action: Accept in Principle in Part

Accept the deletion of the word "All" and the addition of the phrase "from overcurrent" in the third sentence of the proposal. Change the words "Article 240" in the third sentence to "240.4, 240.5, and 240.100."

Reject the remainder of the proposal.

Panel Statement:

Requiring listing or approval of a power outlet or panelboard is better left to the discretion of the AHJ since there may be equipment in service that is not listed or is not totally complete but must be used for temporary power until the new equipment can be installed.

The proposed reference to "cables included in Chapter 3" was not accepted since there are cable assemblies used for temporary lighting strings and receptacle power that are not Chapter 3 wiring methods and are used throughout the industry for temporary wiring.

Referencing the specific section in Article 240 provides the necessary requirements for providing overcurrent protection for conductors, cables, and cords while still providing a choice of either using 240.5(A) with its reference to Article 400 or 240.5(B) that permits protection by a branch circuit protection device. This section specific reference makes the proposed sentence for flexible cords or cables unnecessary.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

3-117 Log #230 NEC-P03 (527-4(D)) **Final Action: Reject**

Submitter: Alan H. Nadon, City of Elkhart, IN

Recommendation:

Add new text to read as follows:

527.4(D) Receptacles used during periods of construction [527.3 (A)] that are installed in damp or wet locations, shall comply with Section 406.8(A) or (B)(2)(a) and (b), as applicable.

Substantiation:

1. On job sites, contractors typically do not leave attachment plug caps inserted and unattended, due to theft of equipment.
2. Most covers that provide protection when in use are not designed for use with the heavy duty cords and plug caps used on construction sites.
3. Most covers that provide protection when in use are not designed for the abusive environment of a construction site, which will exacerbate the problem of missing and damaged covers.
4. On construction sites because of spraying liquids "in use" covers may not provide the degree of protection afforded by covers that are weatherproof only when the plug is removed.

Panel Meeting Action: Reject

Panel Statement:

Section 527.2(A) requires compliance with all other parts of the NEC, unless specifically modified by Article 527. The proposed change does not modify the requirements for 406.8(B)(1) so the requirement for 15 and 20 ampere, 125- and 250-volt receptacles in a wet location to be weatherproof whether or not a attachment plug cap is inserted is still in force. Making sure that the receptacles are weatherproof whether attended or not is a real safety issue, especially at a temporary installation and must be left as a requirement.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

3-118 Log #1964 NEC-P03 **Final Action: Reject**
(527-4(D))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(D) Receptacles. All receptacles shall be of the grounding type. Unless installed in a continuous grounded metal raceway or metal-covered cable, all branch circuits shall contain a separate equipment ~~grounding~~ bonding conductor, and all receptacles shall be electrically connected to the equipment grounding conductors. Receptacles on construction sites shall not be installed on branch circuits that supply temporary lighting. Receptacles shall not be connected to the same ungrounded conductor of multiwire circuits that supply temporary lighting.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Changing the phrase "equipment grounding conductor" to "equipment bonding conductor" is outside the jurisdiction of Panel 3 and must be acted on by Panel 1 as a definition and Panel 5 which has jurisdiction over that particular phrase.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

EASTER: See my Comment on Affirmative on Proposal 3-1. (Log #2453c).

3-119 Log #2512 NEC-P03 **Final Action: Reject**
(527-4(J) Exception (New))

Submitter: Russell LeBlanc, Peterson School of Engineering

Recommendation:

Add exception:
In accordance with 527.3(B), (C) and (D) vegetation shall be permitted to be used for support of overhead spaces of branch circuit or feeder conductors, where the wiring is arranged with proper strain reliefs, tension take-up devices or other approved means to avoid damage from the movement of the vegetation.

Substantiation:

I believe it is possible with careful planning to use a tree to support overhead wiring without damaging the wires. On regular occasions I am called to apartment buildings where all the security and parking lot lights are out because an underground cable has gone bad and tripped the breaker. Often these service calls come in the middle of the night when it is pitch black outside. Typically, in the past, I would quickly rectify the problem by locating the shorted cable, disconnecting that portion of the cable from pole "A" to pole "B", and then I would install an emergency temporary cable from pole "A" through some trees to pole "B". In a very short time, I was able to make the parking lot safe again because I was able to quickly restore power. Now I don't have that option. Now I have to tell my customer, sorry the lights have to stay off until we can get the excavator here to dig up the asphalt. This can create a very unsafe parking lot if the lights are not working. People get mugged, cars get vandalized. Are the people safer in the dark with the lights out, or are they safer with a temporary cable strung through the trees to get the lights going until the asphalt can be dug up and the repair made permanent? I believe in this situation it is much safer to install the temporary cable through the trees than to have no security lighting. This can be arranged to avoid damaging the wiring.

Panel Meeting Action: Reject

Panel Statement:

Overhead branch circuit and feeders can be damaged by connection to live vegetation. For example, in areas where there are high wind capabilities, attaching the cables or cords to vegetation may subject them to insulation and jacket damage even where proper strain relief devices and tension take-up devices are installed. Tree branches and limbs can chafe and damage the insulation or even cause separation of the cable or conductors creating an even greater damage.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

MAASSEN: I agree with the submitter that live vegetation should be allowed for temporary wiring to support overhead branch circuits and feeders. Large live vegetation is a better support than braced 4x4's or 2x4 commonly used to support them now. This would not be in conflict with 225-26 as 527.3 limits the time live vegetation could be used for this purpose. 527.4 (J) as presently written does not allow for wiring of large holiday tree lighting without laying the feeders and branch circuits on the ground or trenching them, in destroying their root systems or setting a pole next to them.

3-120 Log #1736 NEC-P03 **Final Action: Accept in Part**
(527-5 and A.527.5 (New))

TCC Action:

The Technical Correlating Committee directs that the Code-Making Panel add a title to the new section. This action will be considered by the panel as a public comment.

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 18 for action in Article 410. This action will be considered by Code-Making Panel 18 as a Public Comment.

Submitter: Marcelo M. Hirschler, GBH International / Rep. Fire Retardant Chemicals Association

Recommendation:

Add text to read as follows:

527.5 Decorative lighting used for holiday lighting and similar purposes, in accordance with 527.3 (B), shall be listed.

527.5.1 The decorative lighting addressed by this section are temporary-use, seasonal decorative-lighting products and accessories with a maximum input voltage rating of 120 V. Such products include the following:

(a) factory-assembled seasonal lighting strings with push-in, midget-screw, or miniature-screw lampholders connected in series for across-the-line use or with candelabra- or intermediate-screw lampholders connected in parallel for direct-connection use.

(b) factory-assembled seasonal decorative outfits such as wreaths, stars, light sculptures, crosses, candles or candle sets without lamp shades, products in the shape of, or in resemblance to, a Christmas tree provided with simulated branches and needles not exceeding 30 inches in height, blow-molded figures or objects, animated figures, tree tops, controllers, tree stands, and motorized decorative displays.

(c) products which are portable and not permanently connected to a power source.

(d) ornaments which are provided with an adapter for connection to a push-in lampholder and are intended to replace a push-in lamp in a series-connected decorative-lighting string or decorative outfit.

527.5.2 The decorative lighting addressed by this section does not cover strings employing lampholders larger than intermediate-screw, non-seasonal lighting, non-seasonal products, permanently connected products, non-decorative lighting intended for illumination only, cord sets, or temporary power taps.

Substantiation:

* Decorative lighting can be a severe source of fire when placed in contact with, or close proximity to, natural or artificial combustible vegetation. In fact, it has been shown that the vast majority of fire losses associated with Christmas tree fires are actually caused by faulty or inadequate decorative lighting. UL has recently developed UL 588 (Standard for Seasonal and Holiday Decorative Products), issued in August 2000, to address this problem (often caused by non-compliant lights). Thus, it behooves the NEC to require that any decorative lights used in temporary installations should be listed (both when used in natural or in artificial trees and when used simply as lighted decorations).

* NFPA statistics for 1988 show: (a) that the leading cause of Christmas tree fires and property damage was short circuit or ground fault (21%), (b) that, in this category, electrical failure other than short circuit ranked second in number of fires, injuries and property damage with the exception of the "other known" category, and (c) that cords and plugs were the leading type of equipment involved in the ignition of Christmas trees.

* It is important to point out that the National Electrical Code does not, as yet, require the listing of decorative lighting, to a large extent because UL 588 has not been available in its present form until recently.

* Fire statistics by the NFPA show that on average in the United States there were 400 fires a year (between 1993 and 1997) in which a Christmas tree was the item first ignited. Those fires accounted for 14 fire fatalities per year, 79 fire injuries per year and a yearly property damage of 17.5 million dollars. The same NFPA fire statistics also show that, in the same period, there were 32,400 fires a year in which electrical wire or cable insulation was the item first ignited, resulting in 144 fire fatalities per year, 754 fire injuries per year and a yearly property damage of 275.5 million dollars. Thus, Christmas tree fires cause a greater amount of damage (both in terms of victims and of cost) than most electrical fires.

* The NFPA web site contains the following recommendation: "When decorating Christmas trees, always use safe tree lights. (Some lights are designed only for indoor or outdoor use, but not both.) Larger tree lights should also have some type of reflector rather than a bare bulb and all lights should be listed by a testing laboratory."

* There have also been recommendations from a large number of organizations that all tree lights should be listed. A simple web site search brings up, among others: the US Fire Administration (an entity of the Federal Emergency Management Agency, 500 C Street, SW Washington, D.C. 20472), the National Safety Council (A Membership Organization Dedicated to Protecting Life and Promoting Health, 1121 Spring Lake Drive, Itasca, IL), US Department of Agriculture, various universities (including University of Illinois, @ Urbana-Champaign, University of Nebraska, University of California @ Berkeley, and so on), various authorities having jurisdiction and, of course, Underwriters Laboratories.

* Decorative lighting is often used as temporary lighting, as recognized in section 527.3 (B) of the NEC, where time constraints are imposed for such lights.

* The following Table (taken from NFPA data between 1980 and 1988) compares the likelihood of having a fire fatality when a fire starts on a particular product. In other words, how likely is a fire starting on a Christmas tree going to lead to a fatality. We can get that information by comparing the number of fires to the number of fire fatalities, and it shows that every 26 fires starting on a Christmas tree lead to a fatality. This is a poor record, as only two of the other products on the list are worse: clothing that is being worn by a person (at 8 fires per fatality) and upholstered furniture (at 25 fires per fatality). At the other end of the spectrum, with fires from plants and trees, there is a fire fatality every 871 fires, and with other decorations, there is a fatality every 450 fires. It is important to keep pointing out that Christmas tree fires really usually mean decorative light fires.

* Of course, the same NFPA data also shows that several other products are more likely to result in fires. For example, fires are 90 times more likely to start on mattresses or bedding than on Christmas trees, and 13 times more likely to start on curtains and drapes than on Christmas trees. However, looking at deaths from fires, products such as decorations, toys and games and plants and trees are much less deadly than Christmas trees (which really means decorative lights): a fire starting in any other decoration is 10 times less likely to lead to a fire fatality than one starting on a Christmas tree.

****Insert Table NEC Tb 527.5 L1736 Here****

(Table shown on page 2702)

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

Panel Meeting Action: Accept in Part

Accept the first sentence and section reference as follows: 527.5 Decorative lighting used for holiday lighting and similar purposes, in accordance with 527.3(B), shall be listed.

Reject the remainder of the proposal.

Panel Statement:

Recommend sending this Panel Action to Panel 18 for their information. The remainder of the proposal was rejected since this information is more appropriately located in the product listing standards.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

HORMAN: The proposal should be rejected and the Technical Correlating Committee should send this proposal to CMP-18 for action. The requirement for decorative lighting as described by the submitter is covered in Article 410.

3-121 Log #1965 NEC-P03 **Final Action: Reject**
(527-6)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:

Exception: In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified personnel are involved, an assured equipment ~~grounding~~ bonding conductor program as specified in 527.6(B)(2) shall be permitted for only those receptacle outlets used to supply equipment that would create a greater hazard if power was interrupted or having a design that is not compatible with GFCI protection.

(B) Use of Other Outlets. Receptacles other than 125-volt, single-phase, 15-, 20-, and 30-ampere receptacles shall have protection in accordance with (1) or, the assured equipment ~~grounding~~ bonding conductor program in accordance with (2).

(1) GFCI Protection. Ground-fault circuit interrupter protection for personnel.

(2) Assured Equipment ~~Grounding~~ Bonding Conductor Program. A written assured equipment ~~grounding~~ bonding conductor program continuously enforced at the site by one or more designated persons to ensure that equipment ~~grounding~~ bonding conductors for all cord sets, receptacles that are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug are installed and maintained in accordance with the applicable requirements of 250.114, 250.138, 406.3(C), and 527.4(D).

(a) The following tests shall be performed on all cord sets, receptacles that are not part of the permanent wiring of the building or structure, and cord- and plug-connected equipment required to be grounded:

(1) All equipment ~~grounding~~ bonding conductors shall be tested for continuity and shall be electrically continuous.

(2) Each receptacle and attachment plug shall be tested for correct attachment of the equipment ~~grounding~~ bonding conductor. The equipment ~~grounding~~ bonding conductor shall be connected to its proper terminal.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Changing the phrase "equipment grounding conductor" to "equipment bonding conductor" is outside the jurisdiction of Panel 3 and must be acted on by Panel 1 as a definition and Panel 5 which has jurisdiction over that particular phrase.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

Comment on Affirmative:

EASTER: See my Comment on Affirmative on Proposal 3-1. (Log #2453c).

3-122 Log #3412 NEC-P03 **Final Action: Reject**
(527-6(A))

Submitter: Richard D. Thompson, Thompson Associates

Recommendation:

Revise this section as follows:
527.6(A) Receptacle Outlets. All ~~125-volt, single-phase 15-, 20-, and 30-ampere~~ receptacle outlets that are not a part of the permanent wiring of the building or structure and that are in use by personnel shall have ground-fault circuit-interrupter protection for personnel.

Substantiation:

Recently, a new technology has evolved allowing the Ground-Fault Circuit-Interrupter devices to protect at higher currents and voltages. Several models have received UL listing, and Underwriters Laboratories is presently revising UL 943 (Class C, D, E) to accommodate this new technology. Such devices can now protect at current levels up to 400-amperes and at 480 volts. These devices are available for both single phase and poly-phase circuits, the device will respond correctly to a ground leakage current waveform with "pure DC" to "DC+AC with harmonics" frequency components. The design is such that a single unit can be installed at the service entrance point thereby protecting all receptacle outlets downstream of that point.

In a typical temporary installation involving the use of portable electrical distribution systems serving receptacles for hand tools, which operate at 125-volts and 15- to 30-amperes are adequately protected by a GFCI receptacle, circuit breaker, or in a cord connected GFCI assembly. However, within the same facility, there are numerous other tools and equipment, while not "hand held" do require operator contact with possible conductive surfaces. Examples might be pumps, compressors, table saws, cut off saw, drill presses, milling machines, lathes, welding machines, hoists, etc.

Until there is a requirement to protect all tools and equipment in these situations, the "umbrella of safety is only half open."

One of the devices now on the market is the LifeGuard System by PowerGuard LLC, of Sylmar, CA. The device was initially developed for the motion picture industry where until its development there was no adequate method for the protection of actors and crew members (personnel) when the scene being filmed involved water effects. Examples can be seen in many of your favorite films. The method for protection most often used in the studios was to supply only a direct current (DC) service. It was felt that "no one got killed on DC". As the lighting technology evolved, the DC operated carbon arc lamps have now been replaced with alternating current (AC) powered HMT lamps.

For the film "Titantic" PowerGuard LLC received the contract to supply the generators and portable power distribution system at the 20th Century Fox studios in Baja, California. At one point during the filming of this production, an underwater lighting fixture failed. There were 125 actors in the water at that time. The GFCI system designed by PowerGuard LLC and Bender Corp. shut down nine generators within 20 milliseconds of sensing the fault. No actors were injured! A permanently installed system is at the Bellagio Hotel in Las Vegas, where Cirque du Soleils perform "O" nightly.

Panel Meeting Action: Reject

Panel Statement:

While the submitter has provided some anecdotal information in his substantiation, he has not provided any product data or fact-finding information to support his claim of this new technology. Deleting 125 volt, single phase 15-, 20-, and 30-ampere receptacles from 527.6(A) is not necessary since 527.6(B) requires all other receptacles to either be GFCI protected or to use the assured equipment grounding conductor program. The device he has mentioned in his substantiation can be installed now without any change to the NEC. See Section 215.9 that permits GFCI protection for feeders.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

3-123 Log #3466 NEC-P03 **Final Action: Reject**
(527-6(A) Exception)

Submitter: Charles M. Trout, Maron Electric Co. Inc.

Recommendation:

Delete the exception in its entirety.

Substantiation:

The National Electrical Code is prescriptive code. To say "where the conditions of maintenance and supervision ensure that only qualified persons service the installation," is a performance requirement. Without prescriptive requirements indicating whether this qualified person is an employee of the owner of the premises or is a separately contracted person and the Authority Having Jurisdiction has a means of verification of the continued employment of the qualified person and whether the qualified person has been verified by the authority having jurisdiction as meeting the definition of a qualified person as shown in the definitions of this Code no prescriptive requirements have been followed.

To permit relaxation of the safety requirements of this Code without establishing a positive guarantee that the safety of persons and property is indisputably assured is a reprehensible act.

Panel Meeting Action: Reject

Panel Statement:

The NEC is primarily a prescriptive code but there are some performance requirements found in the Code. For example, 250.4 very specifically states as follows: 250.4 General Requirements for Grounding and Bonding.

The following general requirements identify what grounding and bonding of electrical systems are required to accomplish. The prescriptive methods contained in Article 250 shall be followed to comply with the performance requirements of this section.

There are industrial facilities where a greater hazard would be created if power were interrupted or where the design of the equipment is not compatible with GFCI operation. Permitting these facilities to have an alternative to installing GFCI protection is necessary to permit the equipment to operate safely but there must be qualified personnel to maintain and supervise the use of the assured grounding program.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

3-124 Log #3394 NEC-P03 **Final Action: Reject**
(Chapter 7)

Submitter: Gilbert L. Thompson, MEIA Codes and Standards

Recommendation:

Add a new Article 528 as follows:
A Minimum Standard for the Evaluation of Wiring Conditions in Existing Dwellings.
This article is informative unless specifically adopted by the local jurisdiction adopting the National Electrical Code.
Article 7XXX - Inadequately wired dwelling type occupancies.
7XX1 Scope. This article covers the examination and evaluation of wiring systems and conditions in existing dwellings that will at least ensure a minimum safety standard.
A.7XX2 - Inadequate wiring. Evidence of the inadequacy of wiring of an existing dwelling type occupancy shall be two or more of the following:
(1) Evidence of loose, broken, frayed, damaged or unattached lighting fixtures, receptacles, switches, junction boxes, fittings and cables and all missing cover plates required.
(2) Oversizing of conductor overcurrent protection for branch circuits, feeders or services.
(3) Electrical overloads.
(4) Misuse of electrical equipment.
(5) Illegal or unapproved, unlisted or unlabeled extensions to the wiring system in order to provide light, heat or power.
(6) Use of cords in lieu of permanent wiring.
(7) For lighting, receptacles, laundry, bathrooms, basements, heating equipment, service and kitchens see Part B Sections 7XXX - 7XXX.
B. Minimum standards for the following:
7XXX - Entrance and Exits. Entrances and exits shall be illuminated by exterior lighting outlets. Lighting outlets shall be controlled by interior wall switches located for convenient and readily accessible use.
7XXX - Living Rooms. The living room shall be provided with illumination. The lighting outlet shall be controlled by a wall switch, located for convenient and readily accessible use, nearest to the entrance into the room. Receptacle outlets controlled by a wall switch in lieu of a lighting outlet shall be permitted. Convenient duplex electrical outlets shall be provided equally spaced around the room, at least one duplex electrical outlet on each wall.
7XXX - Other Habitable Rooms. All habitable rooms shall be illuminated. Lighting outlets shall be controlled by a wall switch. Wall switches shall be located for convenient and readily accessible use. Convenient duplex electrical receptacle outlets shall be provided with at minimum of two (2) outlets equally spaced around the room. An additional electrical outlet controlled by a wall switch shall be permitted in lieu of a light outlet.
7XXX - Kitchen. Kitchen shall be provided with illumination. Lighting outlet shall be controlled by a wall switch, located for convenient and readily accessible use, nearest to the entrance to the room. A separate small appliance circuit shall be provided supplying a minimum of three (3) grounding type duplex electrical receptacle outlets. Two of these receptacles shall be located at least thirty (30) inches above the floor and near the counter tops.
7XXX - Bathrooms or Washrooms. Bathrooms or washrooms shall be illuminated. Lighting outlet or outlets shall be controlled by a wall switch. A duplex electrical outlet separate from the lighting fixture shall be provided and shall be located at least thirty (30) in. above the floor adjacent to the wash basin.
7XXX - Basement. Basements shall be wired for a minimum of one lighting outlet for each three hundred (300) square feet of area or major fraction thereof for use as general illumination. The lighting shall be located so as to provide illumination for equipment that needs servicing such as electrical panels, heating system, etc. All enclosed areas that can be walked into such as toilet rooms, fruit storage rooms, utility rooms, excavated areas under porches, etc., shall be provided with at least one lighting outlet (except coal bins). Stairways and laundry lighting outlets shall not be counted as the required basement lighting outlets.
7XXX - Laundry Areas. Laundry areas shall be provided with illumination. The laundry circuit shall be an independent circuit with grounding type duplex receptacle outlets mounted on the wall adjacent to the laundry area (within 6 ft), convenient for the use of laundry appliances.
7XXX - Heating Equipment. Heating equipment, furnaces or heating systems requiring electrical energy for operation or control shall be provided with an individual circuit. A disconnect switch shall be provided on, adjacent to, or within sight of the unit.
7XXX - Stairways. Stairways and/or each stair section shall be adequately illuminated. Lighting outlets shall be controlled by wall switches. Wall switches shall be located for convenient and readily accessible use. Switches shall not be located where it is necessary to use a darkened stair or stair sections for their operation. All stairwells to finished portions of dwelling occupancies shall be provided with multiple switch control, at least one (1) at the head and the other at the foot of the stairway.
7XXX - Service. Service to the existing dwelling occupancies shall be at least minimum three (3) wire fifty-five (55) ampere capacity. Service equipment shall be dead front. Type "S" fuses shall be installed where fusible equipment is used. If the existing service does not comply with the above and it is then necessary to increase service or change service equipment, the service shall be increased in compliance with 230.42(A) and not less than three (3) wire one hundred (100) amperes.
C.7XXX - Existing Wiring, Electrical Equipment and Replacements. Existing wiring and electrical equipment shall be maintained and used as originally listed and designed to be used. All new wiring and electrical equipment used to replace existing inadequate wiring shall comply with all provisions with the latest edition of the NEC promulgated by NFPA.
D. New Wiring and Electrical Equipment. Any new wiring installed in addition to replacement shall meet the latest edition of the NEC promulgated by NFPA.

Substantiation:

Many states or jurisdictions are establishing rehabilitation codes so that existing facilities can be upgraded and evaluated for safety. This allows existing water, sewerage, gas, and electrical distribution systems to be used without constructing new facilities. At present, there is no established national code to be used when evaluating these buildings. Most jurisdictions must adopt their own rehabilitation codes. Guidelines to help in this evaluation are sorely needed on the national level to establish a minimum standard.

Panel Meeting Action: Reject

Panel Statement:

This information is already available in an NFPA document, NFPA 73, for existing dwellings. Adding it to the NEC is unnecessary since NFPA 73 can be adopted as a standard and contains similar plus additional requirements.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-101 Log #3092 NEC-P15 (530-6) **Final Action: Reject**

Submitter: Richard D. Thompson, Thompson Associates

Recommendation:

Revise text as follows:

530.6 Portable Equipment. Portable ~~stage and studio lighting equipment~~ motion picture luminaries and portable power distribution equipment shall be permitted for temporary use outdoors provided the equipment is supervised by qualified personnel while energized and barriered from the public.

(1) Luminaries that are exposed to rain or water effects shall have the power supply circuit protected by a ground-fault circuit-interrupter.

(2) Portable electrical power distribution systems installed outdoors, and subject to wet locations shall be designed for wet locations.

Exception: Portable and temporary electrical distribution systems not designed for wet locations shall be protected by a special purpose ground-fault circuit-interrupter system.

(3) All portable motion picture luminaries, portable electrical power distribution equipment, feeders, and branch circuits that are or can be exposed to water or a wet environment including special effects shall have personnel protection in the form of a special purpose ground-fault circuit-interrupter system.

Substantiation:

Recently a new technology has evolved allowing Ground-Fault Circuit-Interrupter devices to protect at higher currents and voltages. Several models have received UL listing, and Underwriters Laboratories is presently revising UL 943 (Class C, D, E) to accommodate this new technology. These devices have now been identified by UL as "Special purpose Ground-Fault Circuit-Interrupters". Such devices can now protect at current levels up to 400-amperes and at 480-volts. These devices are available for both single phase and poly-phase circuits. The device will respond correctly to a ground leakage current waveform with "pure DC" to "DC+AC with harmonics" frequency components. The design is such that a single unit can be installed at the service entrance point thereby protecting all receptacle outlets downstream of that point.

Panel Meeting Action: Reject

Panel Statement:

"Motion picture luminaries" is not an industry recognized term. The term "stage and studio lighting equipment" also includes more than just a luminaire.

The submitter failed to provide data substantiating that there is a problem sufficient to mandate the use of this device. The current Code does not preclude the use of this device in this application.

The submitter also failed to indicate which class of special-purpose GFCI is suitable for the identified application. The coordination of the protective device to the application is of concern to the panel. The panel is not aware of any listed special-purpose GFCIs.

See panel action and statement in Proposal 15-74 (Log #3407).

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

Comment on Affirmative:

VANNICE: See my Comment on Affirmative on Proposal 15-74.

15-102 Log #1966 NEC-P15 (530-11) **Final Action: Reject**

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:

530.11 Permanent Wiring. The permanent wiring shall be Type MC cable, Type AC cable containing an insulated equipment ~~grounding~~ bonding conductor sized in accordance with Table 250.122, Type MI cable, or in approved raceways.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement in Proposal 15-1 (Log #2453o).

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

Comment on Affirmative:

SMITH: See my Comment on Affirmative on Proposal 15-1.

15-103 Log #2244 NEC-P15 **Final Action: Reject**
(530-22)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
530.22 Single-Pole Separable Connectors.
(A) General. Where ac single-pole portable cable connectors are used, they shall be listed and of the locking type. Sections 400.10, 406.6, and 406.7 shall not apply to listed single-pole separable connections and single-conductor cable assemblies utilizing listed single-pole separable connectors. Where paralleled sets of current-carrying single pole separable connectors are provided as input devices, they shall be prominently labeled with a warning indicating the presence of internal parallel connections. The use of single-pole separable connectors shall comply with at least one of the following conditions:
(1) Connection and disconnection of connectors are only possible where the supply connectors are interlocked to the source and it is not possible to connect or disconnect connectors when the supply is energized.
(2) Line connectors are of the listed sequential-interlocking type so that load connectors shall be connected in the following sequence:
a. Equipment grounding conductor connection
b. ~~Grounded~~ Earth circuit conductor connection, if provided
c. Ungrounded conductor connection, and that disconnection shall be in the reverse order
(3) A caution notice shall be provided adjacent to the line connectors, indicating that plug connection shall be in the following order:
a. Equipment grounding conductor connectors
b. ~~Grounded~~ Earth circuit-conductor connectors, if provided
c. Ungrounded conductor connectors, and that disconnection shall be in the reverse order
(B) Interchangeability. Single-pole separable connectors used in portable professional motion picture and television equipment shall be permitted to be interchangeable for ac or dc use or for different current ratings on the same premises, provided they are listed for ac/dc use and marked in a suitable manner to identify the system to which they are connected.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject
Panel Statement:
See panel action and statement in Proposal 15-53 (Log #2216).
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-104 Log #1967 NEC-P15 **Final Action: Reject**
(530-22(A)(2) and (3))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(2) Line connectors are of the listed sequential-interlocking type so that load connectors shall be connected in the following sequence:
a. Equipment ~~grounding~~ bonding conductor connection
b. Grounded circuit conductor connection, if provided
c. Ungrounded conductor connection, and that disconnection shall be in the reverse order
(3) A caution notice shall be provided adjacent to the line connectors, indicating that plug connection shall be in the following order:
a. Equipment ~~grounding~~ bonding conductor connectors
b. Grounded circuit-conductor connectors, if provided
c. Ungrounded conductor connectors, and that disconnection shall be in the reverse order

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.
Panel Meeting Action: Reject
Panel Statement:
See panel action and statement in Proposal 15-1 (Log #2453o).
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16
Comment on Affirmative:
SMITH: See my Comment on Affirmative on Proposal 15-1.

19-5 Log #695 NEC-P19 (545-2) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
Wherever the ~~requirements~~ provisions of other articles of this Code and Article 545 differ, the ~~requirements~~ provisions of Article 545 shall apply.

Substantiation:

Edit. The Code contains requirements (rules) which are mandatory and provisions which are permissive but not mandatory, which should be specifically permitted. Similar wording is other Code sections. The word "provisions" includes mandatory and permissive rules.

Panel Meeting Action: Reject

Panel Statement:

Section 545.2 has been removed through the panel's action on Proposal 19-5a (Log #CP 1900).

Number Eligible to Vote: 9

Ballot Results: Affirmative: 8

Ballot Not Returned: 1 Zieman

19-6 Log #2074 NEC-P19 (545-2) **Final Action: Reject**

Submitter: Michael J. Johnston, Int'l Assn. of Electrical Inspectors

Recommendation:

Relocate the text in 545.2 to Section 545.3 as follows:
~~545.2~~ 545.3 Other Articles. Wherever the requirements of other articles of this Code and Article 545 differ, the requirements of Article 545 shall apply.

Substantiation:

The change is editorial only and relocates 545.2 (Other Articles) to 545.3 to allow the definitions in the Article presently located in 545.3 to be located in 545.2 in accordance with the requirements of the Style Manual.

Panel Meeting Action: Reject

Panel Statement:

Section 545.2 has been removed through the panel's action on Proposal 19-5a (CP #1900).

Number Eligible to Vote: 9

Ballot Results: Affirmative: 8

Ballot Not Returned: 1 Zieman

19-5a Log #CP1900 NEC-P19 (545.2) **Final Action: Accept**

Submitter: Code-Making Panel 19

Recommendation:

Delete Section 545.2.

Substantiation:

In accordance with 90.3 Chapters 1-4 of the NEC apply generally and throughout the Code unless modified or amended by the requirements in Chapters 5, 6 or 7. This section in Article 545 is not necessary to enhance the understanding of this concept.

Panel Meeting Action: Accept

Number Eligible to Vote: 9

Ballot Results: Affirmative: 8

Ballot Not Returned: 1 Zieman

19-7 Log #2075 NEC-P19 **Final Action: Accept**
(545-3 Building Component, Building System, Closed Construction)

Submitter: Michael J. Johnston, Int'l Assn. of Electrical Inspectors

Recommendation:

This change is editorial only. Relocate Section 545.3 (Definitions) to Section 545.2 as follows:
~~545.3~~ 545.2 Definitions.
Building Component. Any subsystem, subassembly, or other system designed for use in or integral with or as part of structure, which can include structural, electrical, mechanical, plumbing, and fire protection systems, and other systems affecting health and safety.
Building System. Plans, specifications, and documentation for a system of manufactured building or for a type or a system of building components, which can include structural, electrical, mechanical, plumbing, and fire protection systems, and other systems affecting health and safety, and including such variations thereof as are specifically permitted by regulation, and which variations are submitted as part of the building system or amendment thereto.
Closed Construction. Any building, building component, assembly, or system manufactured in such a manner that all concealed parts of processes of manufacture cannot be inspected before installation of the building site without disassembly, damage, or destruction.
Manufactured Building. Any building that is of closed construction and is made or assembles in manufacturing facilities on or off the building site for installation, or for assembly and installation on the building site, other than manufactured homes, mobile homes, park trailers, or recreational vehicles.

Substantiation:

This change is needed to be consistent with the requirements of the Style Manual which places definitions of an article in the second section of that article. The change is editorial only and relocates existing 545.2 (Other Articles) to Section 545.3.

Panel Meeting Action: Accept
Number Eligible to Vote: 9
Ballot Results: Affirmative: 8
Ballot Not Returned: 1 Zieman

19-7a Log #CP1908 NEC-P19 **Final Action: Accept**
(547.2)

Submitter: Code-Making Panel 19

Recommendation:

Add a new definition for site-isolating device to 547.2.
Site-Isolating Device. A disconnecting means installed at the distribution point for the purposes of isolation, system maintenance, emergency disconnection, or connection of optional standby systems.

Substantiation:

CMP-19 has created a definition for "site-isolating device" since this is a term that is unique to Article 547 and the definition will help understand the purpose and function of this device. This definition incorporates the description of the device's function formerly located in 547.9(A)(1).

Panel Meeting Action: Accept
Number Eligible to Vote: 8
Ballot Results: Affirmative: 8

19-8 Log #3085 NEC-P19 **Final Action: Accept**
(547-5(A))

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and make a specific reference to the Article 502 wiring methods rather than referencing the entire article. This action will be considered by the panel as a public comment.

Submitter: Barry Bauman, Alliante Energy

Recommendation:

Revise text as follows:
547.5 Wiring Methods.
(A) Wiring Systems. Types UF, NMC, copper SE cables, jacketed Type MC cable, rigid nonmetallic conduit, liquidtight flexible nonmetallic conduit, or other cables or raceways suitable for the location, with approved termination fittings, shall be the wiring methods employed. ~~Article 398 and~~ Article 502 wiring methods shall be permitted for areas described in 547.1(A).

Substantiation:

Equipment enclosures, boxes, conduit bodies and fittings required in 547.5(C) and luminaires required in 547.8 are not available for Article 398 wiring methods.
A companion proposal has been submitted for 398.12.

Panel Meeting Action: Accept

Panel Statement:

While open wiring on insulators is an acceptable wiring method for some areas within agricultural establishments as permitted by 398.10, the panel concludes that it is not acceptable within those buildings covered within the scope of Article 547. The use of open wiring on insulators is not prohibited for other areas of farms that are outside the scope of Article 547.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-9 Log #907 NEC-P19 **Final Action: Reject**
(547-5(C)(4) (New))

Submitter: Murch Carroll, Jr., United States Deparment of Agriculture

Recommendation:

In greenhouses, all fittings be compression type and equipment in all spaces be weatherproof. All 125-volt 15- and 20-amp receptacle outlets be GFCI.

Substantiation:

Water is not just a problem in the obvious places, i.e. water plants washing down the floors. Most greenhouses in time develop leaks due to the expansion and contraction from extreme temperatures. The water then runs into the conduit and eventually into the equipment.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided technical substantiation that warrants the expanded use of GFCI protection. The requirements of 547.5(C)(2) and 547.5(G)(3) cover installations in damp and wet locations.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-10 Log #1968 NEC-P19 (547-5(F)) **Final Action: Reject**

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(F) Separate Equipment ~~Grounding~~ Bonding Conductor. Non–current-carrying metal parts of equipment, raceways, and other enclosures, where required to be grounded, shall be grounded by a copper equipment ~~grounding~~ bonding conductor installed between the equipment and the building disconnecting means. If installed underground, the equipment ~~grounding~~ bonding conductor shall be insulated or covered.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Bonding is defined in the NEC as the permanent joining of metallic parts together to form a conductive path. Grounding is defined in the NEC as the connection of the bonded parts to earth. The proposed change to rename this conductor does not clarify the confusion indicated by the submitter.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 7 Negative: 1

Explanation of Negative:

ZANICCHI: See my Explanation of Negative on Proposal 19-1 (Log #2453s).

19-10a Log #CP1901 NEC-P19 (547.5(G)) **Final Action: Accept**

TCC Action:

It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.

Submitter: Code-Making Panel 19

Recommendation:

Revise 547.5(G) to read:
(G) Ground Fault Protection. Ground-fault protection shall be provided in accordance with 1 and 2 below:
1. General Purpose Receptacles. All 125-volt, single-phase, 15- and 20-ampere general-purpose receptacles installed in the following locations shall have ground-fault circuit-interrupter protection for personnel:
(a) Areas having an equipotential plane
(b) Outdoors
(c) Damp or wet locations
(d) Dirt confinement areas as covered in 547.10(B)
2. Other Circuits. Other circuits providing electric power to metallic equipment that may become energized and is accessible to livestock in dirt confinement areas as covered in 547.10(B) shall have ground-fault protection of equipment.

Revise 547.10(B) to read:
(B) Areas Not Requiring Equipotential Planes. Equipotential planes shall not be required in dirt confinement areas containing metallic equipment that may become energized and is accessible to livestock.

Substantiation:

The panel's action moves all requirements for ground-fault protection into one section. The panel's action also provides an alternative to GFCI protection for circuits installed in dirt livestock confinement areas. The concern expressed in Proposal 19-25 regarding equipment that is not compatible with GFCI protection has been addressed by this proposal. A circuit that does not supply general-purpose receptacles is not required to be protected by a ground-fault circuit interrupter.

Panel Meeting Action: Accept

Number Eligible to Vote: 8

Ballot Results: Affirmative: 7 Negative: 1

Explanation of Negative:

MCNEIVE: NEMA is concerned that the provision for GFPE protection may be interpreted that this type of protection is equivalent to personnel protection provided by GFCI. The submitter of Proposal 19-25 has not provided adequate technical substantiation to support that GFPE protection is adequate in meeting the panel's responsibility to protect personnel from electric shock.

19-11 Log #3373 NEC-P19 **Final Action: Reject**
(547-5(H) (New))

Submitter: Donald W. Zipse, Zipse Electrical Engineering, Inc.

Recommendation:

(H) Receptacles and other 120 volt Loads for Dairy or Pig Farms.
All phase-to-neutral electrical loads in and on Dairy and Pig Farms shall be protected by ground-fault circuit-interrupters. GFCI's shall be installed on all 120-volt circuits.

Substantiation:

There are two classifications of sources of stray current, the correct term, not stray voltage. One source originates from on farm neutral-to-ground faults. The other source is from the utility multigrounded neutral distribution systems.
Before a farmer can go to the utility, his farm must be free of all sources of neutral-to-ground faults, which produce stray current flow that is uncontrolled.
It is cruelty to animals, especially cows and pigs to subject them to stray current that shocks them, prevents the cows from drinking and dropping their milk.
Equipotential planes do not prevent stray current from flowing over the plane and shocking the animals. (See Zipse's technical paper subtitled, "The Shocking Swimming Pool").
There are laws such as Ohm's Law and Kirchhoff's Laws. Now there is Zipse's Law-
Zipse's Law:
In order to have and maintain an electrical installation safe from electrical shocks and to prevent electrocution from stray current:
All continuously, flowing current shall be contained within a conductor, insulated from earth, except at one place within the system and only one place can the neutral be connected to earth.
A system is defined as the conductors between transformers or after the last transformer.
Revision #4.
Since neutral-to-ground faults can occur at any time, a detection and protection device(s) must be installed to protect humans and animals from this dangerous and hazardous stray continuous flow of uncontrolled currents.
The GFCI detects neutral-to-ground faults and opens the circuit preventing stray current from flowing. (The majority of electrical persons, electricians and engineers do not know this fact. In fact, Mr. Zipse just learned about GFCI function since the last code cycle. Do not jump to false conclusions.)
This technique, the installation of GFCIs on all 120-volt circuits, has been used on many farms to prevent shocking stray current from harming cows and humans.
The installation of GFCIs on all 120-volt circuits on a dairy or pig farm is a preventative measure long over due and has been unknown and overlooked. The installation of GFCI's will detect future neutral-to-earth faults and open the faulted circuit.
If the phase conductor faulted to earth, the protective device would open stopping the flow of fault current. However, when a energized neutral conductor faults to earth nothing happens to the protective device and the stray neutral current starts to flow continuously, uncontrolled over the earth harming cows, pigs and humans.

Panel Meeting Action: Reject

Panel Statement:

Section 547.5(G) currently requires GFCI protection of general purpose receptacles. Requiring dedicated use circuits to have GFCI protection could result in nuisance tripping where the loss of power to lighting and ventilation can endanger the well-being of humans and livestock.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-12 Log #3196 NEC-P19 **Final Action: Reject**
(547-7)

Submitter: Truman C. Surbrook, Michigan State University

Recommendation:

Add a sentence to the end of this section stating the grounding requirement so the new sentence will read as follows:
Fastened in place and portable motors shall be grounded as specified in 547.5(F) unless listed as not requiring grounding. The equipment grounding conductor size shall not be smaller than found in Table 250.122 based upon 125 percent of the motor full-load current. Where the motor supply conductors are size 10 and smaller, the equipment grounding conductor shall be of the same size as the ungrounded conductors.

Substantiation:

Proper equipment grounding on farms is of extreme importance. The rules for motor grounding in Article 430 are so confusing it is not even clear whether many motors are even required to be grounded. The rules for sizing the equipment grounding conductor or an electric motor in Article 430 and Article 250 are impossible to understand. Please be reminded that the overcurrent device for a motor circuit is frequently of a much higher rating than the ampacity of the circuit conductors. The NEC does a poor job of dealing with motor grounding. At least in the agricultural section, you should provide clear rules that will ensure that all motors are adequately grounded.

Panel Meeting Action: Reject

Panel Statement:

The panel concludes that the requirements of 250.122 and specifically 250.122(D) clearly state how equipment grounding conductors for motor circuits are sized. The submitter has not provided technical substantiation why the requirements of 250.110, 250.112, 250.114, 430 Part XII, or 547.5(F) are inadequate.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-13 Log #2245 NEC-P19 **Final Action: Reject**
(547-9)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:

547.9 Electrical Supply to Building or Structures from a Distribution Point.

(A) Site-Isolating Device. A disconnecting means shall be installed at the distribution point where two or more agricultural buildings, structures, associated farm dwelling(s), or other buildings are supplied from the distribution point. for the purposes of applying the requirements of this section, this disconnecting means shall be classified as a site isolating device and shall have provisions for bonding the grounding electrode conductor to the ~~grounded~~ earth conductor.

(1) Purpose. The disconnecting means shall simultaneously interrupt all ungrounded conductors for he purposes of isolation, system maintenance, emergency disconnection, or connection of optional standby systems.

(2) Series disconnects. An additional disconnecting means shall not be required where the serving utility provides a disconnecting means as part of their service requirements and this disconnecting means is accessible to the user and meets the requirements of this section.

(3) Rating. The disconnecting means shall be rated for the calculated load as determined by Part IV of Article 220.

(4) Overcurrent. The disconnecting means shall not be required to contain overload protection.

(5) Accessibility. Where not readily accessible, the disconnecting means shall be capable of operation from a readily accessible point.

(6) Grounding. The ~~grounded~~ earth conductor of the system shall be connected to a grounding electrode through a grounding electrode conductor at the disconnecting means.

(B) Electrical Supply. The buildings or structures shall be permitted to be supplied by either 547.9(B)(1) or (B)(2).

(1) Building(s) or Structure(s). Where the disconnecting means and overcurrent protection are located at the buildings or structures, the supply conductors shall be sized in accordance with Part IV of Article 220 and installed in accordance with the requirements of Part II of Article 225. For each building or structure, the conditions in either (a) or (b) shall be permitted.

(a) The ~~grounded~~ earth circuit conductor shall be permitted to be connected to the building disconnecting means and to the grounding electrode system of that building or structure where all the requirements of 250.32(B)(2) are met.

(b) A separate equipment grounding conductor shall be run with the supply conductors to the building(s) or structure(s) and the following conditions shall be met:

(1) The equipment grounding conductor is the same size as the largest supply conductor, if of the same material, or is adjusted in size in accordance with the equivalent size columns of Table 250.122 if of different materials.

(2) The equipment grounding conductor is bonded to the ~~grounded~~ earth circuit conductor at the disconnecting means enclosure at the distribution point or at the source of a separately derived system.

(3) A grounding electrode system is provided in accordance with Part III of Article 250 and connected to the equipment grounding conductor at the building(s) or structure(s) disconnecting means.

(4) The ~~grounded~~ earth circuit conductor is not connected to a grounding electrode or to any equipment grounding conductor on the load side of the distribution point.

(2) Disconnecting Means and Overcurrent Protection at the Distribution Point. Where the disconnecting means and overcurrent protection for each set of feeder conductors are located at the distribution point, feeders to building(s) or structure(s) shall meet the requirements of 250.32 and Article 225, Parts, I and II.

FPN: methods to reduce neutral-to-earth voltages in livestock facilities include supplying buildings or structures with 4-wire, single-phase services, sizing of 3-wire service conductors to limit voltage drop to 2 percent, and connecting loads line-to-line.

(C) Underground Equipment Grounding Conductors. Where livestock is housed, any portion of the equipment grounding conductor run underground to the building or structure shall be insulated or covered copper.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP 19 that changing the existing terminology will result in enhanced understanding of this concept. CMP 19 does recommend to CMP-1 that a FPN referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-14 Log #3087 NEC-P19 **Final Action: Accept in Principle in Part**
(547-9)

Submitter: Barry Bauman, Alliante Energy

Recommendation:

Revise text as follows:

547.9 Electrical Supply to Buildings or Structures from a Distribution Point.

(A) Site-Isolating Device. A disconnecting means shall be installed at the distribution point where two or more agricultural buildings, structures, associated farm dwelling(s), or other buildings are supplied from the distribution point. For the purposes of applying the requirements of this section, this disconnecting means shall be classified as a site-isolating device and shall have provisions for bonding the grounding electrode conductor to the grounded conductor.

(1) Purpose. The disconnecting means shall simultaneously interrupt all ungrounded conductors for the purposes of isolation, system maintenance, emergency disconnection, or connection of optional standby systems.

(2) Series Disconnects. An additional disconnecting means shall not be required where the serving utility provides a disconnecting means as part of their service requirements and this disconnecting means is accessible to the user and meets the requirements of this section.

(3) Rating. The disconnecting means shall be rated for the calculated load as determined by Part IV of Article 220.

(4) Overcurrent. The disconnecting means shall not be required to contain overload protection.

(5) Accessibility. Where not readily accessible, the disconnecting means shall be capable of operation from a readily accessible point.

(6) Grounding. The grounded conductor of the system shall be connected to a grounding electrode through a grounding electrode conductor at the disconnecting means.

~~(B) Electrical Supply. The buildings or structures shall be permitted to be supplied by either 547.9(B)(1) or (B)(2).~~

~~(1)~~ (B) Disconnecting Means and Overcurrent Protection at the Building(s) or Structure(s). Where the disconnecting means and overcurrent protection are located at the buildings or structures, the supply conductors shall be sized in accordance with Part IV of Article 220 and installed in accordance with the requirements of Part II of Article 225.

For each building or structure, the conditions in either (~~a~~1) or (~~b~~2) shall be permitted.

(~~a~~1) Three-wire system. The grounded circuit conductor shall be permitted to be connected to the building disconnecting means and to the grounding electrode system of that building or structure where all the requirements of 250.32(B)(2) are met.

(~~b~~2) Four-wire system. A separate equipment-grounding conductor shall be run with the supply conductors to the building(s) or structure(s) and the following conditions shall be met:

(~~1~~a) The equipment grounding conductor is the same size as the largest supply conductor, if of the same material, or is adjusted in size in accordance with the equivalent size columns of Table 250.122 if of different materials.

(~~2~~b) The equipment grounding conductor is bonded to the grounded circuit conductor at the disconnecting means enclosure at the distribution point or at the source of a separately derived system.

(~~3~~c) A grounding electrode system is provided in accordance with Part III of Article 250 and connected to the equipment-grounding conductor at the building(s) or structure(s) disconnecting means.

(~~4~~d) The grounded circuit conductor is not connected to a grounding electrode or to any equipment-grounding conductor on the load side of the distribution point.

(~~2~~C) Disconnecting Means and Overcurrent Protection at the Distribution Point. Where the disconnecting means and overcurrent protection for each set of feeder conductors are located at the distribution point, feeders to the building(s) or structure(s) shall meet the requirements of 250.32 and Article 225, Parts I and II. Where there are six or fewer disconnects a Site-Isolating Device is not required.

FPN: Methods to reduce neutral-to-earth voltages in livestock facilities include supplying buildings or structures with 4-wire, single-phase services, sizing of 3-wire service conductors to limit voltage drop to 2 percent, and connecting loads line-to-line.

(~~C~~D)

Substantiation:

New titles make the article easier to read.

A Site-Isolating Device is redundant where a disconnecting means and overcurrent protection for each set of feeder conductors is located at the distribution point.

Panel Meeting Action: Accept in Principle in Part

The panel rejects the portion of the proposal that recommends that a site-isolating device not be required where there are six or fewer disconnects.

The panel accepts in principle the remainder of the recommendations.

Panel Statement:

The panel rejection is based on a lack of technical substantiation for the proposed change. The panel action on Proposal 19-12a (Log #CP1907) has incorporated the other recommendations contained in this proposal.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-12a Log #CP1907 NEC-P19 (547.9) **Final Action: Accept**

TCC Action:

It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. In addtion, the panel should review the text for the use of mandatory language (e.g. replacing "is the same" with "shall be the same" in 547.9(B)(3)(b)(1). This action will be considered by the panel as a public comment.

Submitter: Code-Making Panel 19

Recommendation:

Revise 547.9 to read.
547.9 Electrical Supply to Building(s) or Structure(s) from a Distribution Point.
(A) Site-Isolating Device. Site-isolating devices shall comply with 547.9(A)(1) through (A)(9).
(1) Where Required. A site-isolating device shall be installed at the distribution point where two or more agricultural buildings, structures, associated farm dwelling(s), or other buildings are supplied from the distribution point.
(2) Location. The site-isolating device shall be pole-mounted and shall meet the clearance requirements of 230.24.
(3) Operation. The site-isolating device shall simultaneously disconnect all ungrounded service conductors from the premises wiring.
(4) Bonding Provisions. The site-isolating device enclosure shall be bonded to the grounded circuit conductor and the grounding electrode system.
(5) Grounding. At the site-isolating device the system grounded conductor shall be connected to a grounding electrode system via a grounding electrode conductor.
(6) Rating. The site-isolating device shall be rated for the calculated load as determined by Part IV of Article 220.
(7) Overcurrent Protection. The site-isolating device shall not be required to provide overcurrent protection.
(8) Accessibility. Where the site-isolating device is not readily accessible, it shall be capable of being remotely operated by an operating handle installed at a readily accessible location. The operating handle of the site-isolating device, when in its highest position, shall not be more than 2.0 m (6 ft. 7 in.) above grade or a working platform.
(9) Series Devices. An additional site-isolating device for the premises wiring system shall not be required where a site-isolating device meeting all applicable requirements of this section is provided by the serving utility as part of their service requirements and meets the requirements of 547.9(A)(7).
(B) Service Disconnecting Means and Overcurrent Protection at the Building(s) or Structure(s). Where the service disconnecting means and overcurrent protection are located at the building(s) or structure(s), the requirements of 547.9(B)(1) through (B)(4) shall apply.
(1) Conductor Sizing. The supply conductors shall be sized in accordance with Part IV of Article 220.
(2) Conductor Installation. The supply conductors shall be installed in accordance with the requirements of Part II of Article 225.
(3) Grounding and Bonding. For each building or structure, the conditions in either (a) or (b) shall be permitted.
(a) System with grounded neutral conductor. The grounded circuit conductor shall be connected to the building disconnecting means and to the grounding electrode system of that building or structure where all the requirements of 250.32(B)(2) are met.
FPN: A system with a grounded neutral conductor is commonly referred to as a "3-wire system" in single-phase applications.
(b) System with separate equipment grounding conductor. A separate equipment-grounding conductor shall be run with the supply conductors to the building(s) or structure(s) and the following conditions shall be met:
FPN: A system with a separate equipment grounding conductor is commonly referred to as a "4-wire system" in single-phase applications.
(1) The equipment grounding conductor is the same size as the largest supply conductor, if of the same material, or is adjusted in size in accordance with the equivalent size columns of Table 250.122 if of different materials.
(2) The equipment grounding conductor is bonded to the grounded circuit conductor and the site-isolating device at the distribution point.
(3) A grounding electrode system is provided in accordance with Part III of Article 250 and connected to the equipment-grounding conductor at the building(s) or structure(s) disconnecting means.
(4) The grounded circuit conductor is not connected to a grounding electrode or to any equipment-grounding conductor on the load side of the distribution point.
(C) Service Disconnecting Means and Overcurrent Protection at the Distribution Point. Where the service disconnecting means and overcurrent protection for each set of feeder conductors are located at the distribution point, feeders to building(s) or structure(s) shall meet the requirements of 250.32 and Article 225, Parts I and II.
FPN No. 1: A service rated transfer switch is typically installed ahead of a service with multiple disconnects to meet the requirements for a site-isolating device.
FPN No 2: Methods to reduce neutral-to-earth voltages in livestock facilities include supplying buildings or structures with 4-wire single-phase services, sizing of 3-wire single-phase service and feeder conductors to limit voltage drop to 2 percent, and connecting loads line-to-line.
(D) Direct-Buried Equipment Grounding Conductors. Where livestock is housed, any portion of a direct-buried equipment grounding conductor run to the building or structure shall be insulated or covered copper.

Substantiation:

This revision to 547.9 accomplishes several objectives. First the section has been revised to comply with the NEC Style Manual. Second, the proposal incorporates in principle or in part the technical changes in the recommendations of Proposals 19-14, 19-16, 19-17, 19-18, 19-19, 19-21, and 19-23. Third, the panel has revised existing text covering grounding at and accessibility to the site-isolating device. This overall proposal will clarify the requirements for farm premises distribution.

Panel Meeting Action: Accept

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

Comment on Affirmative:

SABIN-MERCADO: If during the Report on Comments meeting the panel accepts Proposal 19-1 (and other proposals to change the term "equipment grounding conductor" to "equipment bonding conductor"), the same should be done in this proposal.

WEAKLEY: The issues are, that this is a currently used application and the CMP is providing guidelines to make an installation that is not in conformance with normal service entrance requirements legal.

The site-isolating device is in common usage by utilities that are in agricultural areas. The switching equipment that would be used as a site-isolating device is now manufactured by only one company, Ronk Electrical Industries, Inc.

This section of Article 547 was rewritten last code cycle and there were many issues that were not addressed, and subsequently caused enforcement and compliance problems. CMP 19 spent an inordinate amount of time belaboring the issues, yet as I left the meeting, I felt that the section still had some flaws that would need to be fixed before the letter ballot. Here are some ideas to make the section more succinct:

547.9(A)(1) Where required should be changed to, Where used or utilized. There is no requirement for a site isolating device in other parts of the code, this is equipment that could be utilized and is not required to be utilized. One of the major attributes of using this is, instead of a single throw switch, is to install a double throw switch, and power the whole site from a generator during a utility power outage.

547.9(A)(7) The site-isolating device shall not be required to have overcurrent protection, should be changed to The site-isolating device shall have a short circuit rating equal to or greater than the available current at the disconnect and have overcurrent protection, unless it is pole top mounted. The premise here is, that these switches, without protection or rating, when pole top mounted, do not endanger personnel or structures if they explode. There doesn't seem to be a lot of problems with these installations. In grade level installations normal installation requirements apply.

547.9(C) FPN No. 2 The reference to maintaining a maximum voltage drop of 2 percent should be deleted as it has no mathematic relevance to livestock resistance, versus earth resistance, versus voltage drop on the neutral conductor. The issue is step potential, with the following values, a cow has an average of 390 ohms pathway resistance, this is mouth to hooves (swine are 789 ohms), and the perceived problems are in the 2ma range. The calculation if it were to be used would be the distributed voltage drop from the maximum hoof dimension divided by the resistance of a cow. Removing the statement would be the easiest thing to do.

19-15 Log #3017 NEC-P19 **Final Action: Reject**
(547-9(A))

Submitter: Donald R. Offerdahl, North Dakota State Electrical Board

Recommendation:

Revise text as follows:

(A) Site-Isolating Device. A disconnecting means shall be permitted to be installed at the distribution point where two or more agricultural buildings, structures, associated farm dwelling(s), or other buildings are supplied from the distribution point. For the purposes of applying the requirements of this section, this disconnecting means shall be classified as a site-isolating device and shall have provisions for bonding the grounding electrode conductor to the grounded conductor.

Substantiation:

This requirement is only for farms that have livestock at the time of the electrical work being done. For farms that do not have livestock, this disconnect is not required. The disconnecting means was added at the same time the grounding requirements were moved to this article. By adding "shall be permitted", would only address the areas that have a problem with stray voltage as it was originally intended to provide.

Panel Meeting Action: Reject

Panel Statement:

Section 547.9(A) was created to address electrical safety issues. It was not created to address stray-voltage specifically. Section 547.9(A) applies to all buildings covered by Article 547, not just livestock buildings.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-16 Log #2852 NEC-P19 **Final Action: Accept in Principle**
(547-9(A)(7))

Submitter: Alan Manche, Square D Company

Recommendation:

Add the following new text to 547.9(A).

(7) Short Circuit Current Rating. The disconnecting means shall have a short-circuit current rating equal to or greater than the available short circuit current at the disconnect. Where the disconnecting means short circuit current rating is dependent upon overcurrent protection, the overcurrent protection shall be an integral part of the disconnecting means or shall be located immediately adjacent thereto.

Substantiation:

The present provisions in 547.9 establishes a significant concern relative to the short circuit current rating for this disconnecting means. If it is installed without short circuit protection, then a short circuit on the service conductors downstream can cause a violent failure of the disconnecting means. This wording will further support 547.9(A)(4) that state overload protection is not required and that short circuit current ratings must still be considered for this disconnect. The need to have an adequate short circuit current rating is well understood by much of the electrical industry, however repeating this information for this special disconnect application is necessary since the disconnect is connected in the service conductors.

Panel Meeting Action: Accept in Principle

The revision to 547.9 by Proposal 19-12a (CP #1907) has addressed the concern regarding the short-circuit rating of the disconnecting means by permitting site-isolating switches without a short-circuit rating to be pole mounted only.

Panel Statement:

Any device that is readily accessible from grade level is required to meet all of the provisions for service equipment, including those for the device having a short-circuit rating.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-17 Log #2753 NEC-P19 (547-9(A)(4)) **Final Action: Accept in Principle**

Submitter: Bob Fahey Evansville, WI

Recommendation:

Revise to read as follows:
547.9(A)(4) Overcurrent. The disconnecting means shall be required to be service rated and contain overload protection where the conductors leave the site isolating device and are routed underground to one or more buildings. Overload protection shall be sized for the service conductors which supply the disconnecting means, the feeders leaving the disconnecting means may be protected per 240.21(B)(5). The disconnecting means shall not be required to be service rated or contain overcurrent protection if conductors are routed overheard from the disconnecting means.

Substantiation:

I believe the 2002 NEC section 547.9(A)(4) creates a hazard for the end user (the farmer). The NEC does not require any overcurrent protection for the conductors leaving the disconnecting means on a farm. I do not believe this is a problem if the conductors are overhead. In this situation you can see the hazard. I believe the hazard is when the conductors leave the disconnecting means and are buried underground, in this situation the service conductors are out of sight. These conductors are only protected by the primary fuse on the utility transformer, this provides little or no protection against shock or electrocution. My concern is the farmer or another person who is excavating the earth near these conductors and is unaware of the buried conductors, because typically these conductors are not located by the local Diggers Hotline. I believe this is an accident waiting to happen. I have always thought it was important to have overcurrent protection for underground conductors on the premises wiring system, more importantly, if they are underground. This would make farm wiring safer for all users, from the electrician to the owner of the farm.

Panel Meeting Action: Accept in Principle

Panel Statement:

The revisions to 547.9 in Proposal 19-12a (Log #CP1907) have incorporated the concepts expressed in the recommendation.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-18 Log #801 NEC-P19 (547-9(A)(5)) **Final Action: Accept in Principle**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete present text and substitute:
A site isolating disconnecting means shall not be required to be readily accessible if provided with means for operation and fuse renewal, if so equipped, from a readily accessible location.

Substantiation:

There is no specific permission, only inference, for the disconnecting means to be not readily accessible, if it is not a hookstick operable switch covered in 404.8, Exception No. 3. If it contains an overcurrent device 240.24 does not appear to be modified.

Panel Meeting Action: Accept in Principle

Panel Statement:

The revisions to 547.9 in Proposal 19-12a (Log #CP1907) have incorporated the concepts expressed in the recommendation.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-19 Log #3112 NEC-P19 (547-9(A)(7) (New)) **Final Action: Accept in Principle**

Submitter: Thomas J. Garvey, State of Wisconsin

Recommendation:

Add new text as follows:
"Where the site isolation device is readily accessible from grade, overcurrent protection for the supply conductors shall be provided at the same point. The overcurrent protection shall be an integral part of the service isolation device or shall be located immediately adjacent to and within sight of the device."

Substantiation:

The site isolation device on a farm is frequently becoming a grade mounted transfer switch. Safety is greatly enhanced by providing overcurrent protection at this point. If a service-rated transfer switch is not used, the service equipment should be adjacent to and within site of the transfer switch.

Panel Meeting Action: Accept in Principle

Panel Statement:

The revisions to 547.9 in Proposal 19-12a (Log #CP1907) have incorporated the concepts expressed in the recommendation.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-20 Log #1969 NEC-P19 **Final Action: Reject**
(547-9(B)(1))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(1) Building(s) or Structure(s). Where the disconnecting means and overcurrent protection are located at the buildings or structures, the supply conductors shall be sized in accordance with Part IV of Article 220 and installed in accordance with the requirements of Part II of Article 225.
For each building or structure, the conditions in either (a) or (b) shall be permitted.
(a) The grounded circuit conductor shall be permitted to be connected to the building disconnecting means and to the grounding electrode system of that building or structure where all the requirements of 250.32(B)(2) are met.
(b) A separate equipment ~~grounding~~ bonding conductor shall be run with the supply conductors to the building(s) or structure(s) and the following conditions shall be met:
(1) The equipment ~~grounding~~ bonding conductor is the same size as the largest supply conductor, if of the same material, or is adjusted in size in accordance with the equivalent size columns of Table 250.122 if of different materials.
(2) The equipment ~~grounding~~ bonding conductor is bonded to the grounded circuit conductor at the disconnecting means enclosure at the distribution point or at the source of a separately derived system.
(3) A grounding electrode system is provided in accordance with Part III of Article 250 and connected to the equipment ~~grounding~~ bonding conductor at the building(s) or structure(s) disconnecting means.
(4) The grounded circuit conductor is not connected to a grounding electrode or to any equipment ~~grounding~~ bonding conductor on the load side of the distribution point.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Bonding is defined in the NEC as the permanent joining of metallic parts together to form a conductive path. Grounding is defined in the NEC as the connection of the bonded parts to earth. The proposed change to rename this conductor does not clarify the confusion indicated by the submitter.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 6 Negative: 2

Explanation of Negative:

SABIN-MERCADO: "Grounded" and "grounding" sound similar but are intended to describe two totally different concepts. However, these terms are often used interchangeably by users of the NEC. In fact, there are places in the NEC where these terms are used interchangeably. The words ground, grounded and grounding will apply to the concept of connecting an electrical system to the earth. While the words bond, bonded and bonding will apply to the concept of connecting together noncurrent carrying conductive parts likely to become energized so that they form an effective ground fault path back to the source. If the terms are not similar, the concepts can be more easily differentiated by the users. I think this change will greatly improve usability and understanding of the NEC. This issue needs to be brought forth through the Technical Correlating Committee.
ZANICCHI: The term "bonding" is technically correct for this conductors application. This conductor is there to "bond" equipment to the "system grounded conductor, the grounding electrode conductor or both" at the service equipment as stated in Article 100. The use of the term "bonding" instead of "grounding" does not change the function of the conductor but it will help make the code more understandable. An example: A journeyman says to their apprentice "That 3 phase 208v mixer needs to be grounded". The apprentice asks themselves "does the journeyman mean that this mixer needs a grounded conductor brought to it? If we used the term "bonded" instead of "grounded" the journeyman would have said "That 3 phase 208v mixer needs to be bonded". Clearly, the separation of the terms grounded and bonded makes the journeyman's statement easier to understand. I hope that other panels consider making this change, especially Panel 5 which deals with Article 250, and that we "Accept in Principal" the change as I believe it will make a difference in the usability of the code.

19-21 Log #661 NEC-P19 **Final Action: Accept**
(547-9(B)(1)(a))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
(a) The grounded circuit conductor shall be ~~permitted to be~~ connected..." (remainder unchanged).

Substantiation:

Edit. If (b) is not chosen by the installer, the connection of the grounded circuit conductor in (a) to the grounding electrode system should be mandatory, not "permitted". Paragraph (b) does not use the word "permitted".

Panel Meeting Action: Accept

Panel Statement:

This recommendation has been incorporated into the panel action in Proposal 19-12a (Log # CP 1907).

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-22 Log #1970 NEC-P19 **Final Action: Reject**
(547-9(C))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(C) Underground Equipment ~~Grounding~~ Bonding Conductors. Where livestock is housed, any portion of the equipment ~~grounding~~ bonding conductor run underground to the building or structure shall be insulated or covered copper.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Bonding is defined in the NEC as the permanent joining together of metallic parts to form a conductive path. Grounding is defined in the NEC as the connection of the bonded parts to earth. The proposed change to rename this conductor does not clarify the confusion indicated by the submitter.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 6 Negative: 2

Explanation of Negative:

SABIN-MERCADO: "Grounded" and "grounding" sound similar but are intended to describe two totally different concepts. However, these terms are often used interchangeably by users of the NEC. In fact, there are places in the NEC where these terms are used interchangeably. The words ground, grounded and grounding will apply to the concept of connecting an electrical system to the earth. While the words bond, bonded and bonding will apply to the concept of connecting together noncurrent carrying conductive parts likely to become energized so that they form an effective ground fault path back to the source. If the terms are not similar, the concepts can be more easily differentiated by the users. I think this change will greatly improve usability and understanding of the NEC. This issue needs to be brought forth through the Technical Correlating Committee.

ZANICCHI: The term "bonding" is technically correct for this conductors application. This conductor is there to "bond" equipment to the "system grounded conductor, the grounding electrode conductor or both" at the service equipment as stated in Article 100. The use of the term "bonding" instead of "grounding" does not change the function of the conductor but it will help make the code more understandable. An example: A journeyman says to their apprentice "That 3 phase 208v mixer needs to be grounded". The apprentice asks themselves "does the journeyman mean that this mixer needs a grounded conductor brought to it? If we used the term "bonded" instead of "grounded" the journeyman would have said "That 3 phase 208v mixer needs to be bonded". Clearly, the separation of the terms grounded and bonded makes the journeyman's statement easier to understand. I hope that other panels consider making this change, especially Panel 5 which deals with Article 250, and that we "Accept in Principal" the change as I believe it will make a difference in the usability of the code.

19-23 Log #3088 NEC-P19 **Final Action: Accept in Principle**
(547-9(C))

Submitter: Barry Bauman, Alliante Energy

Recommendation:

Revise text as follows:
547.9 Electric Supply to Building or Structures from a Distribution Point.
(C) ~~Underground~~ Direct Burial Equipment Grounding Conductors. Where livestock is housed, any portion of ~~the~~ a direct burial equipment-grounding conductor run ~~underground~~ to the building or structure shall be insulated or covered copper.

Substantiation:

Existing text does not differentiate between conductors installed underground in a conduit and conductors used in a direct burial application. The existing text is intended to apply to the more common direct burial applications. There has been no justification to require an equipment grounding conductor installed in an underground conduit to be copper. Experience has shown that direct burial aluminum conductors are subject to failure but I am not aware of a failure of an aluminum conductor in an underground conduit.

Panel Meeting Action: Accept in Principle

Panel Statement:

The revisions to 547.9 in Proposal 19-12a (Log #CP1907) have incorporated the concepts expressed in the recommendation.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-24 Log #3131 NEC-P19 (547-10(A)) **Final Action: Accept in Part**

Submitter: Jonathan R. Althouse, Twin Creeks Enterprises

Recommendation:

In the second line after the words "installed in" add the words or under, and substitute the word "livestock" for "animals" in the sentence so the sentence will read:

Equipotential planes shall be installed in or under all concrete floor confinement areas of livestock buildings that contain metallic equipment that is accessible to ~~animals~~ livestock and likely to become energized.

Substantiation:

As stated, the requirement may be interpreted literally and require the equipotential plane to be installed "in" the concrete. When a deliberate attempt is made to obtain a voltage transition the metal elements are frequently buried in the dirt under the concrete at an increasing depth. Also a frequent method of installation is simply to lay the metal on the dirt and pour the concrete over the metal. Some may not interpret this as in the concrete. Taking steps to actually insure that the metal elements are in the concrete will add to the cost of pouring concrete and is an unnecessary requirement.

These are farms and the word "livestock "should be used not "animals".

Panel Meeting Action: Accept in Part

The panel accepts the change of "animal" to "livestock" and rejects the remainder of the recommendation.

Panel Statement:

The panel concurs with the submitter regarding the change of "animal" to "livestock" and has done this in Proposal 19-23a (Log #CP1902). The term "or under" is vague, as it does not define how deep the equipotential plane may be installed and still remain effective.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-23a Log #CP1902 NEC-P19 (547.10(A)) **Final Action: Accept**

Submitter: Code-Making Panel 19

Recommendation:

Revise 547.10(A) to read:

(A) Areas Requiring Equipotential Planes. Equipotential planes shall be installed in all concrete floor confinement areas of livestock buildings that contain metallic equipment that may become energized and is accessible to livestock. Outdoor confinement areas, such as feedlots, shall have equipotential planes installed around metallic equipment that may become energized and is accessible to livestock. The equipotential plane shall encompass the area around the equipment where the livestock stands while accessing the equipment.

Substantiation:

The phrase "likely to become energized" has been revised to "may become energized" in order to be consistent with the same change made in other parts of the Code. The term "animal" has been changed to "livestock" to be consistent with the opening statement in 547.10 and specifically identify the type of confinement areas covered by the equipotential plane requirements.

Panel Meeting Action: Accept

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-25 Log #2876 NEC-P19 (547-10(B)) **Final Action: Accept in Principle**

Submitter: Joseph A. Hertel, Safety and Buildings / Rep. Dept. of Commerce, State of Wisconsin

Recommendation:

547.10(B) Areas not requiring Equipotential Planes. The last sentence requires GFCI protection for all circuits supplying equipment that is accessible to animals in dirt confinement areas. The last sentence should read:

All circuits providing electric power to equipment that is accessible to animals in dirt confinement areas shall have ground fault protection.

Substantiation:

Dirt confinement areas for livestock will typically have electrically heated watering devices for the animals. GFCI protection on electrical heating elements is not reliable and in the event of inadvertent trips the water would freeze. Electrical heating elements are required to have an equipment ground for all non-current carrying parts. The requirement for ground fault protection would be appropriate for these installations.

Panel Meeting Action: Accept in Principle

Panel Statement:

The panel action in Proposal 19-10a (Log #CP1901) has addressed the concern regarding equipment operation that is not compatible with ground-fault circuit interrupter protection.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 7 Negative: 1

Explanation of Negative:

MCNEIVE: See my Explanation of Negative Vote on Proposal 19-10a. (NEMA is concerned that the provision for GFPE protection may be interpreted that this type of protection is equivalent to personnel protection provided by GFCI. The submitter of Proposal 19-25 has not provided adequate technical substantiation to support that GFPE protection is adequate in meeting the panel's responsibility to protect personnel from electric shock.)

19-26 Log #3129 NEC-P19 (547-10(B)) **Final Action: Accept in Part**

Submitter: Jonathan R. Althouse, Twin Creeks Enterprises

Recommendation:

Delete the words GFCI protection at the end of the sentence, make reference to livestock not animals, and add the indicated alternate requirement so the paragraph will read as follows:

(B) Areas Not Requiring Equipotential Planes. Equipotential planes shall not be required in dirt confinement areas containing metallic equipment that is accessible to ~~animals~~ livestock and likely to become energized. All circuits providing electric power to equipment that is accessible to ~~animals~~ livestock in dirt confinement areas shall have ~~GFCI protection~~ a grounding electrode meeting the requirements of 250.52(A)(5) or (6) installed at each equipment location in addition to an equipment grounding conductor meeting the requirements of 547.5(F). The grounding electrode conductor at the equipment shall not be smaller than 8 AWG copper and shall not be exposed to severe physical damage.

Substantiation:

Ground-fault circuit-interrupters are not practical for the application indicated in 547.10(B). They will frequently trip prematurely. The conditions under which these circuits are installed are wet and damp and condensation in wiring compartments is common. There is bound to be just enough leakage current to cause a premature trip on the GFCI. Even in ideal dry conditions, the manufacturers specify that a circuit supplied by a GFCI is not to have wiring that adds up to more circuit length than 250 feet. This is stated in the installation directions. Circuits feeding livestock watering devices are typically longer than 250 feet. These problems with GFCI protected circuits are known facts that have been verified by complaints that these circuits are actually tripping prematurely. If the issue is stray voltage, a GFCI will not protect for that malady. Livestock will receive an uncomfortable shock at 5 mA when drinking. If you doubt that then try it yourself by drinking from a cup that delivers 5 mA to your mouth. I have done that very thing, and all I can stand is 3 mA.

If you are really interested in reducing stray voltage at livestock watering equipment and similar equipment, then simply provide a good ground connection to earth at the equipment. I did my Masters of Science degree research on this subject and simply adding a ground rod at equipment significantly lowers the step potential in the area surrounding the equipment. For long equipment such as a bunk feeder, it is recommended that ground rods be driven beneath the equipment about every 20 feet along the length of the equipment, but I would not add this as a requirement.

The most important safety issue for equipment exposed to livestock is reliable equipment grounding. My experience shows that equipment such as livestock watering equipment frequently is not grounded. This section needs to reemphasize the importance of the special grounding requirement for agricultural facilities as stated in 547.5(F).

As for the term livestock in place of animals, this article is about agriculture facilities pet shops and the like. This issue is protection of humans and livestock on farms. The term animal is too broad.

It may seem like repeating to place the equipment grounding conductor reminder in this section, but field experience shows that there seems to be a mentality that adding a ground rod at a livestock watering device is adequate and takes the place of an equipment grounding conductor. Even the directions provided by the manufacturers seem to imply that a ground rod is required. I have never installed livestock watering equipment where the manufacturer provided more than one sadly inadequate grounding terminal. There should be a terminal in the wiring compartment for the equipment grounding conductor and a separate grounding lug somewhere on the equipment adequate to terminate at least a size 6 copper grounding electrode conductor. I have always had to add this grounding terminal. Perhaps if these requirements were added somewhere in the NEC, there would be fewer electrical accidents with livestock equipment on farms.

Panel Meeting Action: Accept in Part

The panel accepts the part of the proposal to change the term "animals" to "livestock". The panel rejects the remainder of the submitter's recommendation.

Panel Statement:

The panel disagrees that the installation of additional grounding electrodes will reduce the leakage current that the livestock will be exposed to. Via the panel's action in Proposal 19-10a (Log #CP 1901) to allow other than GFCI protection in dirt livestock confinement areas the problem with premature tripping of GFCI's has been addressed.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-27 Log #3089 NEC-P19 **Final Action: Reject**
(547-10(C))

Submitter: Barry Bauman, Alliante Energy

Recommendation:

Revise text as follows:
547.10 Equipotential Planes and Bonding of Equipotential Planes.
(C) Bonding. Equipotential planes shall be bonded to the electrical grounding system. The bonding conductor shall be copper, insulated, covered or bare, and ~~not smaller than 8 AWG~~ sized according to 250.66.

Substantiation:

Equipotential planes are typically the lowest impedance element of a farmstead's grounding electrode system. To accommodate the level of current flowing to this low impedance ground, the bonding conductor needs to be sized according to 250.66.

Panel Meeting Action: Reject

Panel Statement:

The recommendation indicates that the equipotential plane inevitably will become a component of the grounding electrode system. Although the panel does not disagree with this premise, the function of 547.10(C) is for equipotential bonding and there has been no substantiation provided to indicate that the present rule for sizing bonding jumpers is inadequate for its intended function.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-28 Log #636 NEC-P19 **Final Action: Accept**
(550-3)

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and consider deleting 550.3 in its entirety since the requirement is already covered by 90.3. This action will be considered by the panel as a public comment.

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Wherever the ~~requirements~~ provisions of other articles of this Code and Article 550 differ, the ~~requirements~~ provisions of Article 550 shall apply.

Substantiation:

Edit. Some provisions in the Code are not requirements, per se: but permissive and those should also be considered.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-29 Log #2248 NEC-P19 **Final Action: Reject**
(550-4)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
550.4 General Requirements.
(A) Mobile Home Not Intended as a Dwelling Unit. A mobile home not intended as a dwelling unit — for example, those equipped for sleeping purposes only, contractor's on-site offices, construction job dormitories, mobile studio dressing rooms, banks, clinics, mobile stores, or intended fo rthe display or demonstration of merchandise or machinery—shall not be required to meet the provisions of this article pertaining to the number or capacity of circuits required. It shall, however, meet all other applicable requirements of this article if provided with an electrical installation intended to be energized from a 120-volt or 120/240-volt ac power supply system. Where different voltage is required by either design or available power supply system, adjustment shall be made in accordance with other articles and sections for the voltage used.
(B) In Other Than Mobile Home Parks. Mobile homes installed in other than mobile home parks shall comply with the provisions of this article.
(C) Connection to Wiring System. The provisions of this article shall apply to mobile homes intended for connection to a wiring system rated 120/240 volts, nominal, 3-wire ac, with ~~grounded~~ earthed neutral.
(D) Listed or Labeled. All electrical materials, devices, appliances, fittings, and other equipment shall be listed or labeled by a qualified testing agency and shall be connected in an approved manner when installed.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject
Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP-19 that changing the existing terminology will result in enhanced understanding of this concept. CMP-19 does recommend to CMP-1 that a FPN referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 13
Ballot Results: Affirmative: 12
Ballot Not Returned: 1 Zieman

19-30 Log #3462 NEC-P19 **Final Action: Reject**
(550-7(K))

Submitter: Charles M. Trout, Maron Electric Co. Inc.

Recommendation:

Delete the section in its entirety.

Substantiation:

The National Electrical Code is prescriptive code. To say "where the conditions of maintenance and supervision ensure that only qualified persons service the installation," is a performance requirement. Without prescriptive requirements indicating whether this qualified person is an employee of the owner of the premises or is a separately contracted person and the Authority Having Jurisdiction has a means of verification of the continued employment of the qualified person and whether the qualified person has been verified by the authority having jurisdiction as meeting the definition of a qualified person as shown in the definitions of this Code no prescriptive requirements have been followed.
To permit relaxation of the safety requirements of this Code without establishing a positive guarantee that the safety of persons and property is indisputably assured is a reprehensible act.

Panel Meeting Action: Reject
Panel Statement:

Section 550.7(K) does not exist in the 2002 NEC. There are no provisions in Article 550 that use the phrase "where the conditions of maintenance and supervision".

Number Eligible to Vote: 13
Ballot Results: Affirmative: 12
Ballot Not Returned: 1 Zieman

19-31 Log #646 NEC-P19 (550-10(A)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:

(A) Securing and Supporting. Electrical equipment enclosures installed on piers ~~above deck~~ level shall securely and substantially be supported by structural members, independent of any ~~conduit~~ raceway. connected to them ~~If enclosures are not attached to mounting surfaces by means of external ears or lugs the~~ Internal ~~screw heads~~ mounting holes shall be sealed to ~~prevent~~ minimize entrance of moisture ~~seepage of water~~ through mounting holes.

Exception: Enclosures shall be permitted to be supported in accordance with 314.23(E) and (F).

Substantiation:

Equipment is a broad term including material (conductors). Present wording modifies 314.23(E) and (F) and requires direct support of conduit bodies, boxes etc., if above deck level but not if they are below deck level and contain no electrical connections (pull or junction points) per 555.9. Support requirements should not be limited to above deck enclosures and generally also be independent of raceways other than conduit, such as EMT.

Present wording does not allow for support of luminaire enclosures as permitted by 314.23(F) Exception No. 2.

Panel Meeting Action: Reject

Panel Statement:

The substantiation does not indicate that field application of this requirement has been problematic. There are general requirements in Chapters 1-4 that address issues raised in the proposal.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-32 Log #795 NEC-P19 (550-10(A)) **Final Action: Accept in Part**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:

Feeder. The power supply to the mobile home shall be a feeder assembly consisting of not more than one listed 50-ampere mobile home power-supply cord with an integrally molded or securely attached plug cap, or a permanently installed feeder with an ampacity not less than 50-amperes, utilizing an approved Chapter 3 wiring method.

Exception No. 1: A mobile home that is factory-equipped with gas or oil-fired central heating equipment shall be permitted to be provided with a listed mobile home power-supply cord rated 40-amperes or a permanently installed feeder with an ampacity not less than 40-amperes.

Exception No. 2: A feeder assembly shall not be required for manufactured homes constructed in accordance with 550.22(B).

Substantiation:

This article does not specify a minimum rating for a permanently installed feeder. Section (I)(2) states feeder sizes shall be prescribed by the manufacturer where a raceway is installed from the mobile home disconnecting means to the underside, but no conductor size or rating is indicated in I(1) for a mast installation for a load of less than 50-amperes. If a mobile home has a computed load of 28 amperes and is served by a permanent mast-weatherhead, it appears that conductors that comply with 215.2 (30-ampere rating) would be Code compliant. There is no definition of "permanently installed"; to some it is other than cord wiring, other than plug-connected, or other than wiring covered by 527.3, even though cords are permitted for "permanently installed" wiring by many Code sections. Sections 550.10(B), 551.46(A)(2), and 552.43(B), for example, use the words "permanently installed".

Present Exception No. 2 is unclear; since manufactured homes are included in the definition of mobile home they are not prohibited from having a feeder assembly power supply, but are permitted to have service equipment in or on the home.

Panel Meeting Action: Accept in Part

The panel accepts the proposed revision to 550.10(A) Exception No. 2 and understands that the correct reference is to 550.32(B) as is in the current exception.

The panel rejects the proposed changes to 550.10(A) and to 550.10(A) Exception No. 1.

Panel Statement:

The submitter has not provided any rational for establishing 40 or 50 amperes as the minimum size for a permanently installed feeder.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-33 Log #700 NEC-P19 (550-10(C)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise last sentence:
If a right-angle cap is used, the configuration of the cap and receptacle shall be oriented so that when inserted the cord extends directly downward from the cap. ~~grounding member is farthest from the cord.~~

Substantiation:

The intent seems to be to prevent strain on the cord if extended horizontally or upward from the receptacle. The presetn wording can be complied with and still result in a 90 or 180° bend in the cord.

Panel Meeting Action: Reject

Panel Statement:

The current text provides necessary requirements for the receptacle configuration. Arranging the receptacle so that the cord will hang freely is the responsibility of the receptacle installer.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-34 Log #1971 NEC-P19 (550-10(I)(1)) **Final Action: Reject**

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(1) One mast weatherhead installation, installed in accordance with Article 230, containing four continuous, insulated, color-coded feeder conductors, one of which shall be an equipment ~~grounding~~ bonding conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Bonding is defined in the NEC as the permanent joining of metallic parts together to form a conductive path. Grounding is defined in the NEC as the connection of the bonded parts to earth. The proposed change to rename this conductor does not clarify the confusion indicated by the submitter.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 2

Ballot Not Returned: 1 Zieman

Explanation of Negative:

SABIN-MERCADO: "Grounded" and "grounding" sound similar but are intended to describe two totally different concepts. However, these terms are often used interchangeably by users of the NEC. In fact, there are places in the NEC where these terms are used interchangeably. The words ground, grounded and grounding will apply to the concept of connecting an electrical system to the earth. While the words bond, bonded and bonding will apply to the concept of connecting together noncurrent carrying conductive parts likely to become energized so that they form an effective ground fault path back to the source. If the terms are not similar, the concepts can be more easily differentiated by the users. I think this change will greatly improve usability and understanding of the NEC. This issue needs to be brought forth through the Technical Correlating Committee.

ZANICCHI: The term "bonding" is technically correct for this conductors application. This conductor is there to "bond" equipment to the "system grounded conductor, the grounding electrode conductor or both" at the service equipment as stated in Article 100. The use of the term "bonding" instead of "grounding" does not change the function of the conductor but it will help make the code more understandable. An example: A journeyman says to their apprentice "That 3 phase 208v mixer needs to be grounded". The apprentice asks themselves "does the journeyman mean that this mixer needs a grounded conductor brought to it? If we used the term "bonded" instead of "grounded" the journeyman would have said "That 3 phase 208v mixer needs to be bonded". Clearly, the separation of the terms grounded and bonded makes the journeyman's statement easier to understand. I hope that other panels consider making this change, especially Panel 5 which deals with Article 250, and that we "Accept in Principal" the change as I believe it will make a difference in the usability of the code.

19-35 Log #2246 NEC-P19 (550-11) **Final Action: Reject**

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:

550.11 Disconnecting Means and Branch-Circuit Protective Equipment. The branch-circuit equipment shall be permitted to be combined with the disconnecting means as a single assembly. Such a combination shall be permitted to be designated as a distribution panelboard. If a fused distribution panelboard is used, the maximum fuse size for the mains shall be plainly marked with lettering at least 6 mm (1.4 in.) high and visible when fuses are changed. Where plug fuses and fuseholders are used, they shall be tamper-resistant Type S, enclosed in dead-front fuse panelboards. Electrical distribution panelboards containing circuit breakers shall also be dead-front type.

FPN: See 110.22 concerning identification of each disconnecting means and each service, feeder, or branch circuit at the point where it originated and the type marking needed.

(A) Disconnecting Means. A single disconnecting means shall be provided in each mobile home consisting of a circuit breaker, or a switch and fuses and its accessories installed in a readily accessible location near the point of entrance of the supply cord or conductors into the mobile home. The main circuit breakers or fuses shall be plainly marked "Main." This equipment shall contain a solderless type of grounding connector or bar for the purposes of grounding, with sufficient terminals for all grounding conductors. The neutral bar termination of the ~~grounded~~ earth circuit conductor shall be insulated in accordance with 550.16(A). The disconnecting equipment shall have a rating suitable for the connected load. The distribution equipment, either circuit breaker or fused type, shall be located a minimum of 600 mm (24 in.) from the bottom of such equipment to the floor level of the mobile home.

FPN: See 550.20(B) for information on disconnecting means for branch circuits designed to energize heating or air-conditioning equipment, or both, located outside the mobile home, other than room air conditioners.

A distribution panelboard shall be rated not less than 50 amperes and employ a 2-pole circuit breaker rated 40 amperes for a 40-ampere supply cord, or 50 amperes for a 50-ampere supply cord. A distribution panelboard employing a disconnect switch and fuses shall be rated 60 amperes and shall employ a single 2-pole, 60-ampere fuseholder with 40- or 50-ampere main fuses for 40- or 50-ampere supply cords, respectively. The outside of the distribution panelboard shall be plainly marked with the fuse size. The distribution panelboard shall be located in an accessible location but shall not be located in a bathroom or a clothes closet. A clear working space at least 750 mm (30 in.) wide and 750 mm (30 in.) in front of the distribution panelboard shall be provided. this space shall extend from the floor to the top of the distribution panelboard.

(B) Branch-Circuit Portective Equipment. Branchcircuit distribution equipment shall be installed in each mobile home and shall include overcurrent protection for each branch circuit consistingg of either circuit breakers or fuses. The branch-circuit overcurrent devices shall be rated as follows:

(1) Not more than the circuit conductors; and

(2) Not more than 150 percent of the rating of a single appliance rated 13.3 amperes or more that is supplied by an individual branch circuit; but

(3) Not more than the overcurrent prottection size and of the type marked on the air conditioner or otehr motoroperated appliance.

(C) Two-Pole Circuit Breakers. Where circuit breakers are provided for branch-circuit protection, 240-volt circuits shall be protected by a 2-pole common or companion trip, or handle-tied paired circuit breakers.

(D) Electrical Nameplates. A metal nameplate on the outside adjacent to the feeder assembly entrance shall read:

This connection for 120/240-volt, 3-pole, 4-wire, 60-hertz, ___Ampere Supply.

The correct ampere rating shall be marked in the blank space.

Exception: For manufactured homes, the manufacturer shall provide in its written installation instructions or in the data plate the minimum ampere rating of the feeder assembly or, where provided, the service entrance conductors intended for connection to the manufactured home. The rating provided shall not be less than the minimum load calculated in accordance with 550.18.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP-19 that changing the existing terminology will result in enhanced understanding of this concept. CMP-19 does recommend to CMP-1 that a FPN referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-36 Log #628 NEC-P19 (550-11(A)) **Final Action: Accept in Principle in Part**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise fifth sentence of first paragraph:
The disconnecting equipment shall have a rating ~~suitable for~~ not less than the ~~connected~~ computed load.
Delete second paragraph and substitute:
The main disconnecting means and distribution panelboard shall be rated not less than the ampacity of the feeder assembly. The main disconnecting means shall employ overcurrent protection rated not less than the ampacity of the feeder assembly in accordance with the ampacity of the feeder assembly. The outside of an enclosure containing main fuses shall be plainly and durably marked with the proper fuse rating.

Substantiation:

"Connected" load is not necessarily the same as computed load; e.g., general-use receptacles and loads with applicable demand factors. Calculated (computed) loads may be greater or less than actual connected loads and are generally so addressed in the Code. The exception for 550.11(D) for example, refers to calculated load. Present wording does not envision or provide for use of a separate main disconnecting means not part of a panelboard. Present text does not address "permanent" feeder assemblies, or those permanent assemblies rated over 50-amperes. The requirements for 2-pole devices is covered in the first paragraph which specifies a single disconnecting means and "a" circuit breaker or switch.

Panel Meeting Action: Accept in Principle in Part

The panel accepts in principle the proposed change to revise the fifth sentence of the first paragraph to read:
The disconnecting equipment shall have a rating not less than the calculated load.
The panel rejects the remainder of the proposal.

Panel Statement:

The panel has changed the word "computed" to "calculated" in order to harmonize with similar Usability Task Group proposed changes throughout the Code.
The panel rejects the revised second paragraph as the submitter has not provided sufficient technical substantiation to cause disharmonization with NFPA 501, the standard for manufactured home construction.

Number Eligible to Vote: 13
Ballot Results: Affirmative: 12
Ballot Not Returned: 1 Zieman

19-37 Log #696 NEC-P19 (550-11(B), FPN (New)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add:
FPN: Where only motor loads are supplied see Article 430, part IV.

Substantiation:

This article applies where requirements differ from other articles. The requirement of (1) requires motor circuit conductors to be protected at not more than their ampacity.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not demonstrated that there are loads in a mobile or manufactured home that fall exclusively within the purview of Article 430. The requirements of 1, 2 and 3 adequately cover the loads that are inherent to these units.

Number Eligible to Vote: 13
Ballot Results: Affirmative: 12
Ballot Not Returned: 1 Zieman

19-38 Log #640 NEC-P19 (550-11(C)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:

~~Two Pole~~ Circuit Breakers. Where circuit breakers are provided for ~~branch circuit~~ overcurrent protection they shall comply with 240.20(B). ~~240-volt circuits shall be protected by a 2-pole common or companion trip, or handle tied paired circuit breakers.~~

Substantiation:

Edit. Present wording suggests it may be interpreted to include a multiwire circuit, which is covered by 240-2(B). The requirement should also apply to feeder circuits.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided any technical substantiation to reduce the safety provided by this requirement for all 240 volt circuits. The submitter is reminded that per 90.3 the requirements in Chapter 5 can modify the requirements of Chapters 1-4.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-39 Log #429 NEC-P19 **Final Action: Reject**
(550-11(E))

Submitter: Barry F. Tower

Recommendation:

Please add the following new text: (g) Overcurrent protection of branch circuit grounded conductors and branch circuit equipment grounding conductors. Overcurrent protection of branch circuit grounded conductors and branch circuit equipment grounding conductors shall be provided for mobile home installations. Overcurrent shall be detected and interrupted by use of one of the following means:

1. A single open-neutral fault interrupting device installed as the main disconnecting means within the panelboard.
2. A single open-neutral fault interrupting device installed within the branch circuit on another panelboard that feeds this panelboard.
3. A neutral-switching GFI type overcurrent device shall be required on each branch circuit of the panelboard where a grounded conductor is used in that circuit.

Where a single open-neutral fault interrupting device is used as permitted in 1 and 2 above, it shall be designed so that the open-neutral fault setting does not exceed 1 ampere, and it shall open all ungrounded conductors. It shall not be required to open the grounded feeder conductor. It shall not be permitted to open any equipment grounding conductor.

Where a neutral-switching GFI type overcurrent device is used as permitted in 3 above, all ungrounded branch circuit conductors and the branch circuit grounded conductor shall be opened when a fault is detected. The neutral-switching GFI type overcurrent device shall not be permitted to open any branch circuit equipment grounding conductor.

The requirements specified in this article shall become effective only after the Authority Having Jurisdiction has determined that manufacturers are able to supply at least one of the two permitted interrupting devices described above.

Substantiation:

The purpose of this new proposal is to prevent overcurrent fires caused by "open neutrals in the feeder" of mobile homes and buildings with sub-panels where they are fed with a neutral and a separate grounding conductor such as a four-wire 240/120 V feeder. An open neutral in the feeder anywhere between the service and the distribution panel can start a fire if there is an interconnection between a branch circuit grounded neutral conductor and the branch circuit equipment grounding conductor. If there is an interconnection on just one of the branch circuits of the panelboard (any branch circuit), a fire is almost certain if the large neutral in the feeder is opened for any reason. These interconnections are very, very common. Master Electricians such as myself discover them all the time. Only a professional would even know how to check for an interconnection in a branch circuit between the grounded conductor and the branch circuit equipment grounding conductor (parallel conductors). The equipment grounding conductor may be in contact with the grounded conductor inside a device box. Any defective appliance in which the neutral conductor is grounded to the case can burn down a building if the neutral becomes open at the feeder (only on the 4-wire systems addressed in this proposal). Someone could have an appliance with a grounded neutral plugged in for many years and not know that they have a problem. Then one day their neutral opens up (on their feeder) and a fire starts. They had no warning, and they had no way of knowing that the appliance was defective. A very common appliance that ends up having a grounded neutral is a 240/120 V dryer (or range). The pigtail is often installed by the appliance delivery person. They have no concept of why the bonding jumper must be removed. That bonding jumper may be burning down a home while you are reading this. The requirements have recently changed for ranges and dryers to require a 4-wire system. I agree that this is the proper wiring method. Unfortunately, we have increased the fire hazard while decreasing the electrocution hazard. The facts would show that more people die from house fires (electrically caused) than from electrocution. This proposal provides the only two ways to protect branch circuit neutrals from overcurrent on the 4-wire systems. This problem has been ignored by engineers for years. The public thinks that their wiring is safe because they have circuit breakers. The circuit breakers protect the ungrounded conductor and as a result also protect the grounded neutral conductor (except on a 4-wire system addressed here). With a 4-wire system, a fire can and does start as follows: The neutral feeder conductor (may be rated at 100 amperes) becomes open, but instead of disconnecting the power, there is an alternate path for the circuit because one of the branch circuit equipment grounding conductors is accidentally connected in parallel with a branch circuit neutral conductor. The neutral bus for the entire panelboard will be backfed through that alternate path (perhaps through a no. 14 conductor). There is no overcurrent protection on the grounded conductor or equipment grounding conductor in any branch circuit. I have provided 2 drawings showing how an open neutral can and does cause severe overloads. The first drawing shows that the neutral is already accidentally grounded, but there are no signs of any problem. The second drawing shows the fault path after the main neutral (in the feeder) opens up. The example shows a severe overload (40 amps) on a no. 14 branch circuit equipment grounding conductor and backfeeding the same 40 amps from the branch circuit neutral. It should be noted that the circuit with the problem (interconnection between the neutral and equipment grounding conductor) does not have to be in use - in fact the circuit breaker for that circuit can be turned off and a fire will still result. With this proposal, protecting the neutral will also protect the equipment grounding conductor - no further protection would be required. This proposal is only advisory as presented because no suitable product is currently manufactured that could protect branch circuit neutrals or branch circuit equipment grounding conductors. Even neutral switching breakers provide no overcurrent protection on the grounded neutral conductor - they just open both (ungrounded and grounded) if an overload is detected on the ungrounded conductor. GFIs are available with 2-pole design, but they are not currently made in ratings above 60 amps. Also they have a fault trip setting of only 5 milliamps - much too sensitive for a main breaker. I have suggested that it have a fault trip setting of 1 ampere (a modified GFI). That would satisfy numbers 1 and 2 in the proposal above. It seems that it would be very easy for large manufacturers to produce a product that is needed so much. Two-pole GFIs currently work as follows: If leg one is carrying 60 amperes, and leg two is carrying 40 amperes, then the neutral should be carrying 20 amperes. If so, then everything is fine. If the neutral is only carrying 19 amperes or zero amperes - then trip the breaker because the neutral must be open or there is another alternate path in parallel with the neutral that is carrying the remainder of the current. There is another side benefit of having a device that will shut down a panel with an open neutral, and it would help make it much more cost effective. Whenever a neutral opens up in any panel, appliances connected to circuits on opposite legs become in series with each other. When that happens, Ohms law will determine the voltage that each one will drop. Electronic appliances usually burn out because they might end up getting 180 volts while the opposite appliance might only get 60 volts. Serious property damage can result from an open neutral (especially when it is the large feeder neutral). The second method would also be very easy to make. They currently make GFIs, and they make neutral switching breakers - just make both features into one circuit breaker. That would satisfy number 3 in the proposal above. We now have GFIs, and finally AFIs; it is time for ONFIs (Open Neutral Fault Interrupters) - or whatever the manufacturers might end up calling them.

NOTE: Supporting Material is Available for Review at NFPA Headquarters.

Panel Meeting Action: Reject

Panel Statement:

The scenario of a grounded conductor and grounding conductor interconnection has long been addressed by the requirements of Article 550 that prohibit such interconnections. The submitter has provided only anecdotal evidence that the problem described has resulted in a large number of mobile and manufactured home fires. Additionally, the enforcement of the proposed requirement contingent upon determination by the AHJ that such devices are available is deemed to be problematic for the enforcement community.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-40 Log #704 NEC-P19 (550-12(B)) **Final Action: Accept in Principle**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:

Small Appliances. ~~For the small appliances load in~~ In kitchens, pantries, dining rooms, and breakfast rooms, two or more 20-ampere small-appliance circuits, in addition to the ~~number of~~ circuits required ~~by other parts of~~ elsewhere in this section, shall be provided for all receptacle outlets required by 550.13(D) in these rooms. Such circuits shall have no other outlets.

Exception No. 1: ~~A~~ Receptacles outlets installed solely for the electrical supply and support of an electric clock in any the rooms specified in (B) shall be permitted.

Exception No. 2: Receptacle outlets installed to provide power for supplemental equipment and lighting on gas-fired ranges, ovens, or counter mounted cooking units shall be permitted.

Exception No. 3: A single receptacle for refrigeration equipment shall be permitted to be supplied from an additional circuit rated 15-amperes.

Countertop receptacle outlets installed in the kitchen shall be supplied by not less than two small-appliance circuit branch circuits, either or both of which shall be permitted to supply receptacle outlets in the kitchen and other ~~rooms~~ locations specified in (B). ~~above.~~

Substantiation:

Except for Exception No. 2, the proposal is largely editorial to reflect the use of plurals per Style Manual 3.3.3 and complete sentences for exceptions. The proposed Exception No. 3 is similar to 210.52(B)(1), Exception No. 2 and should be suitable for mobile homes and manufactured homes used as dwelling units.

Panel Meeting Action: Accept in Principle

Revise 550.12(B) to read:

Small Appliances. In kitchens, pantries, dining rooms, and breakfast rooms, two or more 20-ampere small-appliance circuits, in addition to the number of circuits required elsewhere in this section, shall be provided for all receptacle outlets required by 550.13(D) in these rooms. Such circuits shall have no other outlets.

Exception No. 1: Receptacle outlets installed solely for the electrical supply and support of an electric clock in any the rooms specified in (B) shall be permitted.

Exception No. 2: Receptacle outlets installed to provide power for supplemental equipment and lighting on gas-fired ranges, ovens, or counter mounted cooking units shall be permitted.

Exception No. 3: A single receptacle for refrigeration equipment shall be permitted to be supplied from an individual branch circuit rated 15-amperes or greater.

Countertop receptacle outlets installed in the kitchen shall be supplied by not less than two small-appliance circuit branch circuits, either or both of which shall be permitted to supply receptacle outlets in the kitchen and other locations specified in (B).

Panel Statement:

The panel has revised the proposed text for consistency with 210.52(B)(1).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-41 Log #698 NEC-P19 (550-12(C)) **Final Action: Accept**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add:

This circuit shall have no other outlets.

Substantiation:

It is assumed the intent is to limit outlets to the laundry area receptacles. Since 210.11(C)(2)(3) and 550.12(B) similarly specify a circuit but limit the outlets. A 20-ampere circuit supplying the laundry receptacle(s) and other area outlets complies with the literal wording. The Style Manual 3.3.5 indicates similar wording reduces confusion and clarifies intent.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-42 Log #708 NEC-P19 **Final Action: Reject**
(550-12(D))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Replace present text with the following:
(D) General Appliances. Branch circuits for general appliances shall be in accordance with the following:
(1) For central heating equipment see 422.12.
(2) For storage-type water heaters see 422.13.
(3) For ranges see 550.18(B)(5).
(4) For air conditioning equipment employing a hermetic refrigerant motor-compressor see Article 440 Part IV and part VII.
(5) For individual branch circuits and branch circuits supplying two or more outlets or receptacles see 422.10.
(6) For motor-operated appliances see 422.3.
Alternatively substitute the following:
(D) General Appliances. Circuits supplying general appliances shall be installed in accordance with the applicable provisions of Article 422.

Substantiation:

The second sentence appears to literally require a general appliance circuit(s) even if none of the equipment indicated in (1) through (4) is installed.
"Adequate" is a vague term and possibly unenforceable per 3.2.1 of the Style Manual. Where the Code specifies circuit requirements, they are assumed to be adequate per 90.1(B).
The referenced sections in the proposal are more comprehensive, and the differences in this section are not warranted simply because a mobile home or manufactured home is not a conventional-built home.
For example: This section appears to permit a furnace (central heating equipment) to be supplied from a multioutlet circuit, in contrast to 422.12.
Subsection (D)(1) is not clear whether it applies to a single appliance or multiple appliances; 210.23(A)(2) clearly indicates total ratings.
Subsection (D)(2) equates all motor loads with continuous duty and infers that continuous duty loads are the same as continuous loads, by definition they are not the same.
Subsection (D)(3) amends 210.23 which permits an individual branch circuit to supply any load for which it is rated. Section 210.23 only restricts a cord-and plug-cconnected equipment to 80 percent of the circuit rating where two or more outlets or receptacles are supplied. It also amends 210.19(A)(1) exception and the latter portion of the third paragraph of 422.10(A).

Panel Meeting Action: Reject
Panel Statement:

The submitter has not demonstrated in his substantiation that the current wording of this section has been misapplied by the manufacturers of mobile and manufactured homes. This proposal does not enhance the usability of this section.

Number Eligible to Vote: 13
Ballot Results: Affirmative: 12
Ballot Not Returned: 1 Zieman

19-43 Log #635 NEC-P19 **Final Action: Accept**
(550-12(D)(2))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise last sentence to read as follows:
Motor loads or ~~other~~ continuous ~~duty~~ loads shall not exceed 80 percent of the branch circuit rating.

Substantiation:

The present wording infers all motor loads are continuous duty. Continuous duty is not synonymous with continuous load. See definitions.

Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12
Ballot Not Returned: 1 Zieman

19-44 Log #676 NEC-P19 **Final Action: Accept**
(550-13(A)(3)g)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
(A)(3) Except where supplying specific appliances, be 15- or 20-ampere, 125 volt, either single or ~~duplex~~ multiple type, and accept parallel blade attachment plugs
Revise first sentence of (G): Receptacle outlets shall not be required ~~located~~ in the following locations.

Substantiation:

Present wording of (A)(3) does not permit multiple types other than duplex. Present wording of (G) does not correlate with the heading and is in the category of (F) "not permitted".

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-45 Log #880 NEC-P19 **Final Action: Accept**
(550-13(B))

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 2 for comment.

Submitter: James M. Daly, General Cable

Recommendation:

Delete the text indicated:
(B) Ground-Fault Circuit Interrupters (GFCI). All 125-volt, single-phase, 15- and 20-ampere receptacle outlets installed outdoors, in compartments accessible from outside the unit, or in bathrooms, including receptacles in luminaires (light fixtures), shall have GFCI protection ~~for personnel~~. GFCI protection ~~for personnel~~ shall be provided for receptacle outlets serving countertops in kitchens, and receptacle outlets located within 1.8 m (6 ft) of a wet bar sink.

Substantiation:

The use of the term "personnel" implies an employee of a company. The Code should simply require GFCI protection for whoever utilizes the receptacle which, in this case, would be the resident.

Panel Meeting Action: Accept

Panel Statement:

The panel does not concur that personnel implies only employees of a company. However since the definition in Article 100 details the type of protection afforded by these devices, it is unnecessary to repeat its function throughout the NEC.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-46 Log #3127 NEC-P19 (550-13(B)) **Final Action: Accept in Part**

TCC Action:

It was the action of the Technical Correlating Committee that this Proposal be referred to Code-Making Panel 2 for comment.

Submitter: Jonathan R. Althouse, Twin Creeks Enterprises

Recommendation:

In two places in this paragraph delete the words "for personnel" relating to GFCI protection. The paragraph will read:
All 125-volt, single-phase, 15- and 20-ampere receptacle outlets installed outdoors, in compartments accessible from outside the unit, or in bathrooms, including receptacles in luminaires (light fixtures), shall have ~~GFCI~~ ground-fault circuit-interrupter protection ~~for personnel~~. ~~GFCI~~ Ground-fault circuit-interrupter protection ~~for personnel~~ shall be provided for receptacle outlets serving countertops in kitchens, and receptacle outlets located within 1.8 m (6 ft) of a wet bar sink.

Substantiation:

As defined in Article 100 when the term ground-fault circuit-interrupter protection is used in the NEC it is intended to be for personnel protection unless otherwise stated. The words "for personnel protection" do not need to be used. In many places in the NEC these words are not used. By using the words in some places and not in others, it implies there is a difference. The NEC must be consistent on the issue.
The abbreviation GFCI is not defined in the NEC. Either use the full description or perhaps the abbreviation can be used in the definition in Article 100.

Panel Meeting Action: Accept in Part

The panel accepts the proposed recommendation to delete the words "for personnel". The panel rejects deletion of the acronym GFCI.

Panel Statement:

In accordance with Section 3.2.3 of the NEC Style Manual the use of acronyms in the NEC is acceptable for commonly understood terms.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-46a Log #CP1919 NEC-P19 (550.13(F)(1)) **Final Action: Accept**

Submitter: Code-Making Panel 19

Recommendation:

Revise as follows: (1) Receptacle outlets shall not be installed within a bathtub or shower space.

Substantiation:

"Within reach" is a subjective term even as qualified by the 750 mm dimension. Prohibiting a receptacle within 750 mm could be perceived as overly restrictive since this restriction is not applied to conventional housing. This revision brings this section into conformity with 406.8(C).

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-47 Log #645 NEC-P19 (550-15(E)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
~~If~~ Where a range, clothes dryer, or similar appliance is connected by metal-covered cable or flexible ~~metal~~ conduit, a length not less than 900 mm (3 ft) of free cable or conduit shall be provided to permit moving the appliance. The cable or flexible ~~metal~~ conduit shall be secured to the wall. (remainder unchanged).

Substantiation:

Section 550.15 permits LFMC and LFNC as wiring methods, in addition to FMC.

Panel Meeting Action: Reject

Panel Statement:

The recommendation has not provided sufficient technical substantiation to disharmonize this requirement with NFPA 501 and HUD 3280.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-48 Log #1353 NEC-P19 **Final Action: Reject**
(550-15(G)(2))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
(2) For motors or other loads switches shall have an ampere or horsepower rating, or both, ~~adequate for~~ not less than the loads supplied, ~~controlled~~ and in accordance with applicable provisions elsewhere in this Code. ~~An ac general-use snap switch shall be permitted to control a motor 2 hp or less with full-load current not over 80 percent of the switch ampere rating.~~

Substantiation:

"Adequate" is a term to be avoided per the Style Manual. The word "controlled" may be construed as applying only to a switch used to start and stop a motor, since similar wording is used in 430.83(C) referring to motor controllers. Per 550.3 this section may be interpreted that a switch may be "adequate" without meeting the requirement of 430.110(A). The snap switch provision does not specify a stationary motor as does 430.83(C)(2) and 430.109(C)(2); what justifies the difference? The similar reiteration of the snap switch provisions of 430.83(C)(2) and 430-109(C)(2) but omission of the provisions for a general-use switch in those sections infer that those provisions are not applicable for this article.

Panel Meeting Action: Reject

Panel Statement:

The panel has removed this text from Article 550 and referenced 404.14 for switch requirements covering motor and other loads.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-48a Log #CP1903 NEC-P19 **Final Action: Accept**
(550.15(G)(2))

Submitter: Code-Making Panel 19

Recommendation:

Revise 550.15(G)(2) to read:
(2) Switches for motor or other loads shall comply with the provisions of 404.14.

Substantiation:

The requirements in this section are covered in 404.14 and in accordance with 90.3 it is not necessary to repeat these same requirements in Article 550.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-49 Log #790 NEC-P19 **Final Action: Accept**
(550-15(H) Exception)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Exception: Type MI cable, ~~Electrical~~ electrical metallic tubing, or rigid nonmetallic conduit... (remainder unchanged).

Substantiation:

Type MI cable is a wiring method that is resistant to damage, watertight, and can preclude the use of boxes and conduit bodies to comply with maximum number of bends, which may be required for raceway methods.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-50 Log #786 NEC-P19 (550-16) **Final Action: Accept in Principle**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete the last sentence in the first paragraph and in (A)(1): ~~Where service equipment is installed in or on a manufactured home as permitted in 550.32(B) the neutral conductors and the ground bus shall be permitted to be connected in the distribution panel.~~

Substantiation:

The word "permitted" appears to be an option for interconnecting the neutral and ground bus (although it doesn't specify "together"). This is a requirement of 550.32(B)(4), since 250.28 specifies a main bonding jumper connection between the grounded and grounding conductors is mandatory.

Panel Meeting Action: Accept in Principle

Revise the last sentences in the first paragraph and in (A)(1) to read:
Where the distribution panelboard is the service equipment as permitted by 550.32(B) the neutral conductors and the equipment grounding bus shall be connected.

Panel Statement:

The panel action meets the objective in the recommendation and clarifies the requirement where the distribution panelboard is the service equipment.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-51 Log #2247 NEC-P19 (550-16) **Final Action: Reject**

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:

550.16 Grounding. Grounding of both electrical and nonelectrical metal parts in a mobile home shall be through connection to a grounding bus in the mobile home distribution panelboard. The grounding bus shall be grounded through the green-colored insulated conductor in the supply cord or the feeder wiring to the service ground in the service-entrance equipment located adjacent to the mobile home location. Neither the frame of the mobile home nor the frame of any appliance shall be connected to the ~~grounded~~ earth circuit conductor (neutral) in the mobile home. Where service equipment is installed in or on a manufactured home as permitted in 550.32(B), the neutral conductors and the ground bus shall be permitted to be connected in the distribution panel.

(A) ~~Grounded~~ Earth ~~(Neutral)~~ Conductor.

(1) Insulated. The ~~grounded~~ earth circuit conductor ~~(neutral)~~ shall be insulted from the grounding conductors and from equipment enclosures and other grounded parts. The ~~grounded~~ earth ~~(neutral)~~ circuit terminals in the distribution panelboard and in ranges, clothes dryers, counter-mounted cooking units, and wall-mounted ovens shall be insulated from the equipment enclosure. Bonding screws, straps, or buses in the distribution panelboard or in appliances shall be removed and discarded. Where service equipment is installed in or on a manufactured homme as permitted in 550.32(B), the neutral conductors and the ground bus shall be permitted to be connected in the distribution panel.

(2) Connections of Ranges and Clothes Dryers. Connections of ranges and clothes dryers with 120/240-volt, 3-wire ratings shall be made with 4-conductor cord and 3-pole, 4-wire, grounding-type plugs or by Type AC cable, Type MC cable, or conductors enclosed in flexible metal conduit.

(B) Equipment Grounding Means.

(1) Supply Cord or Permanent Feeder. the greencolored insulated grounding wire in the supply cord or permanent feeder wiring shall be connected to the grounding bus in the distribution panelboard or disconnecting means.

(2) Electrical System. In the electrical system, all exposed metal parts, enclosures, frames, lamp fixtures canopies, and so forth shall be effectively bonded to the grounding terminal or enclosure of the distribution panelboard.

(3) Cord-Connected Appliances. Cord-connected appliances, such as washing machines, clothes dryers, and refrigerators, and the electrical system of gas ranges and so forth, shall be grounded by means of a cord with grounding conductor and grounding-type attachment plug.

(C) Bonding of Non-Current-Carrying Metal Parts.

(1) Exposed Non-Current-Carrying Metal Parts. All exposed non-current-carrying metal parts that may become energized shall be effectively bonded to the grounding terminal or enclosure of the distribution panelboard. A bonding conductor shall be connected between the distribution panelboard and accessible terminal on the chassis.

(2) Grounding terminals shall be of the solderless type and listed as pressure-terminal connectors recognized fo rthe wire size used. The bonding conductor shall be solid or stranded, insulated or bare, and shall be 8 AWG copper minimum, or equivalent. The bonding conductor shall be routed so as not to be exposed to physical damage.

(3) Metallic Piping and Ducts. Metallic gas, water, and waste pipes and metallic air-circulating ducts shall be considered bonded if they are connected to the terminal on the chassis [see 550.16(C)(1)] by clamps, solderless connectors, or by suitable grounding-type straps.

(4) Metallic Roof and Exterior Coverings. Any metallic roof and exterior covering shall be considered bonded if the following conditions are met:

(1) The metal panels overlap one another and are securely attached to the wood or metal frame parts by metallic fasteners.

(2) The lower panel of the metallic exterior covering is secured by metallic fasteners at a cross member of the chassis by two metal straps per mobile home unit or section at opposite ends.

The bonding strap material shall be a minimum of 100 mm (4 in.) in width of material equivalent to the skin or a material of equal or better electrical conductivity. The straps shall be fastened with paint-penetrating fittings such as screws and star washers or equivalent.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP-19 that changing the existing terminology will result in enhanced understanding of this concept. CMP-19 does recommend to CMP-1 that a FPN referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-52 Log #2615 NEC-P19 (550-16) **Final Action: Reject**

Submitter: Stephan Barreres, NABET-CWA Local 16 Safety Committee

Recommendation:

Revise text to read as follows:

550.16 Grounding. Grounding of both electrical and nonelectrical metal parts in a mobile home or metallic adjunct accessories used at a mobile home installation, shall be through connection to a grounding bus in the mobile home distribution panelboard. Accessories shall include, but not be limited to, metallic items such as stairs, steps, platforms, decks, railings, awnings, storage sheds, etc., that are within 6 feet of the mobile home's exterior. The grounding bus shall be grounded through the green-colored insulated conductor in the supply cord or the feeder wiring to the service ground in the service-entrance equipment located adjacent to the mobile home location. Neither the frame of the mobile home nor the frame of any appliance shall be connected to the grounding circuit conductor (neutral) in the mobile home. Where service equipment is installed in or on a manufactured home as permitted in 550.32(B), the neutral conductor and the ground bus shall be permitted to be connected in the distribution panel.

Substantiation:

Mobile homes are frequently constructed with an exterior metallic siding. This siding, as well as other metal parts are grounded as per the NEC. Field usage of metallic accessories in mobile home installations is common place. Without grounding, a serious shock hazard would exist in the event a fault condition would electrically charge an "isolated" metal accessory.

It is believed by many electrical professionals that the NEC requires that "all" metal parts at a mobile home installation must be grounded as the code is currently written, including accessories. Others feel that an accessory is not part of the "mobile home" proper and thus exempt from any grounding requirements. It is far too easy for direct human contact to occur between the "mobile home" metallic structural components and these adjunct metal components. For this reason, we ask for clearer grounding language and at least a six (6) foot safety perimeter be established. This would eliminate the possibility of an individual making hand to hand contact between grounded and ungrounded metal components at a mobile home installation.

To eliminate confusion in the future and help promote electrical safety, we respectfully submit the above additions to the 2005 National Electrical Code for your consideration.

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

Panel Meeting Action: Reject

Panel Statement:

The accessory items shown in the proposed language do not fall within the scope of this article. From 550.1 the panel concludes that they are not "appurtenances related to electrical installations". There is no technical substantiation for establishing a six foot zone or why a storage shed poses a shock hazard. This proposal would literally apply to items such as trash containers and mailboxes, again with no technical substantiation. The installation of steps, decks, or railings and the types of materials used are field installed options. There is nothing in the existing code language that would prohibit the bonding of any metallic accessory to the frame of the unit should a difference of potential as mentioned in the substantiation be encountered based on some unique condition.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-53 Log #785 NEC-P19 (550-16(A)(2)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise latter part as follows:

"...or conductors enclosed in flexible ~~metal~~ conduit.

Substantiation:

Wiring and connections to other equipment is permitted by 550.15 to employ liquidtight flexible conduit, metal or nonmetallic types under their conditions of use, and is apparently not prohibited for similar connections in other types of dwelling units. Liquidtight flexible metal and nonmetallic conduit appear to be as suitable as the other connections indicated.

Panel Meeting Action: Reject

Panel Statement:

The recommendation has not provided sufficient technical substantiation to disharmonize this requirement with NFPA 501 and HUD 3280.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-54 Log #644 NEC-P19 (550-18) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete present wording of this section and substitute:
Calculations. The load for services, feeders, and branch-circuits shall be computed in accordance with Article 220 Part I, Part II, and Part III.

Substantiation:

Mobile homes and manufactured homes for the most part included in the definition of dwelling unit in Article 100, and inferred as such in 550.4(A). As such they, and other structures are adequately and comprehensively covered in Article 220. A mobile or manufactured home may have comparable dimensions, lighting, appliances, etc. as a conventional site-built home for which Article 220 would apply, and does apply, to other structures in the park.

Present wording infers the feeder assembly only covers a supply-cord type since a permanent type is not specifically indicated, and doesn't this method apply to the mobile home service equipment. Is Article 220 to be used for services?

The two legs of the 3-wire system should be indicated as the ungrounded legs.

The optional method of 220.30 permitted by (C) conflicts with the first paragraph. That method is restricted by 220.30 to feeder or service conductors with an ampacity of 100 or more. It is not clear whether this restriction is intended to apply since the method shown is in 220.30(B). If the optional method permitted by (C) is used, does the 15-ampere per leg required by (B)(2) apply? And is it intended to apply to the feeder neutral to allow for a 120-volt air conditioner? The definition of Manufactured Homes indicates it is included in the term "mobile home", is this section intended to apply to a manufactured home, or Article 220?

Panel Meeting Action: Reject

Panel Statement:

The panel concludes that the existing language sufficiently addresses the needs of the manufacturers of these units. The language of 550.18 does not include a permanent feeder assembly, refer to the definition of feeder assembly in 550.2.

Services are covered in Part III of Article 550. The panel also does not see any conflict with 220.30 and 550.18(C) since the language clearly states that the use of 220.30 shall be permitted. Mobile and manufactured home service equipment and feeder conductors must be rated not less than 100 amperes.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-55 Log #642 NEC-P19 (550-20(A)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise last sentence:
Where located on the underside of the home or located under any roof extensions or similarly protected locations, outdoor luminaires (fixtures) ~~and equipment~~ shall be listed for use in wet or damp locations.

Substantiation:

Outdoor equipment such as air cooling equipment is generally listed for "outdoor" use and not "damp" locations as required in the last sentence. The present wording literally requires a "damp" listing label for fixtures in partially protected locations, whereas the UL "white book" indicates a wet location label also suffices for a damp location.

Panel Meeting Action: Reject

Panel Statement:

The existing text provides the minimum requirement for equipment located on the underside of the unit. It is clearly understood in the field that equipment marked for use in wet locations or for outdoor use exceeds the minimum requirement of this section.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-56 Log #802 NEC-P19 (550-20(A)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise last sentence to read as follows:
Where located on the underside of the mobile home or located under roof extensions or similarly protected locations, outdoor luminaires (lighting fixtures) ~~and equipment~~ shall be listed for use in wet or damp locations.

Substantiation:

Outdoor equipment such as air cooling is generally listed for "outdoor": use and not "damp" locations. Present wording literally requires a "damp" listing for fixtures in partially protected locations. Whereas, the UL "white book" indicates a wet location label also suffices for a damp location.

Panel Meeting Action: Reject

Panel Statement:

The existing text provides the minimum requirement for equipment located on the underside of the unit. It is clearly understood in the field that equipment marked for use in wet locations or for outdoor use exceeds the minimum requirement of this section.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-57 Log #1581 NEC-P19Meeting Action: Accept (550-25) **Final Action: Reject**

TCC Action: Reject

It was the action of the Technical Correlating Committee that this proposal be reported as "Reject" to correlate with the Technical Correlating Committee action on Proposal 1-54 and the Panel Action on Proposal 2-121.

Submitter: Michael J. Johnston, Int'l Assn. of Electrical Inspectors

Recommendation:

Revise this section to refer to Article 100 for the definition of the term "arc-fault circuit-interrupter":
550.25 Arc-Fault Circuit-Interrupter Protection.
(A) ~~Definition.~~Arc-fault circuit interrupters are defined in Article 100 ~~210.12(A)~~.
(B) Bedrooms of Mobile Homes and Manufactured Homes. All branch circuits that supply 125-volt, single-phase, 15- and 20-ampere outlets installed in bedrooms of mobile homes and manufactured homes shall be protected by arc-fault circuit interrupter(s).

Substantiation:

This revision is a companion proposal to work together with the proposals to Section 210.12 to relocate the definition of "arc-fault circuit-interrupter" to Article 100.

Panel Meeting Action: Accept

Panel Statement:

The panel action is contingent upon similar actions taken by CMP-1 and CMP-2.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-58 Log #632 NEC-P19 (550-30) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:

The ~~mobile home park secondary system~~ electrical distribution system to mobile home lots shall be single-phase 120/240 volts, nominal. Feeder conductors supplying mobile home lot service equipment shall be treated as service conductors. ~~For the purpose of Part III, where the park service exceeds 240 volts, nominal, transformers and secondary distribution panelboards shall be treated as services.~~

Substantiation:

The definition of mobile home service equipment is not the same as the definition of service equipment in Article 100. The definition in this article does not require supply conductors to be service conductors, and where they are a feeder the applicable provisions for services in Articles 230 and 250 do not apply. Section 550.31 indicates supply conductors may be either. Where there are feeders requirements for services do not apply, such as listing suitable for service equipment, number of disconnects, grounding and bonding, etc. These requirements would be invoked if the supply conductors are considered as service conductors. If the intent is not to consider mobile home lot supply conductors as service conductors, the Code should be clear. Many mobile parks have lots supplied by utility service conductors, while some have lots supplied by feeders from a common park service.

Panel Meeting Action: Reject

Panel Statement:

The proposed text does not enhance the clarity of this requirement.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-59 Log #797 NEC-P19 (550-31) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise third paragraph as follows:

It shall be permissible to compute the feeder or service load in accordance with Table 550.31. Where demand factors less than 100 percent are used, there shall be no reduction of the ampacity of the neutral as permitted in 220.22. ~~No demand factor shall be allowed for any other load except as provided in this Code.~~

Substantiation:

For larger feeder or service conductors, Tables 550.31 and 220.22 could result in a demand factor applied to a demand factor, which could result in an overloaded neutral where many 120 volt loads are supplied, especially if not balanced. The present last sentence is superfluous and obviously applies.

Panel Meeting Action: Reject

Panel Statement:

The existing text has not proved to be problematic in field application.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-60 Log #1327 NEC-P19 (550-31) **Final Action: Accept**

Submitter: National Electrical Code Technical Correlating Committee

Recommendation:

1. Replace the term "compute" with the term "calculate" in the following locations:
550.31.

2. Replace the term "computing" with the term "calculating" in the following sections:
550.18.

Substantiation:

This proposal is the result of an effort by the NEC Usability Task Group to standardize the language throughout the NEC relative to the use of the terms computed and calculated. After analyzing the usage, the group agreed that the term "calculated" was the best term for use throughout the NEC. This is one in a series of proposals to standardize on the term calculated.

The term "calculate" and its derivatives is presently used in the article title, section titles, and throughout portions of the existing article. Other Articles of the NEC such as for calculating conductor ampacties (under engineering supervision), calculating the size of enclosures, and in Annex D use the term calculate. Additionally, the term "calculate" is more commonly used in other NFPA codes and standards e.g. NFPA 70E, arc flash calculation. Adversely, the term "computation" has a connotation of using a computer, although "load calculations" are frequently determined using a calculator. It appears that the term "computation" was used more frequently beginning with the 1975 NEC based on an editorial revision project.

Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12
Ballot Not Returned: 1 Zieman

19-61 Log #637 NEC-P19 (550-32(A)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
(A) Mobile Home Service Equipment. ~~The~~ Each mobile home shall be provided with individual service equipment ~~shall be~~ located ~~adjacent to~~ on the mobile home lot and not mounted in or on the mobile home. (remainder unchanged).

Substantiation:

There does not appear to be any provision in this article to preclude mobile home service equipment from serving more than one unit, where other requirements are met. "Adjacent" is a vague term to be avoided, per the Style Manual.

Panel Meeting Action: Reject

Panel Statement:

The proposed text does not provide additional clarity. In the context of this section, the term "adjacent" has been clearly understood in field application.

Number Eligible to Vote: 13
Ballot Results: Affirmative: 12
Ballot Not Returned: 1 Zieman

19-62 Log #638 NEC-P19 (550-32(A)) **Final Action: Accept in Principle**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise penultimate sentence:
The service equipment shall be permitted to be located elsewhere on the premises provided that a disconnecting means suitable for service equipment and rated not less than the feeder is located in sight from..." (remainder unchanged).

Substantiation:

This permitted disconnecting means is not service equipment and, therefore, not covered by (C) and no minimum rating is specified. It is reasonable to require a current rating not less than the feeder conductors. A minimum 40- or 50-ampere cord assembly is required for a mobile home with a computed load of 25 amperes, but a disconnecting means covered by this section could be rated 30-amperes with no apparent violation. If future added load increases to an actual amount over 30-amperes, a non-fusible switch, for example could carry excessive current and be potentially hazardous.

Panel Meeting Action: Accept in Principle

Revise the third sentence of 550.32(A) to read:

The service equipment shall be permitted to be located elsewhere on the premises provided that a disconnecting means suitable for service equipment is located within sight from and not more than 9.0 m (30 ft) from the exterior wall of the mobile home it serves and is rated not less than that required for service equipment per 550.32(C).

Panel Statement:

The panel's action provides the necessary requirement for the minimum rating of a disconnecting means that is not service equipment.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-63 Log #639 NEC-P19 (550-32(A)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add new text to read as follows:
Grounding and bonding at mobile home lot service equipment supplied by service conductors shall be in accordance with Parts II, III, IV, and V of Article 250.

Substantiation:

Grounding and bonding at service equipment supplied by service conductors is not specifically noted as is done in (B)(4) for Manufactured Homes.

Panel Meeting Action: Reject

Panel Statement:

The grounding requirements for mobile home lot service equipment do not differ from grounding requirements for service equipment installed in or at any other occupancy. It is not necessary to provide general references to the parts of Article 250 that apply to the grounding of services.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-64 Log #701 NEC-P19 (550-32(B)(2)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
(2) The installation of the service ~~equipment~~ complies with Article 230.

Substantiation:

Edit. Installation requirements should apply to the entire service, not just service-equipment.

Panel Meeting Action: Reject

Panel Statement:

This section applies specifically to service equipment for manufactured homes, thus the existing text, specific to service equipment, is correct.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-65 Log #3117 NEC-P19 **Final Action: Reject**
(550-32(B)(7))

Submitter: Thomas J. Garvey, State of Wisconsin

Recommendation:

Replace the first word of the red warning label with: "Warning Service Equipment Only" (Remainder of Label to remain the same).

Substantiation:

Installers observe that the panelboard supplied with the most homes is "suitable for use as service equipment". Yet it is not often connected for use as a service panel. Supplying a feeder panel with service conductors creates a shock hazard. The revised label wording should assist in a correct installation.

Panel Meeting Action: Reject

Panel Statement:

The label required by 550.32(B)(7) has a different function than the labels required for product standard compliance. Additionally this requirement harmonizes with NFPA 501 and HUD 3280.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-66 Log #2252 NEC-P19 **Final Action: Reject**
(550-33)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
550.33 Feeder.
(A) Feeder Conductors. Feeder conductors shall consist of either a listed cord, factory installed in accordance with 550.10(B), or a permanently installed feeder consisting of four, insulated, color-coded conductors that shall be identified by the factory or field marking of the conductors in compliance with 310.12. Equipment grounding conductors shall not be identified by stripping the insulation.
Exception: "Where a feeder is installed between service equipment and a disconnecting means as covered in 550.32(A), it shall be permitted to omit the equipment grounding conductor where the ~~grounded~~ earth circuit conductor is grounded at the disconnecting means as required in..."

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP-19 that changing the existing terminology will result in enhanced understanding of this concept. CMP-19 does recommend to CMP-1 that a FPN referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-67 Log #1972 NEC-P19 **Final Action: Reject**
(550-33(A) Exception)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
Exception: Where a feeder is installed between service equipment and a disconnecting means as covered in 550.32(A), it shall be permitted to omit the equipment ~~grounding~~ bonding conductor where the grounded circuit conductor is grounded at the disconnecting means as required in 250.32(B).

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Bonding is defined in the NEC as the permanent joining of metallic parts together to form a conductive path. Grounding is defined in the NEC as the connection of the bonded parts to earth. The proposed change to rename this conductor does not clarify the confusion indicated by the submitter.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 2

Ballot Not Returned: 1 Zieman

Explanation of Negative:

SABIN-MERCADO: "Grounded" and "grounding" sound similar but are intended to describe two totally different concepts. However, these terms are often used interchangeably by users of the NEC. In fact, there are places in the NEC where these terms are used interchangeably. The words ground, grounded and grounding will apply to the concept of connecting an electrical system to the earth. While the words bond, bonded and bonding will apply to the concept of connecting together noncurrent carrying conductive parts likely to become energized so that they form an effective ground fault path back to the source. If the terms are not similar, the concepts can be more easily differentiated by the users. I think this change will greatly improve usability and understanding of the NEC. This issue needs to be brought forth through the Technical Correlating Committee.

ZANICCHI: The term "bonding" is technically correct for this conductors application. This conductor is there to "bond" equipment to the "system grounded conductor, the grounding electrode conductor or both" at the service equipment as stated in Article 100. The use of the term "bonding" instead of "grounding" does not change the function of the conductor but it will help make the code more understandable. An example: A journeyman says to their apprentice "That 3 phase 208v mixer needs to be grounded". The apprentice asks themselves "does the journeyman mean that this mixer needs a grounded conductor brought to it? If we used the term "bonded" instead of "grounded" the journeyman would have said "That 3 phase 208v mixer needs to be bonded". Clearly, the separation of the terms grounded and bonded makes the journeyman's statement easier to understand. I hope that other panels consider making this change, especially Panel 5 which deals with Article 250, and that we "Accept in Principal" the change as I believe it will make a difference in the usability of the code.

19-68 Log #641 NEC-P19 **Final Action: Accept in Part**
(550-33(A) and (b))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
(A) Feeder Assembly Conductors. Feeder assembly conductors shall..." (remainder unchanged).
(B) ~~Adequate~~ Feeder and Service Conductor Capacity. Mobile home and manufactured home lot ~~feeder~~ supply conductors shall have ~~adequate~~ an ampacity not less than ~~for~~ the loads supplied and shall be rated not less than 100 amperes. ~~at 120/240 volts.~~

Substantiation:

If (A) is intended to cover feeder assemblies and not feeder conductors covered in (B), it should be specific. Some mobile home lots are supplied by service conductors, which should be included in (B). "Adequate" is a vague term to be avoided per the Style Manual. Voltage rating is superfluous as conductor ampacities are not based on voltage.

Panel Meeting Action: Accept in Part

The panel accepts the recommendation to delete "adequate" and to add "an" and "not less than". The panel rejects all of the other recommended changes.

Panel Statement:

The rejected portions of the recommendation do not provide additional clarity to the requirement. It is necessary to retain the reference to the supply system voltage to emphasize that this is the only type of supply system permitted.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-68a Log #CP1904 NEC-P19 **Final Action: Accept**
(551.4(B))

TCC Action:

See Technical Correlating Committee note on Proposal 19-73. This action will be considered by the panel as a public comment.

Submitter: Code-Making Panel 19

Recommendation:

Revise this section and add new FPN to read:
(B) Systems. This article covers combination electrical systems, generator installations, and 120- or 120/240-volt, nominal, systems.
FPN: For information on low-voltage systems refer to NFPA 1192-2002, Standard on Recreational Vehicles and ANSI/RVIA 12V-2000, Standard for Low-Voltage Systems in Conversion and Recreational Vehicles.

Substantiation:

Based on the panel's acceptance of Proposal 19-73 this revision and new Fine Print Note is necessary for correlation and to provide guidance on where to find installation requirements for low voltage systems in recreational vehicles.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 11 Negative: 1

Ballot Not Returned: 1 Zieman

Explanation of Negative:

LAROCCA: See my Explanation of Negative Vote on Proposal 19-73.

19-69 Log #703 NEC-P19 **Final Action: Reject**
(551-1)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
Scope. The provisions of this article cover the electrical conductors installed within or on recreational vehicles, <u>including units designated as camping trailer, travel trailer, or park trailer.</u> (remainder unchanged).

Substantiation:

The intent of this proposal is to specifically incorporate park trailers of Article 552 into this article. The definitions of 551.2 for camping trailer, recreational vehicle, and travel trailer, along with 552.2 definition of park trailer are not definitive and one unit may fit several definitions. For example the definition of recreational vehicle encompasses camping trailer, travel trailer, and park trailer. A travel trailer with less than 300 sq. foot area is within the definition of park trailer. Section 552.1 suggests that provisions of this article may apply to park trailers. However, since this is a separate article for park trailers, it is not clear which provisions of Articles 550 and 551 are intended to apply. Many provisions of Article 552 are virtually verbatim repeats of provisions in Article 551.

Panel Meeting Action: Reject

Panel Statement:

Scope statements are not within the jurisdiction of the panel and are the responsibility of the Technical Correlating Committee. The panel recommends that the TCC reject this proposal to change the article scope. Incorporating park trailers into the scope of Article 551 would negate the basic premise of creating Article 552, (refer to the panel substantiation on Proposal 19-133A found on page 659 of the 1995 NEC ROP). Park trailers then and now are a hybrid unit that do not fall under either Article 550 or 551. Additionally the assertion that park trailers are included within the definition of recreational vehicle is not correct.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-70 Log #2253 NEC-P19 **Final Action: Reject**
(551-2)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:

551.2 Definitions. (See article 100 for additional definitions.)

Air-Conditioning or Comfort-cooling Equipment. all of that equipment intended or installed for the purpose of processing the treatment of air so as to control simultaneously its temperature, humidity, cleanliness, and distribution to meet the requirements of the conditioned space.

Appliance, Fixed. An appliance that is fastened or otherwise secured at a specific location.

Appliance. Portable. An appliance that is actually moved or can easily be moved from one place to another in normal use.

FPN: For the purpose of this article, the following major appliances, other than built-in, are considered portable if cord connected; refrigerators, range equipment, clothes washers, dishwashers without booster heaters, or other similar appliances.

Appliance, Stationary. An appliance that is not easily moved from one place to another in normal use.

Camping Trailer. A vehicular portable unit mounted on wheels and constructed with collapsible partial side walls that fold for towing by another vehicle and unfold at the campsite to provide temporary living quarters for recreational, camping, or travel use. (See recreational Vehicle.)

Converter. A device that changes electrical energy from one form to another, as from alternating current to direct current.

Dead Front (as applied to switches, circuit breakers, switchboards, and distribution panelboards). Designed, constructed, and installed so that no current-carrying parts are normally exposed on the front.

Disconnecting Means. The necessary equipment usually consisting of a circuit breaker or switch and fuses, and their accessories, located near the point of entrance of supply conductors in a recreational vehicle and intended to constitute the means of cutoff for the supply to that recreational vehicle.

Distribution Panelboard. A single panel or group of panel units designed for assembly in the form of a single panel, including buses, and with or without switches and/or automatic overcurrent-protective devices for the control of light, heat, or power circuits of small individual as well as aggregate capacity; designed to be placed in a cabinet or cutout box placed in or against a wall or partition and accessible only from the front.

Frame. Chassis rail and any welded addition thereto of metal thickness of 1.35 mm (0.053 in.) or greater.

Low Voltage. An electromotive force rated 24 volts, nominal, or less, supplied from a transformer, converter, or battery.

Motor Home. a vehicular unit designed to provide temporary living quarters for recreational, camping, or travel use built on or permanently attached to a self-propelled motor vehicle chassis or on a chassis cab or van that is an integral part of the completed vehicle. (See Recreational Vehicle.)

Power-Supply Assembly. The conductors, including ungrounded, ~~grounded~~ earth, and equipment grounding conductors, the connectors, attachment plug caps, and all other fittings, grommets, or devices installed for the purpose of delivering energy from the source of electrical supply to the distribution panel within the recreational vehicle.

Recreational Vehicle. A vehicular-type unit primarily designed as temporary living quarters for recreational, camping, or travel use, which either has its own motive power or is mounted on or drawn by another vehicle. The basic entities are travel trailer, camping trailer, truck camper, and motor home.

Recreational Vehicle Park. a plot of land upon which two or more recreational vehicle sites are located, established, or maintained for occupancy by recreational vehicles of the general public as temporary living quarters for recreation or vacation purposes.

Recreational Vehicle Site. A plot of ground within a recreational vehicle park set aside for the accommodation of a recreational vehicle on a temporary basis. It can be used as either a recreational vehicle site or as a camping unit site.

Recreational vehicle Site Feeder Circuit Conductors. The conductors from the park service equipment to the recreational vehicle site supply equipment.

Recreational vehicle Site Supply Equipment. The necessary equipment, usually a power outlet, consisting of a circuit breaker or switch and fuse and their accessories, located near the point of entrance of supply conductors to a recreational vehicle site and intended to constitute the disconnecting means for the supply to that site.

Recreational Vehicle Stand. that area of a recreational vehicle site intended for the placement of a recreational vehicle.

Transformer. A device that, when used, raises or lowers the voltage of alternating current of the original source.

Travel Trailer. A vehicular unit, mounted on wheels designed to provide temporary living quarters for recreational, camping, or travel use, of such size or weight as not to require special highway movement permits when towed by a motorized vehicle, and of gross trailer area less than 30 m2 (320 ft^2). (See Recreational Vehicle.)

Truck Camper. A portable unit constructed to provide temporary living quarters for recreational, travel, or camping use, consisting of a roof, floor, and sides, designed to be loaded onto and unloaded from the bed of a pick-up truck. (See recreational Vehicle).

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP-19 that changing the existing terminology will result in enhanced understanding of this concept. CMP-19 does recommend to CMP-1 that a

~~changing the existing terminology will result in enhanced understanding of this concept. CMP-19 does recommend to CMP-1 that a~~ FPN referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-71 Log #566 NEC-P19 **Final Action: Reject**
(551-2– Low voltage)

Submitter: Bruce A. Hopkins, Recreation Vehicle Industry Assn.

Recommendation:

Delete the definition of "Low Voltage".

Substantiation:

Low Voltage requirements (Article 551) of the NEC are no longer referenced within the RV Standard NFPA 1192 for Recreational Vehicles. Instead, NFPA 1192 now references the ANSI/RVIA Low Voltage Systems in Conversion and Recreational Vehicles, 2002 edition, for all low voltage requirements. Therefore, all NEC Article 551 RV low voltage requirements can be deleted without jeopardizing safety.

Panel Meeting Action: Reject

Panel Statement:

This definition is necessary due to the presence of requirements for combination electric systems in Article 551.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-72 Log #685 NEC-P19 **Final Action: Accept**
(551-3)

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and consider deleting section 551-3 since the issue is already covered by 90.3. This action will be considered by the panel as a public comment.

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Wherever the ~~requirements~~ provisions of other articles of this Code and Article 551 differ, the ~~requirements~~ provisions of Article 551 shall apply.

Substantiation:

Edit. The Code contains requirements (rules) which are mandatory and provisions which are permissive but not mandatory, which should be specifically permitted. Similar wording is other Code sections. The word "provisions" includes mandatory and permissive rules.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-73 Log #563 NEC-P19 **Final Action: Accept**
(551-10(A) Thru (H))

TCC Action:

It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.

Submitter: Bruce A. Hopkins, Recreation Vehicle Industry Assn.

Recommendation:

Delete section II Low-Voltage Systems (551.10(A) through (H)).

Substantiation:

Low Voltage requirements (551-10) of the NEC are no longer referenced within the RV Standard NFPA 1192 for Recreational Vehicles. Instead, NFPA 1192 now references the ANSI/RVIA Low Voltage Systems in Conversion and Recreational Vehicles, 2002 edition, for all low voltage requirements. Therefore, all NEC Article 551 RV low voltage requirements can be deleted without jeopardizing safety.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 2

Ballot Not Returned: 1 Zieman

Explanation of Negative:

LAROCCA: All NEC Article 551 RV low voltage requirements cannot be deleted without jeopardizing safety. The 12 Volt wiring systems used in Recreational Vehicles are not energy limited to Class 2 levels and represent a potential risk of fire. The requirements contained in ANSI/RVIA 12 V-2002, Low Voltage Systems in Conversion and Recreational Vehicles are not equivalent to the current requirements in 551.10(A) through (H) of the National Electrical Code, NFPA 70-2002. Specific areas that are not equivalent are:

Paragraph 3-2 of ANSI/RVIA 12V-2002 allows overcurrent protection as permitted by the OEM in addition to the ratings based on the recognized ampacity values of Table 1 (NEC Table 551.10(E)(1), and Table 2 (SAE ampacity ratings). This would allow overcurrent protection to be higher than any of the currently recognized wiring ampacity values with a potential increase in the risk of fire.

Paragraph 4-2 of ANSI/RVIA 12V-2002 incorporates the wording of 551.10(B)(2) but omits the requirement for conductors in sizes 6 through 18 AWG or SAE to be Listed. UL currently lists wire to SAE standards. Listing ensures that the wire actually meets the requirements of the referenced wire standards, and follow-up service ensures that it continues to meet these requirements. Omitting the requirement for listing eliminates this control on the construction of the wiring used in RVs with a potential increase in the risk of fire.

Paragraph 4-4 of ANSI/RVIA 12V-2002 omits the requirement for the wires to be surface printed at maximum 4 foot intervals, as contained in 551.10(B)(3) of the NEC. This may create difficulties for AHJs or other certification authorities that will need to verify wire ratings, determine ampacities, and ultimately assess overcurrent protection ratings.

The minimum circular mil areas for some wire sizes contained in Table 3 of ANSI/RVIA 12V-2002 are less than those required by either Table 8 of the NEC, Table 20 of UL 1581 or SAE J1128.

551.10(E)(3) of the NEC currently requires motors controlled by automatic switching mechanisms or latching switches to have overload protection in accordance with 430.32(B). This requirement does not exist in ASNI/RVIA 12V-2002.

TIPTON: 90.2(A)(1) states that recreational vehicles are to be covered by the National Electrical Code. 551.1 Scope makes it very clear that electrical systems in recreational vehicles are to be installed in accordance with NFPA 70.

Therefore, it would seem more appropriate to bring the requirements of ANSI/RVIA Low Voltage systems into the NEC where the full consensus process is applied.

19-74 Log #690 NEC-P19 **Final Action: Reject**
(551-10(C)(4))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise last sentence:
In the event the <u>unbonded</u> ~~power~~ lead from the battery...(remainder unchanged).

Substantiation:

Edit. All leads from the battery supply power, whether bonded or unbonded.

Panel Meeting Action: Reject

Panel Statement:

This section is no longer contained in Article 551. See the panel action on Proposal 19-73.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-75 Log #675 NEC-P19 (551-20(F)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add new text to read as follows:
A durable and permanent label conforming to 551.46(D) shall be provided at the external connection for low-voltage power, with letters not less than 6 mm (1/4 in.) high that read THIS CONNECTION IS FOR VOLT POWER. The correct voltage rating (12 or 24 volts) shall be marked in the blank space.

Substantiation:

The proposed labeling may deter an unqualified person from adapting 125 volt supply assemblies to accommodate the vehicle low-voltage flanged inlet or connecting device.

Panel Meeting Action: Reject

Panel Statement:

There is no indication that this change is necessary, as the requirements already specify that the connectors have a different configuration to prevent the inadvertent connection of 120 volt power.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-76 Log #629 NEC-P19 (551-31(B)) **Final Action: Accept**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete.

Substantiation:

There is no calculation of loads provided in 551.42.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-77 Log #1673 NEC-P19 (551-32) **Final Action: Accept**

Submitter: Bruce Hopkins, Recreation Vehicle Industry Assn.

Recommendation:

Revise the first sentence as follows:
Other sources of ac power, such as inverters ~~or,~~ motor generators or engine generators, shall be listed for use in recreational vehicles and installed in accordance with the terms of the listing.

Substantiation:

This revision would clarify that "engine" generator sets that are currently being installed in RVs must also carry a listing for RV use.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-78 Log #707 NEC-P19 **Final Action: Reject**
(551-33 (New))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add:
551.xx Lighting Outlets Required At least one wall switch-controlled lighting outlet shall be installed in kitchens and bathrooms, and to provide illumination on the exterior of outside entrances of (motor homes, travel trailers, and truck campers). (alternate choice in parentheses).

Substantiation:

Lighting outlets should be a requirement in the locations noted to reduce the likelihood of use of portable lamps or makeshift lighting which may be potentially hazardous.

Panel Meeting Action: Reject

Panel Statement:

The submitter did not provide sufficient technical substantiation to support this change to equate recreational vehicle requirements with those for dwelling units.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-79 Log #2254 NEC-P19 **Final Action: Reject**
(551-40)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text to read as follows:
551.40 120-volt or 120/240-volt- Nominal, Systems.
(A) General Requirements. The electrical equipment and material of recreational vehicles indicated for connection to a wiring system rated 120 volts, nominal, 2-wire with ground, or a wiring system rated 20/240 volts, nominal, 3-wire with ground, shall be listed and installed in accordance with the requirements of Parts I, III, IV, V, and VI of this article.
(B) Materials and equipment. Electrical materials, devices, appliances, fittings, and other equipment installed in, intended for use in, or attached to the recreational vehicle shall be listed. All products shall be used only in the manner in which they have been tested and found suitable for the intended use.
(C) Ground-Fault circuit-Interrupter Protection. The internal wiring of a recreational vehicle having only one 15- or 20-ampere branch circuit as permitted in 551.42(A) and (B) shall have ground-fault circuit interrupter protection for personnel. The ground-fault circuit interrupter shall be installed at the point where the power supply assembly terminates within the recreational vehicle. Where a separable cord set is not employed, the ground-fault circuit interrupter shall be permitted to be an integral part of the attachment plug of the power supply assembly. The groundfault circuit interrupter shall provide protection also under the conditions of an open ~~grounded~~ earth circuit conductor, interchanged circuit conductors, or both.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word ground or grounded is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the Code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP 19 that changing the existing terminology would result in enhanced understanding of this concept. CMP 19 does recommend to CMP 1 that a fine print note referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-80 Log #3090 NEC-P19 **Final Action: Accept**
(551-40(A))

Submitter: Barry Bauman, Alliante Energy

Recommendation:

Add the following sentence to the end of paragraph: Electrical equipment connected line-to-line shall have a voltage rating of 208-230 volts.

Substantiation:

Many recreational vehicle parks require a service larger than is available from a single-phase service or they require a 3-phase service for 3-phase loads. Due to the unavailability of 120/240-volt 3-phase service from the providing utility, the park will be served with a 120/208-volt 3-phase service. As newer recreational vehicles add more electrical amenities line-to-line connected electrical equipment may be used. Requiring the recreational park owner to install a transformer to convert from 120/208-volt to 120/240-volt for line-to-line connected equipment is an unnecessary burden. Requiring any line-to-line connected equipment to be rated 208-230 volts will prevent future voltage incompatibility problems.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-81 Log #699 NEC-P19 **Final Action: Reject**
(551-41(B)(c))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add to (B):
(4) At least one readily accessible 125-volt 15- or 20-ampere receptacle outlet shall be installed on the exterior of the unit.

Revise (C): Except where ground-fault circuit-interruptor protection is provided in accordance with 551.40(C), ~~Where provided~~ each 125-volt, single phase 15- or 20-ampere receptacle in the following locations shall have ground-fault circuit-interruptor protection for personnel.
(1) ~~Adjacent to a bathroom lavatory~~ Within 1.8 m (6 ft) of any lavatory or sink.
(2) Where the receptacles are installed to serve the kitchen countertop surfaces. ~~And are within 1.8 m (6 ft) of any lavatory or sink.~~
Exception No. 1: No change
Exception No. 2: No change
Exception No. 3: No change
(3) In the area occupied by a toilet, shower, tub, or any combination thereof.
(4) On the exterior of the vehicle

Exception No. 1: Single receptacles that are located inside a compartment ~~of an access panel~~ that is ~~installed on~~ directly accessible from the exterior and supplies ~~to supply~~ power for an installed ~~appliance~~ utilization equipment shall not be required to have ground-fault circuit-interrupter protection.

Exception No. 2: A single receptacle installed to supply a pipe heating cable shall not be required to have ground-fault circuit-interruptor protection.

A receptacle outlet shall be permitted in a listed luminaire (lighting fixture). A receptacle shall not be installed in or ~~a tub or combination tub-shower compartment~~ within reach 750 mm (30 in.) of a shower or bathtub space. Receptacles required by this section shall be in addition to any receptacle that is part of a luminaire (lighting fixture) or appliance, located within cabinet or cupboards, or located more than 1.7 m (5 1/2 ft.) above the floor.

Substantiation:

There is no requirement for an exterior receptacle for a wired motor home, truck camper, camping trailer, or travel trailer. However, if the unit is defined as a park trailer, 552.4(E) requires an outdoor receptacle (based on safety, per 90.1). Safety considerations should be no less for occupants of units covered by this article.

The proposal clarifies that where entire circuit GFCI protection is provided, additional protection is not required for receptacles.

"Adjacent" is a vague term. The proposed (C)(1) provides specific distance and applies to any lavatory. The wording tracks 551.1(C)(2). The proposed (C)(2) specified kitchen countertop surfaces and removes the distance specification and sink requirement, which are not required in 210.8(a); what justifies a less stringent requirement for recreational vehicles? Countertop receptacles not in the kitchen would not be included unless within 6 ft. of a sink. Section 210.8(A) and (B) require kitchen countertop receptacles in dwelling units and kitchen receptacles in other than dwelling units to have GFCI protection regardless of proximity to a sink. What justifies a less stringent requirement for recreational vehicles.

A multiple receptacle installed in accordance with the present exception for (C)(4) invites use for other purposes, especially since an exterior general-use receptacle is not presently required.

Present literal wording does not prohibit a receptacle in a shower-only space and does not provide for a space separation as does 550.13. The Style Manual indicates similar requirements should be similarly worded.

Receptacles in a lighting fixture on the ceiling or at a height above 5 1/2 ft. should not be permitted as required receptacles. Section 552.41(A) specifies wall spaces. Section 210.52 does not permit receptacles in fixtures or above 5 1/2 ft. to be counted as required receptacles. Receptacles that serve kitchen countertop spaces should have GFCI protection, as is required in 210.8(A) and (B) regardless of distance from a sink. The potential hazard of metal countertops or rims connected to a metal sink with a grounded disposal, and grounded surfaces of dishwashers, microwave ovens, ranges, etc. does not disappear beyond the 6 ft distance from a sink.

Panel Meeting Action: Reject

Panel Statement:

The submitter did not provide sufficient technical substantiation to support this change to equate recreational vehicle requirements with those for dwelling units.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-82 Log #799 NEC-P19 **Final Action: Reject**
(551-42(C) and (D))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise second sentence of (C) as follows:
Such recreational vehicles shall be equipped with a 30-ampere rated distribution panelboard... (remainder unchanged).
Revise (D) as follows:
A 50-ampere 120/250-volt power-supply assembly and 50-ampere rated distribution panelboard shall be used where six or more circuits are employed. The load ~~distribution~~ shall ~~ensure a reasonable current balance between phases~~ be balanced as much as practicable between the two ungrounded conductors.

Substantiation:

Power supply assembly does not include the panelboard; no rating is specified. Though "reasonable" and "practicable" are possibly vague and unenforceable, the former is basically opinion related and the latter is possibility related. Since the supply is single-phase it may be more correct to specify a load balance between ungrounded conductors.

Panel Meeting Action: Reject

Panel Statement:

The proposed text places an unnecessary restriction on the rating of the distribution panelboard. The existing text of the requirement has not been problematic to the manufacturers of these units.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-83 Log #929 NEC-P19 **Final Action: Reject**
(551-42(D))

Submitter: James W. Finch, Kampgrounds of America, Inc. (KOA)

Recommendation:

Revise text as follows:
551.42(D) More than Five Circuits ~~Without a Listed Energy Management System~~. A 50-ampere 120/240-volt power-supply assembly shall be used where six or more circuits are employed. The load distribution shall ensure a reasonable current balance between phases.
Exception: If the calculated load for a recreational vehicle exceeds the capability of a 50-amp/240-volt system, a listed energy management system rated at 50-amps maximum can be employed within the system.

Substantiation:

There is a demand for recreational vehicles to have more appliances that are electrical rather than propane. When the water heater, stovetop, oven and even heating systems are done with electricity instead of propane, the additional demand for these all electric units exceeds the potential of the 50-amp/240-volt service.
There currently is not a cord and plug configuration that is designed for a load larger than 50-amp/240-volt unless a pin and sleeve application is used. Between the size of the cord and configuration of pin and sleeve connections, I do not believe that this would be a practical solution.
Multiple cords from the recreational vehicle to the campground campsite electrical service would create a major overload problem on existing campground circuits because of the way that they have been designed and wired.
The precedent has already been set to use listed energy management systems in recreational vehicles that have more than five 15- or 20-amp circuits on a 30-ampere rated main power-supply assembly. This is an opportunity for a manufacturer to provide the same type of energy management system for a 50-ampere rated main power-supply assembly because the pedestal wiring is only sized for the largest receptacle in the pedestal per NEC 551.73.

Panel Meeting Action: Reject

Panel Statement:

The proposed deletion is not acceptable, as the load management feature is necessary for 30 ampere systems.
In regard to the proposed exception, the current text of the NEC does not prohibit manufacturers from developing this type of energy management equipment as a method to control the electrical load in a recreational vehicle.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-84 Log #800 NEC-P19 **Final Action: Reject**
(551-43(C))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
If more than ~~one~~ a single receptacle or load... (remainder unchanged).

Substantiation:

Edit. One receptacle could be a duplex, triplex, or quadriplex type on one strap or yoke. Single receptacle is defined in Article 100, and more appropriate.

Panel Meeting Action: Reject

Panel Statement:

The panel concludes that the current language is appropriate based on 210.21(B)(2) and (B)(3).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-85 Log #689 NEC-P19 **Final Action: Reject**
(551-44(A), (B), (C))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete the phrase "or larger".

Substantiation:

The definition of power assembly in 551.2 includes attachment plug caps; 551.46(C) specifies 15-, 20-, and 30-ampere attachment plugs for (A) (B) (C).

Panel Meeting Action: Reject

Panel Statement:

The proposed text limits the manufacturer's flexibility and does not improve safety.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-86 Log #2255 NEC-P19 **Final Action: Reject**
(551-45(A))

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text as follows:
551.45 Distribution Panelboard.
(A) Listed and Appropriately Rated. A listed and appropriately rated distribution panelboard or other equipment specifically listed for the purpose shall be used. The ~~grounded~~ earth conductor termination bar shall be insulated from the enclosure as provided in 551.54(C). An equipment grounding terminal bar shall be attached inside the metal enclosure of the panelboard.
(B) Location. The distribution panelboard shall be installed in a readily accessible location. Working clearance for the panelboard shall be not less than 600 mm (24 in.) wide and 750 mm (30 in.) deep. (Text Missing)
shall be equipped with an attachment plug of the type described in 551.46(C). Where the cord passes through the walls or floors, it shall be protected by means of conduit and bushings or equivalent. The cord assembly shall have permanent provisions for protection against corrosion and mechanical damage while the vehicle is in transit.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word "ground" or "grounded" is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP 19 that changing the existing terminology would result in enhanced understanding of this concept. CMP 19 does recommend to CMP 1 that a fine print note referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-85a Log #CP1911 NEC-P19 **Final Action: Accept**
(551.45(A))

Submitter: Code-Making Panel 19

Recommendation:

Revise 551.45(A) to read:
A listed and appropriately rated distribution panelboard or other equipment specifically listed for this purpose shall be used.

Substantiation:

Based on the Usability Task Group's request to review all occurrences of the phrase "listed for the purpose" to ensure that it provides clear direction, the panel concludes the revised language clarifies its use in this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-87 Log #631 NEC-P19 **Final Action: Reject**
(551-46(C)(1), (2), (3),(4))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add: "and flanged surface inlet, where used" after "attachment plug".

Substantiation:

Edit. Power supply assemblies covered in (A)(1) of this section require a flanged surface inlet which is inferred to be the same as an attachment plug cap. However, the definition of attachment plug in Article 100 indicates it is connected to a flexible cord, while a flanged surface inlet is not.

Panel Meeting Action: Reject

Panel Statement:

The proposed text is more than an editorial clarification. The flanged surface inlets used are not always the same configurations used as the attachment plug.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-88 Log #784 NEC-P19 **Final Action: Reject**
(551-46(C)(5) (New))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add:
(5) Attachment Plug Cap. If a right-angle cap is used, the configuration of the cap and receptacle shall be oriented so that when the cap is inserted the cord extends directly downward from the cap.

Substantiation:

The proposal is intended to reduce strain on the conductors which may be caused by 90 or 180° bends in the cord at the receptacle.

Panel Meeting Action: Reject

Panel Statement:

The current text provides necessary requirements for the receptacle configuration. Arranging the receptacle so that the cord will hang freely is the responsibility of the receptacle installer.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-89 Log #564 NEC-P19 **Final Action: Accept in Principle**
(551-46(E) Exception No. 3 (New))

Submitter: Bruce A. Hopkins, Recreation Vehicle Industry Assn.

Recommendation:

Add new Exception 3 as follows:
Exception No. 3: Recreational vehicles designed for transporting livestock shall be permitted to have the electrical point of entrance located on either side.

Substantiation:

These units do not typically use traditional RV parks, and should not be restricted regarding power cord location. These units are often designed with left side primary entrances, thus requiring additional flexibility in the location of the power supply entrance location.

Panel Meeting Action: Accept in Principle

Revised proposed new Exception No. 3 to read:
Recreational vehicles designed for transporting livestock shall be permitted to have the electrical point of entrance located on either side or the front.

Panel Statement:

The panel concurs with the submitter's substantiation and has amended the proposed text to also permit the electrical connection at the front of the recreational vehicle.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-90 Log #694 NEC-P19 **Final Action: Reject**
(551-47(K))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:
Physical Damage. Where likely to be subject to physical damage... (remainder unchanged).

Substantiation:

Edit. All exposed cable is subject to damage; Section 110.27(B) uses the phrase "likely to be" which more specifically allows for judgment based on conditions.

Panel Meeting Action: Reject

Panel Statement:

This section requires the AHJ to assess the installation for compliance. The proposed text does not provide any additional insight to the AHJ in making this assessment.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-91 Log #792 NEC-P19 **Final Action: Accept in Part**
(551-47(N))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete present wording and substitute: Moisture or Physical Damage. Where exterior wiring is 120 volts, nominal, or over, the conductors shall be installed in rigid metal conduit or intermediate metal conduit, except that where not likely to be subject to physical damage electrical metallic tubing, rigid nonmetallic conduit, Type MI cable or other raceway or cable identified for the application that is closely routed against vehicle frames or surfaces shall be permitted.

Substantiation:

Routing may enhance protection but this section does not indicate it eliminates exposure to damage. Sections 352.12(C) and 358.12 prohibit EMT and RNMC where subject to physical damage. Type MI cable is resistant to damage and watertight and doesn't require boxes or conduit bodies where installed with more than 360 degrees of bends.
Section 110.27(B) uses the phrase "likely to be" re; damage.

Panel Meeting Action: Accept in Part

Revise the text to read:
Where outdoor or under-chassis wiring is 120 volts, nominal, or over and is exposed to moisture or physical damage, the wiring shall be protected by rigid metal conduit, by intermediate metal conduit, or by electrical metallic tubing, rigid nonmetallic conduit, or Type MI cable, that is closely routed against frames and equipment enclosures or other raceway or cable identified for the application.

Panel Statement:

The panel accepts the recommendation to add Type MI cable as an acceptable wiring method under the chassis. The remainder of the recommendation is rejected, as the proposed text does not enhance the clarity and field application of this requirement.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-92 Log #1674 NEC-P19 **Final Action: Reject**
(551-47(P)(1))

TCC Action:

It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. This action will be considered by the panel as a public comment.

Submitter: Bruce Hopkins, Recreation Vehicle Industry Assn.

Recommendation:

Add a new sentence after the second sentence of (1) to read as follows:
Flexible cord shall be permitted to enter a wall or floor for a total length of 12" before terminating.

Substantiation:

The use of flexible cord in this application is permitted by NEC 400-7(A)10 - Connection of moving parts. Providing a length of 12" allows the transition from flexible cord to NM cable to be made in an interior location. This would not compromise the intent of this requirement, or the serviceability of the flexible cord. Also, this minimizes the number of splices needed, and allows use of an interior rather than an exterior junction box, enhancing safety in both cases.

Panel Meeting Action: Reject

Panel Statement:

While the use of a flexible cord is permitted for this application by 551.47(P)(1), that section also requires conformance with all provisions of Article 400. The use within walls or floors is prohibited by 400.8(2) and (5).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 11 Negative: 1

Ballot Not Returned: 1 Zieman

Explanation of Negative:

HOPKINS: This proposal should be accepted. The panel statement reads: "While the use of flexible cord is permitted for this application by 551.47(P)(1); that section also requires conformance with all provisions of Article 400. The use within walls or floors is prohibited by 400.8(2) and (5)."

While I agree with the panel's comment that paragraph 551.47(P)(1) states all provisions of Article 400 apply, the panel did not discuss the balance of the sentence in paragraph 551.47(P)(1) including the statement that the cord and connections shall be considered as a permitted use under 400.7. Further, the opening statement of 400.8 reads, "Unless specifically permitted in 400.7, flexible cords and cables shall not be used... ." Therefore, since the cord and its connections are specifically permitted in 400.7, items (2) and (5) under 400.8 are not applicable.

It remains our contention that routing a flexible cord inside the walls of a slide out for up to 12 inches is not a safety concern. The flexible cable is afforded the same protection as nonmetallic sheathed cable. This includes supports within 8 inches of the outlet box and sleeve protection through structural members. Furthermore, the flexible cords used in slide-out applications are designed for outdoor use and are typically rated SJ or better. The jacket of these outdoor flexible cords is certainly more durable than nonmetallic sheathed cable.

Finally, if the proposal is not accepted, manufacturers will be required to make a transition between the SJ cord and the nonmetallic sheathed cable in a junction box on the vehicle exterior. This additional connection on the outside of the unit, will not enhance safety, but will potentially reduce safety.

Comment on Affirmative:

TIPTON: While I agree with the panel action and would not support the expansion of the use of cords in a wall, it has been my observation that the junction box under the floor is a potential problem point also. Perhaps a flexible liquid tight conduct system would be a better wiring method.

19-93 Log #803 NEC-P19 (551-47(Q)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:

Prewiring for Central Type Air Conditioning Installations. Prewiring installed for the purpose of facilitating future air conditioning installation shall conform to the applicable ~~portions~~ provisions of this article and the following:

(1) An overcurrent protective device with a rating in accordance with the ampacity of the circuit conductors as specified in 310.5 shall be installed in the distribution panelboard and wiring connections completed. The provisions of 240.4(B) shall be permitted. The circuit shall be identified "air conditioning" at the panelboard.

(2) The load end of the circuit conductors shall terminate in a ~~junction~~ box with a blank cover or a listed device ~~listed for the purpose. Where a junction box with a blank cover is used, the free~~ Free ends of the conductors shall be fully insulated. ~~adequately capped or taped.~~

(3) A label conforming to 551.46(D) shall be permanently fastened ~~placed~~ on or next to the ~~junction~~ box or device with letters not less than 6 mm (1/4 in.) high and shall read:

AIR CONDITIONING CIRCUIT
THIS CONNECTION CIRCUIT IS FOR AIR CONDITIONERS RATED
_____VOLTS AC 60 HZ _____AMPERES MAXIMUM
DO NOT EXCEED ~~CIRCUIT~~ MAXIMUM RATING

~~An~~ A voltage rating 115 or 230, as applicable and an ampere rating not to exceed 80 percent of the circuit ~~rating~~ conductor ampacity shall be legibly and durably marked in the blank spaces.

(4) The circuit shall serve no other purpose.

Substantiation:

An overcurrent device "compatible with the circuit conductors is vague and inconsistent with other Code language. Section 314.1 indicates the terms "junction", "outlet", "device" and "pull" indicate the usage of boxes. The described box may more accurately be described as an "outlet" box. The phrase "fully insulated" is more specific than "adequately capped or taped".

This section appears intended to cover central type air conditioners since circuits for future room air conditioners are covered by other Code rules. An overcurrent device "compatible with the circuit conductors" is vague and inconsistent with other Code language.

Section 314.1 indicates the terms "junction" "outlet", "pull" and "device" indicate usage of the boxes; the described box may more accurately be an "outlet" box.

The phrase "fully insulated" is more specific, and "adequately" is a vague term per 3.2.1 of the Style Manual.

Since nothing in this article prohibits a 240-volt circuit, label marking should allow for such circuit. Proposed voltage ratings are derived from Table 430.148.

Circuit ratings are determined from the overcurrent device rating which may not always match allowable conductor ampacity. Instructions should be not to exceed the maximum rating permitted for the air conditioner.

Panel Meeting Action: Reject

Panel Statement:

This requirement has provided for safe application in the field for many years, and the submitter has not provided a substantive reason to modify this requirement.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-93a Log #CP1912 NEC-P19 (551.47(Q)(2)) **Final Action: Accept**

Submitter: Code-Making Panel 19

Recommendation:

Revise the first sentence as follows: The load end of the circuit shall terminate in a junction box with a blank cover or other listed enclosure.

Substantiation:

Based on the Usability Task Group's request to review all occurrences of the phrase "listed for the purpose" to ensure that it provides clear direction, the panel concludes the revised language clarifies its use in this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-94 Log #2256 NEC-P19 (551-49) **Final Action: Reject**

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text as follows:
551.49 ~~Grounded~~ Earth Conductors. The identification of ~~grounded~~ earth conductors shall be in accordance with 200.6.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word "ground" or "grounded" is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP 19 that changing the existing terminology would result in enhanced understanding of this concept. CMP 19 does recommend to CMP 1 that a fine print note referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-94a Log #CP1906 NEC-P19 (551.51) **Final Action: Accept**

Submitter: Code-Making Panel 19

Recommendation:

Revise 551.51 to read:
551.51 Switches.
(A) Rating. Switches shall be rated in accordance with 551.51(A)(1) and (A)(2).
(1) Lighting Circuits. For lighting circuits, switches shall be rated not less than 10 amperes, 120–125 volts and in no case less than the connected load.
(2) Motors or Other Loads. Switches for motor or other loads shall comply with the provisions of 404.14.
(B) Location. Switches shall not be installed within wet locations in tub or shower spaces unless installed as part of a listed tub or shower assembly.

Substantiation:

This revision relocates switch requirements from 551.53 to 551.51 to improve usability. The requirement for switches in tub or shower spaces has been revised to be consistent with the same requirement in 404.4 for general applications.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-95 Log #787 NEC-P19 (551-53(B)) **Final Action: Accept in Principle**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise second paragraph as follows:
The switch for ~~shower~~ luminaires (lighting fixtures) and exhaust fans l~~ocated over a tub or in a shower stall,~~ shall be located outside the tub or shower space.

Substantiation:

Edit. The requirement should not be limited to shower lighting fixtures or only fixtures and fans located over a tub or in a shower stall. Present wording does not appear literally to apply to luminaires over a tub.

Panel Meeting Action: Accept in Principle

Panel Statement:

The panel actions in Proposal 19-95a (Log #CP 1905) and Proposal 19-94a (Log #CP1906) has extended the requirement for switch locations to cover tubs.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-95a Log #CP1905 NEC-P19 (551.53(B)) **Final Action: Accept**

Submitter: Code-Making Panel 19

Recommendation:

Relocate the second paragraph of (B) covering the installation of switches for shower luminaires and exhaust fans to 551.51.

Substantiation:

This relocated text is more appropriately located in 551.51 which currently contains requirements for switches. CP 1906 revises the requirements for switches in 551.51 and includes the provisions for switches in tub and shower spaces.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-96 Log #1973 NEC-P19 **Final Action: Reject**
(551-55)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:

551.55 Interior Equipment Grounding.

(A) Exposed Metal Parts. In the electrical system, all exposed metal parts, enclosures, frames, luminaire (lighting fixture) canopies, and so forth, shall be effectively bonded to the grounding terminals or enclosure of the distribution panelboard.

(B) Equipment ~~Grounding and~~ Bonding Conductors. Bare wires, insulated wire with an outer finish that is green or green with one or more yellow stripes shall be used for equipment ~~grounding or~~ bonding conductors only.

(C) Grounding of Electrical Equipment. Where grounding of electrical equipment is specified, it shall be permitted as follows:

(1) Connection of metal raceway (conduit or electrical metallic tubing), the sheath of Type MC and Type MI cable where the sheath is identified for grounding, or the armor of Type AC cable to metal enclosures.

(2) A connection between the one or more equipment ~~grounding~~ bonding conductors and a metal box by means of a grounding screw, which shall be used for no other purpose, or a listed grounding device.

(3) The equipment ~~grounding~~ bonding conductor in nonmetallic-sheathed cable shall be permitted to be secured under a screw threaded into the luminaire (fixture) canopy other than a mounting screw or cover screw, or attached to a listed grounding means (plate) in a nonmetallic outlet box for luminaire (fixture) mounting. [Grounding means shall also be permitted for luminaire (fixture) attachment screws.]

(D) Grounding Connection in Nonmetallic Box. A connection between the one or more ~~grounding~~ bonding conductors brought into a nonmetallic outlet box shall be so arranged that a connection can be made to any fitting or device in that box that requires grounding.

(E) Grounding Continuity. Where more than one equipment ~~grounding or~~ bonding conductor of a branch circuit enters a box, all such conductors shall be in good electrical contact with each other, and the arrangement shall be such that the disconnection or removal of a receptacle, luminaire (fixture), or other device fed from the box will not interfere with or interrupt the grounding continuity.

(F) Cord-Connected Appliances. Cord-connected appliances, such as washing machines, clothes dryers, refrigerators, and the electrical system of gas ranges, and so forth, shall be grounded by means of an approved cord with equipment ~~grounding~~ bonding conductor and grounding-type attachment plug.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Bonding is defined in the NEC as the permanent joining together of metallic parts to form a conductive path. Grounding is defined in the NEC as the connection of the bonded parts to earth. The proposed change to rename this conductor does not clarify the confusion indicated by the submitter.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 2

Ballot Not Returned: 1 Zieman

Explanation of Negative:

SABIN-MERCADO: "Grounded" and "grounding" sound similar but are intended to describe two totally different concepts. However, these terms are often used interchangeably by users of the NEC. In fact, there are places in the NEC where these terms are used interchangeably. The words ground, grounded and grounding will apply to the concept of connecting an electrical system to the earth. While the words bond, bonded and bonding will apply to the concept of connecting together noncurrent carrying conductive parts likely to become energized so that they form an effective ground fault path back to the source. If the terms are not similar, the concepts can be more easily differentiated by the users. I think this change will greatly improve usability and understanding of the NEC. This issue needs to be brought forth through the Technical Correlating Committee.

ZANICCHI: The term "bonding" is technically correct for this conductors application. This conductor is there to "bond" equipment to the "system grounded conductor, the grounding electrode conductor or both" at the service equipment as stated in Article 100. The use of the term "bonding" instead of "grounding" does not change the function of the conductor but it will help make the code more understandable. An example: A journeyman says to their apprentice "That 3 phase 208v mixer needs to be grounded". The apprentice asks themselves "does the journeyman mean that this mixer needs a grounded conductor brought to it? If we used the term "bonded" instead of "grounded" the journeyman would have said "That 3 phase 208v mixer needs to be bonded". Clearly, the separation of the terms grounded and bonded makes the journeyman's statement easier to understand. I hope that other panels consider making this change, especially Panel 5 which deals with Article 250, and that we "Accept in Principal" the change as I believe it will make a difference in the usability of the code.

19-97 Log #806 NEC-P19 **Final Action: Accept in Principle**
(551-55(C))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Where grounding of electrical equipment is provided ~~specified~~ it shall be ~~permitted as follows~~ in accordance with one or more of the following:
(1) Connection of suitable metal raceway, the sheath of Type MC and Type MI cable where the sheath is identified for grounding, or the armor of Type AC cable to metal enclosures.
(2) A connection between one or more equipment grounding conductors and a metal enclosure box by means of ... (remainder unchanged).
(3) No change.

Substantiation:

Edit. It appears the intent is to require one or more of the methods of (1), (2), and (3). The phrase "shall be permitted" infers other methods may be suitable. The phrase (conduit or electrical metallic tubing) appears to limit the metal raceways that can be used for grounding, whereas 551.47(A) permits other raceway wiring methods, for example, Article 386 surface metal raceway, which may be covered by 250.118(14).

Panel Meeting Action: Accept in Principle

Revise 551.55(C) to read:

Grounding of electrical equipment shall be accomplished by one or more of the following methods.
(1) Connection of metal raceway, the sheath of Type MC and Type MI cable where the sheath is identified for grounding, or the armor of Type AC cable to metal enclosures.
(2) A connection between the one or more equipment grounding conductors and a metal enclosure by means of a grounding screw, which shall be used for no other purpose, or a listed grounding device.
(3) No change.

Panel Statement:

The panel has accepted in principle the need to add clarity to this section and has incorporated revised text from the submitter and the panel to accomplish this.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-98 Log #752 NEC-P19 **Final Action: Reject**
(551-58 (New))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add text as follows:
551.xx Pipe Heating Cable Outlet. Where a pipe heating cable outlet is installed, the outlet shall be:
1. Located within 600 mm (2 ft) of the cold water inlet to the unit
2. Supplied by a recreational vehicle branch circuit
3. A single type receptacle where supplying cord and plug-connected equipment
4. Mounted on the underside of the unit and shall not be considered to be the outdoor receptacle outlet required by 551.41(B)(4).

Substantiation:

If a requirement covering heating cable outlets is deemed necessary for park trailers, it seems reasonable to have one for the units covered by this article. Since there is no prohibition of pipe heating cables where the unit is supplied by one circuit no specifics for the circuit is Proposed. Conditions 3 ad 4 are based on possible acceptance of my proposal for 551.41(B)(4) and (C).

Panel Meeting Action: Reject

Panel Statement:

The submitter did not provide sufficient technical substantiation to support this change to equate recreational vehicle requirements with those for dwelling units.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-99 Log #2258 NEC-P19 **Final Action: Reject**
(551-60(A))

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text as follows:

551.60 Factory Tests (Electrical). Each recreational vehicle shall be subjected to the following tests.

(A) Circuits of 120 Volts or 120/240 Volts. Each recreational vehicle designed with a 120-volt or a 120/240 volt electrical system shall withstand the applied potential without electrical breakdown of a 1-minute, 900-volt dielectric strength test, or a 1-second, 1080-volt dielectric strength test, with all switches closed, between ungrounded and ~~grounded~~ earth conductors and the recreational vehicle ground. During the test, all switches and other controls shall be in the "on" position. Fixtures, including luminaires and permanently installed appliances shall not be required to withstand this test. The test shall be performed after branch circuits are complete prior to energizing the system and again after all outer coverings and cabinetry have been secured.

Each recreational vehicle shall be subjected to all of the following:

(1) A continuity test to ensure that all metal parts are properly bonded

(2) Operational tests to demonstrate that all equipment is properly connected and in working order

(3) Polarity checks to determine that connections have been properly made.

(B) Low-Voltage Circuits. An operational test of all low voltage circuits shall be conducted to demonstrate that all equipment is connected and in electrical working order. This test shall be performed in the final stages of production after all outer coverings and cabinetry have been secured.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word "ground" or "grounded" is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP-19 that changing the existing terminology will result in enhanced understanding of this concept. CMP-19 does recommend to CMP-1 that a FPN referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-100 Log #565 NEC-P19 (551-60(B)) **Final Action: Accept**

TCC Action:

See Technical Correlating Committee Note on Proposal 19-73. This action will be considered by the panel as a public comment.

Submitter: Bruce A. Hopkins, Recreation Vehicle Industry Assn.

Recommendation:

Delete entire 551.60(B).

Substantiation:

Low Voltage requirements (Article 551) of the NEC are no longer referenced within the RV Standard NFPA 1192 for Recreational Vehicles. Instead, NFPA 1192 now references the ANSI/RVIA Low Voltage Systems in Conversion and Recreational Vehicles, 2002 edition, for all low voltage requirements. Therefore, all NEC Article 551 RV low voltage requirements can be deleted without jeopardizing safety.

Panel Meeting Action: Accept

This section should now read as follows:

551.60 Factory Tests (Electrical).

Each recreational vehicle designed with a 120-volt or a 120/240-volt electrical system shall withstand the applied potential without electrical breakdown of a 1-minute, 900-volt dielectric strength test, or a 1-second, 1080-volt dielectric strength test, with all switches closed, between ungrounded and grounded conductors and the recreational vehicle ground. During the test, all switches and other controls shall be in the "on" position. Fixtures, including luminaires and permanently installed appliances shall not be required to withstand this test. The test shall be performed after branch circuits are complete prior to energizing the system and again after all outer coverings and cabinetry have been secured.

Each recreational vehicle shall be subjected to all of the following:

(1) A continuity test to ensure that all metal parts are properly bonded

(2) Operational tests to demonstrate that all equipment is properly connected and in working order

(3) Polarity checks to determine that connections have been properly made

Panel Statement:

The panel action requires a revision to this section for NEC Style Manual compliance.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 2

Ballot Not Returned: 1 Zieman

Explanation of Negative:

LAROCCA: See my Explanation of Negative Vote on Proposal 19-73.

TIPTON: See my Explantion of Negative Vote on Proposal 19-73 (Log #563).

19-101 Log #671 NEC-P19 (551-71) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:

Type Receptacles Provided. Every recreational vehicle site with electrical supply shall be ~~equipped~~ provided with at least one 20-ampere 125-volt receptacle supplied by a dedicated 20-ampere circuit. A minimum of 5 percent of all recreational vehicles sites with electrical supply shall each be ~~equipped~~ provided with a 50-ampere 125/250-volt receptacle supplied by a dedicated 50-ampere circuit ~~conforming to the configuration as identified in figure 551.46(C). These electrical supplies shall be permitted to include additional receptacles that have configurations in accordance with 551.81~~. A minimum of 70 percent of all recreational vehicle sites with electrical supply shall each be ~~equipped~~ provided with a 30-ampere 125-volt receptacle supplied by a dedicated 30-ampere circuit. ~~conforming~~ All recreational vehicle site receptacles shall conform to ~~Figure~~ 551.81. ~~The remainder of all recreational vehicle sites shall be equipped with one or more of the receptacle configurations conforming to 551.81. Dedicated tent sites with a 15- or 20-ampere electrical supply shall be permitted to be excluded when determining the percentage of recreational vehicle sites with 30- or 50-ampere receptacles.~~

Additional 15- or 20-ampere 125-volt receptacles with proper overcurrent protection shall be permitted for the connection of electrical equipment outside the recreational vehicle within the recreational vehicle park.

All 125-volt single phase 15- and 20-ampere receptacles shall have ground-fault circuit-interruptor protection for personnel.

Substantiation:

Though 551.73 suggests a circuit rating for the required receptacles, there is no specific requirement nor is there a requirement for a separate circuit for the required receptacles, the 9600 volt-ampere calculated service and feeder load for 50-ampere receptacles could be served by a 40-ampere circuit. A 50-ampere receptacle on an individual or multioutlet circuit is not prohibited by 210.21(B) or table 210.24.

Since all sites with electrical power are required to have a 20-ampere 120 volt receptacle and some of those with additional 50 or 30-ampere receptacles, the requirement for the remainder of sites to have one or more receptacles is superfluous.

It appears this section permits additional receptacles to be supplied from the 50- or 30-ampere receptacle circuits; it does not specify circuit rating. The reference to dedicated tent sites is superfluous, as the required percentages only apply to vehicle sites, which are not permitted to have only a 15-ampere supply.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided any technical substantiation that indicates the current method of computing the load and supplying the sites is inadequate. The definition of a recreational vehicle site currently includes camping sites. The proposed editorial changes do not enhance clarity.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-101a Log #CP1909 NEC-P19 (551.71) **Final Action: Accept**

Submitter: Code-Making Panel 19

Recommendation:

Revise 551.71 by changing 5 percent to 20 percent in the second sentence and add a new fine print note to read:

FPN: The percentage of 50 ampere sites required by 551.71 may be inadequate for seasonal recreational vehicle sites serving a higher percentage of recreational vehicles with 50 ampere electrical systems. In that type of recreational vehicle park the percentage of 50 ampere sites could approach 100 percent.

Substantiation:

A survey of approximately 500 campgrounds involving 45,000 recreational vehicle sites indicates that currently an average of 18% of the sites provide 50-ampere receptacles and an average of 70% of the sites provide 30-ampere receptacles. This information indicates that there is a need to provide a higher percentage of sites with 50-ampere 125/250-volt receptacles. The new Fine Print Note is added to indicate that under some circumstances the 20% may not be adequate.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-102 Log #662 NEC-P19 (551-72) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:

Distribution Systems. Recreational vehicle site receptacles rated at 50-amperes shall be supplied from a dedicated branch circuit rated 50-amperes at 120/240-volts, nominal. ~~of the voltage class and rating of the receptacle. Other~~ Recreational vehicle sites with 125-volt 15-, 20-, or 30-ampere receptacles shall be permitted to be supplied from any grounded system that supplies 120-volt single-phase power. The ~~neutral~~ grounded conductors (may be a neutral) shall have an ampacity not less than ~~not be reduced in size below the size of~~ the ungrounded conductors for the vehicle site ~~distribution~~ supply equipment.

Exception: The grounded conductors (may be a neutral) shall be permitted to ~~be reduced in size below the minimum required size~~ have an ampacity less than the minimum required ampacity of the ungrounded conductors for 240-volt, line-to-line permanently connected loads only.

Substantiation:

A dedicated circuit should be specified since 210.23 and Table 210.24 do not prohibit multiple site receptacles on the same circuit. Specific rating of the circuit is clearer than "voltage class and rating". The limitation to "other" vehicle sites infers that a site with a 50-ampere receptacle doesn't qualify for 20- and 30-ampere receptacles, and 15-ampere receptacles are not included.

A supply system derived from a 4-wire delta-connected system may be deemed not to have a "neutral".

The relationship of grounded (neutral) site conductors to ungrounded site distribution conductors should be based on ampacity, not size. A grounded copper conductor may be smaller in size than an aluminum conductor and have equal ampacity.

In the present penultimate sentence, site "distribution" has been changed to site "supply equipment" to clarify that the requirement applies to feeder conductors supplying a single site and not the feeder conductors covered by (D) which supply more than one site.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided any technical substantiation that indicates the current method of computing the load and supplying the sites is inadequate. The proposed text changes do not provide additional clarity.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-103 Log #672 NEC-P19 (551-73) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add to left column heading: And Dedicated Tent Sites With Electrical Supply.

Substantiation:

Demand factors should also include tent sites and be literally limited to sites where electric supply is provided, which seems to be the intent.

Panel Meeting Action: Reject

Panel Statement:

The proposed language is unnecessary as the current definition of "recreational vehicle site" in 551.2 includes camping sites.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-104 Log #1328 NEC-P19 **Final Action: Accept**
(551-73)

Submitter: National Electrical Code Technical Correlating Committee

Recommendation:

Replace the term "computed" with the term "calculated" in the following sections:
551.73.

Substantiation:

This proposal is the result of an effort by the NEC Usability Task Group to standardize the language throughout the NEC relative to the use of the terms computed and calculated. After analyzing the usage, the group agreed that the term "calculated" was the best term for use throughout the NEC. This is one in a series of proposals to standardize on the term calculated.

The term "calculate" and its derivatives is presently used in the article title, section titles, and throughout portions of the existing article. Other Articles of the NEC such as for calculating conductor ampacties (under engineering supervision), calculating the size of enclosures, and in Annex D use the term calculate. Additionally, the term "calculate" is more commonly used in other NFPA codes and standards e.g. NFPA 70E, arc flash calculation. Adversely, the term "computation" has a connotation of using a computer, although "load calculations" are frequently determined using a calculator. It appears that the term "computation" was used more frequently beginning with the 1975 NEC based on an editorial revision project.

Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12
Ballot Not Returned: 1 Zieman

19-105 Log #2259 NEC-P19 (551-73) **Final Action: Reject**

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text as follows:

551.73 Calculated Load.

(A) Basis of Calculations. Electrical service and feeders shall be calculated on the basis of not less than 9600 volt amperes per site equipped with 50-ampere, 120/240-volt supply facilities; 3600 volt-amperes per site equipped with both 20-ampere and 30-ampere supply facilities; 2400 volt amperes per site equipped with only 20-ampere supply facilities; and 600 volt-amperes per site equipped with only 20-ampere supply facilities that are dedicated to tent sites. The demand factors set forth in Table 551.73 shall be the minimum allowable demand factors that shall be permitted in calculating load for service and feeders. Where the electrical supply for a recreational vehicle site has more than one receptacle, the calculated load shall only be computed for the highest rated receptacle.

(B) Transformers and Secondary Distribution Panelboards. For the purpose of this Code, where the park service exceeds 240 volts, transformers and secondary distribution panelboards shall be treated as services.

(C) Demand Factors. The demand factor for a given number of sites shall apply to all sites indicated. For example, 20 sites calculated at 45 percent of 3600 volt-amperes results in a permissible demand of 1620 volt-amperes per site or a total of 32,400 volt-amperes for 20 sites.

FPN: These demand factors may be inadequate in areas of extreme hot or cold temperature with loaded circuits for heating or air conditioning.

(D) Feeder-Circuit Capacity. Recreational vehicle site feeder-circuit conductors shall have adequate ampacity for the loads supplied and shall be rated at not less than 30 amperes. The ~~grounded~~ earth conductors shall have the same ampacity as the ungrounded conductors.

FPN: Due to the long circuit lengths typical in most recreational vehicle parks, feeder conductor sizes found in the ampacity tables of Article 310 may be inadequate to maintain the voltage regulation suggested in the fine print note to 210.19. Total circuit voltage drop is a sum of the voltage drops of each serial circuit segment, where the load for each segment is calculated using the load that segment sees and the demand factors of 551.73(A).

Loads for other amenities such as, but not limited to, service buildings, recreational buildings, and swimming pools shall be sized separately and then be added to the value calculated for the recreational vehicle sites where they are all supplied by one service.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word "ground" or "grounded" is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP-19 that changing the existing terminology will result in enhanced understanding of this concept. CMP-19 does recommend to CMP-1 that a FPN referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-106 Log #633 NEC-P19 (551-73(A)) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:

Basis of Calculation. ~~Electrical service and feeders~~ The recreational vehicle site and dedicated tent site loads shall be calculated on the basis of at not less than ~~9600~~ 3600 volt-amperes per site equipped with ~~both 20-amperes and~~ 30-amperes ~~supply facilities receptacles~~; 12000 volt-amperes per site equipped with 50-ampere ~~120/240~~ 125/250-volt ~~supply facilities~~ receptacles; 2400 volt-amperes per vehicle site equipped with only 20-ampere ~~supply facilities~~ receptacles; and 600 volt-amperes per dedicated tent site equipped with only 15-or 20-ampere receptacles. ~~supply facilities that are dedicated tent sites~~. The demand factors set forth in Table 551.73 shall be the minimum allowable demand factors that shall be permitted in calculating load for services and feeders. Where the electrical supply for a recreational vehicle site or dedicated tent site has more than one receptacle supplied from the same distribution system, the calculated load shall only be required to be computed for the highest rated receptacle.

Substantiation:

1. The proposal provides for the specified loads to specifically also apply to branch circuit portions of the distribution system. Park sites may be served by branch circuits originating at the service, with no feeders involved.
2. The present 9600 volt-amperes for 50-ampere receptacles infers a 40-ampere circuit and for 50-ampere circuits is an 80 percent demand, to which may be applied an additional demand per Table 551.73. In contrast, the maximum potential volt-amperes is applied for 30- and 20-ampere receptacle sites.
3. "Supply facilities" is broad and can encompass feeders and services which are rated higher than 50-, 30-, or 20-amperes.
4. Since all vehicle sites are required to have 20-ampere receptacles, the 3600 volt-ampere requirement need not specify them.
5. The 600 volt-ampere requirement should tent sites with 15-ampere receptacles since they are indirectly indicated as permissible in 551.71, and where more than one (single) receptacle or tent site is supplied by the same 15- or 20-ampere branch circuit, the 15-ampere receptacles are permitted by Table 210.24.
6. The last sentence should also be reasonably applied to dedicated tent sites and should only apply where the additional receptacles are supplied by the same system. A 125/250-volt receptacle supplied by a 120/240-volt system may be augmented by 120-volt receptacles supplied from another system, such as 208/120 volts.

Panel Meeting Action: Reject

Panel Statement:

The submitter's recommendation to make extensive changes to the method of calculating these loads is not accompanied by any analysis or technical documentation indicating the current text is not adequate for supplying recreational vehicle sites. Information provided by this industry supports the panel's rejection of this proposal. The suggested editorial changes are rejected as they do not provide additional clarity.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-107 Log #928 NEC-P19 (551-73(A)) **Final Action: Accept**

TCC Action:

The Technical Correlating Committee directs the panel to clarify the VA requirement in item (A) of the accepted text. The present code text indicates that 9600VA per site is required. The submitter's recommendation indicates 9500 VA per site, but does not substantiate this change. This action will be considered by the panel as a public comment.

Submitter: James W. Finch, Kampgrounds of America, Inc. (KOA)

Recommendation:

Add new text as follows:

551.73 Calculated Load.

(A) Basis of Calculations. Electrical service and feeders shall be calculated on the basis of not less than 9500 volt-amperes per site equipped with 50-ampere, 120/240-volt supply facilities; 3600 volt-amperes per site equipped with both 20-ampere and 30-ampere supply facilities; 2400 volt-amperes per site equipped with only 20-ampere supply facilities; and 600 volt-amperes per site equipped with only 20-ampere supply facilities that are dedicated to tent sites. The demand factor set forth in Table 551.73 shall be the minimum allowable demand factors that shall be permitted in calculating load for service and feeders. Where the electrical supply for a recreational vehicle site has more than one receptacle, the calculated load shall only be computed for the highest rated receptacle. Where the electrical supply is in a location that serves two recreational vehicles, the equipment for both sites must comply with 551.77 and the calculated load shall only be computed for the two receptacles with the highest rating.

Substantiation:

There are situations where two recreational vehicle sites can park back-to-back and share the same electrical supply location and comply with 551.77 as well. This statement would ensure that the site supply for both sites would be included in the load calculations.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

Comment on Affirmative:

LAROCCA: My notes indicate that "9500" as contained in the first line of the added text should be 9600, as stated by the submitter.

19-108 Log #3091 NEC-P19 **Final Action: Reject**
(551-73(A))

Submitter: Barry Bauman, Alliante Energy

Recommendation:

Add the following sentence to the end of the paragraph: Where there are no designated recreational vehicle/tent sites and the electrical supply can serve an unspecified number of recreational vehicle or tent sites, the calculated load shall be computed using all available receptacles.

Substantiation:

Electric service is typically provided from common sites at special events such as outdoor concerts and rodeos and at limited use facilities such as county fair grounds. Because there are no designated recreational vehicle or tent sites, the load cannot be based on the number of sites. In order to have an adequate electrical supply, all the available outlets need be included in load calculations.

Panel Meeting Action: Reject

Panel Statement:

Temporary camping locations described in the recommendation are not within the scope of Article 551. These areas do not have the type of defined campsite as specified in Article 551.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-109 Log #634 NEC-P19 **Final Action: Reject**
(551-73(D))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:

Services and Feeders. Service and feeder conductors supplying a recreational vehicle site or dedicated tent site ~~feeder~~ conductors shall have ~~adequate~~ an ampacity ~~for~~ not less than the loads supplied and shall be rated not less than 30 amperes. The ~~grounded~~ neutral conductors shall have ~~the same~~ an ampacity not less than as the ungrounded conductors, except a reduction in neutral ampacity shall be permitted in accordance with 220.22 for that portion of the load permanently connected line-to-line to each ungrounded conductor.

FPN No change.

Loads for other amenities such as, but not limited to, service buildings, recreational buildings, and swimming pools shall be ~~sized~~ calculated separately and then added to the values calculated for the recreational vehicle sites and dedicated tent sites where they are all supplied by ~~one~~ a common service.

Substantiation:

(1) This section does not specifically apply to services;
(2) Feeders supplying dedicated tent sites should be included;
(3) "Adequate" is vague and possibly unenforceable per the Style Manual;
(4) Grounded conductors are literally not permitted to have an ampacity greater than the ungrounded conductors;
(5) No reduction in neutral ampacity is permitted for permanently connected line-to-line loads (no neutral) where, for example a 208/120 volt 4-wire system supplies 125 volt site receptacles and also 3-phase 3-wire loads for other buildings or amenities which do not contribute to unbalanced neutral load;
(6) Loads for other amenities are inherent or calculated;
(7) The last paragraph does not indicate loads for dedicated tent sites and only applies where ALL such loads are supplied by one service. It literally does not apply if a 208/120 volt 3-phase 4-wire service supplies 125 volt site receptacles and other buildings, and a 120/240 volt single-phase service supplies 125/250 volt receptacles, since there is more than one service. Combining loads is reasonable only where supplied by a common service.

Panel Meeting Action: Reject

Panel Statement:

The proposed changes do not provide additional clarity or understanding of this section. This section applies to feeders and the substantiation does not provide technical justification for including services. In the context of its use in this section the term "adequate" is not vague. The substantiation includes several parts that simply identify the perceived problem but provide no technical substantiation for changing the existing requirement.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-110 Log #702 NEC-P19 (551-76) **Final Action: Accept in Part**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise:

Recreational Vehicle Site and Dedicated Tent Site Supply Equipment (A) Exposed Non-Current-Carrying Metal Parts. Exposed non-current-carrying metal parts of fixed equipment, metal boxes, cabinets, and ~~fittings that are not electrically connected to grounded equipment~~ shall be grounded by ~~a continuous~~ an equipment grounding conductor in accordance with 250.134, ~~run with the circuit conductors from the service equipment or from the transformer of a secondary distribution system. Equipment grounding conductors shall be sized in accordance with 250.122 and shall be permitted to be spliced by listed means.~~ (remainder unchanged).

(B) No change.

(C) ~~NEUTRAL~~ Grounded Conductor Not To Be Used Aa An Equipment Ground. The ~~neutral~~ grounded conductor shall not be used as an equipment ground for recreational vehicles site or dedicated tent site feeder or branch circuit supply equipment. ~~within the recreational vehicle park.~~

Delete (D) or revise: No Connection On The Load Side. No connection to a grounding electrode shall be made to the grounded ~~neutral~~ conductor on the load side of the service disconnecting means ~~or transformer distribution panelboard~~ except as covered in 250.30(A) for separately derived systems and 250.32(B)(2) for separate buildings.

Substantiation:

1. Dedicated tent sites should be included. While the definition of recreational vehicle site includes a camping (tent) site it doesn't follow that a dedicated tent site is a vehicle site.
2. It is assumed that "electrically connected" means a conductor which may be a wire, metal raceway, or metal-covered cable. However, "continuous" can be interpreted as unbroken without splice, terminal connection, or raceway joints.
3. The provisions of (C) should cover grounded conductors which are not neutrals and include dedicated tent sites. Since individual service pedestals may be provided for sites, the conductors should be specified as a feeder or branch circuit supply since literal wording negates the provisions of 250.142(B), Exception No. 2.
4. Where site feeder conductors also supply other amenities such as service buildings, recreational buildings, swimming pools, etc. the present wording negates the provisions of 250.30(A) and 250.32(B)(2).

Panel Meeting Action: Accept in Part

Revise 551.76(D) to read:

No Connection on the Load Side. No connection to a grounding electrode shall be made to the neutral conductor on the load side of the service disconnecting means except as covered in 250.30(A) for separately derived systems and 250.32(B)(2) for separate buildings.

Panel Statement:

The panel accepts only the part of the recommendation to make the revisions to 551.76(D) shown in the panel action. The panel does not accept the recommendation to change the term "neutral" to "grounded". The term "neutral" as used in this section is well understood and has not proved to be a problem in applying this requirement. The term "continuous" indicates electrically continuous, not physically continuous, and as indicated in the section, the grounding conductor is permitted to be spliced with appropriate means. The substantiation does not support inclusion of the term "dedicated tent site".

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-111 Log #3494 NEC-P19 **Final Action: Reject**
(551-76)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
551.76 Grounding — Recreational Vehicle Site Supply Equipment.
(A) Exposed Non–Current-Carrying Metal Parts. Exposed non–current-carrying metal parts of fixed equipment, metal boxes, cabinets, and fittings that are not electrically connected to grounded equipment shall be grounded by a continuous equipment ~~grounding~~ bonding conductor run with the circuit conductors from the service equipment or from the transformer of a secondary distribution system. Equipment ~~grounding~~ bonding conductors shall be sized in accordance with 250.122 and shall be permitted to be spliced by listed means.
The arrangement of equipment ~~grounding~~ bonding connections shall be such that the disconnection or removal of a receptacle or other device will not interfere with, or interrupt, the grounding continuity.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Bonding is defined in the NEC as the permanent joining of metallic parts together to form a conductive path. Grounding is defined in the NEC as the connection of the bonded parts to earth. The proposed change to rename this conductor does not clarify the confusion indicated by the submitter.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 2

Ballot Not Returned: 1 Zieman

Explanation of Negative:

SABIN-MERCADO: "Grounded" and "grounding" sound similar but are intended to describe two totally different concepts. However, these terms are often used interchangeably by users of the NEC. In fact, there are places in the NEC where these terms are used interchangeably. The words ground, grounded and grounding will apply to the concept of connecting an electrical system to the earth. While the words bond, bonded and bonding will apply to the concept of connecting together noncurrent carrying conductive parts likely to become energized so that they form an effective ground fault path back to the source. If the terms are not similar, the concepts can be more easily differentiated by the users. I think this change will greatly improve usability and understanding of the NEC. This issue needs to be brought forth through the Technical Correlating Committee.
ZANICCHI: See my Explanation of Negative on Proposal 19-1 (Log #2453s).

19-112 Log #805 NEC-P19 **Final Action: Reject**
(551-77(F))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise first sentence as follows:
Where the site supply equipment contains a 125/250 volt receptacle, the equipment shall be durable marked with letters not less than 6 mm (1/4 in.) high as follows: (remainder unchanged).

Substantiation:

Durability and minimum letter size should be required as in other Code sections.

Panel Meeting Action: Reject

Panel Statement:

The submitter has not provided sufficient technical substantiation to support the recommendation.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-113 Log #1002 NEC-P19 **Final Action: Accept**
(551-79, FPN)

Submitter: Noel Williams, Noel Williams Consulting

Recommendation:

Revise the Fine Print Note to read: "FPN: For clearances of conductors over 600 volts, nominal, see 225.60 and 225.61."

Substantiation:

Now that these clearances are included in the NEC, there is no reason to refer the user to ANSI C2. If additional information is needed beyond what is included in Article 225, Sections 225.60 and 225.61 include FPNs to refer the user to ANSI C2.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-114 Log #1974 NEC-P19 (551-80(A)) **Final Action: Reject**

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(A) General. All direct-burial conductors, including the equipment ~~grounding~~ bonding conductor if of aluminum, shall be insulated and identified for the use. All conductors shall be continuous from equipment to equipment. All splices and taps shall be made in approved junction boxes or by use of material listed and identified for the purpose.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Bonding is defined in the NEC as the permanent joining of metallic parts together to form a conductive path. Grounding is defined in the NEC as the connection of the bonded parts to earth. The proposed change to rename this conductor does not clarify the confusion indicated by the submitter.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 2

Ballot Not Returned: 1 Zieman

Explanation of Negative:

SABIN-MERCADO: "Grounded" and "grounding" sound similar but are intended to describe two totally different concepts. However, these terms are often used interchangeably by users of the NEC. In fact, there are places in the NEC where these terms are used interchangeably. The words ground, grounded and grounding will apply to the concept of connecting an electrical system to the earth. While the words bond, bonded and bonding will apply to the concept of connecting together noncurrent carrying conductive parts likely to become energized so that they form an effective ground fault path back to the source. If the terms are not similar, the concepts can be more easily differentiated by the users. I think this change will greatly improve usability and understanding of the NEC. This issue needs to be brought forth through the Technical Correlating Committee.

ZANICCHI: The term "bonding" is technically correct for this conductors application. This conductor is there to "bond" equipment to the "system grounded conductor, the grounding electrode conductor or both" at the service equipment as stated in Article 100. The use of the term "bonding" instead of "grounding" does not change the function of the conductor but it will help make the code more understandable. An example: A journeyman says to their apprentice "That 3 phase 208v mixer needs to be grounded". The apprentice asks themselves "does the journeyman mean that this mixer needs a grounded conductor brought to it? If we used the term "bonded" instead of "grounded" the journeyman would have said "That 3 phase 208v mixer needs to be bonded". Clearly, the separation of the terms grounded and bonded makes the journeyman's statement easier to understand. I hope that other panels consider making this change, especially Panel 5 which deals with Article 250, and that we "Accept in Principal" the change as I believe it will make a difference in the usability of the code.

19-115 Log #791 NEC-P19 (552-3) **Final Action: Accept**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Wherever the ~~requirements~~ provisions of other articles and Article 552 differ, the ~~requirements~~ provisions of Article 552 shall apply.

Substantiation:

Edit. Some provisions in this article and others are not requirements, per se, but permissive rules or Exceptions, and should also apply.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-116 Log #788 NEC-P19 **Final Action: Accept**
(552-10(E)(3))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Appliances. ~~Higher current consuming de~~ Appliances such as pumps... (remainder unchanged).

Substantiation:

Appliances don't "consume" current; how is the value of "higher current" to be determined? Since low voltage may be ac, there is no reason to limit the rule to dc. Proposal tracks wording of 551.10(E)(3).

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-117 Log #794 NEC-P19 **Final Action: Accept in Part**
(552-41(B) (C) (D) (E))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:

(B) Receptacle outlets required by this section shall be in addition to any receptacle that is part of a luminaire (lighting fixture) or appliance, located within cabinets or cupboards, or located more than 1.7 m (5 1/2 ft) above the floor or finish grade.

(C) Ground-Fault Circuit-Interruptor Protection. ~~Where provided, each~~ Each 125-volt, single-phase, 15- or 20-ampere receptacle shall have ground-fault circuit-interruptor protection for personnel in the following locations:

(1) ~~Adjacent to a bathroom lavatory~~ Where the receptacles are installed to serve kitchen countertop surfaces.

(2) No change.

(3) No change.

(4) On the exterior of the unit.

Exception No. 1: Single receptacles that are located inside ~~an access panel~~ a compartment that is directly accessible from ~~installed on~~ the exterior of the unit, to supply power to an installed ~~appliance~~ utilization equipment shall not be required to have ground-fault circuit-interruptor protection.

Exception No. 2: A single receptacle installed to supply power to a pipe heating equipment in accordance with 552.41(D) shall not be required to have ground-fault circuit-interrupter protection.

~~The receptacle outlet shall be permitted in a listed luminaire (lighting fixture). A receptacle outlet shall not be installed in a tub or combination tub-shower compartment.~~

(D) Pipe Heating Cable Outlet. Where a pipe heating cable is installed, the outlet shall be as follows:

(1) Located within 600 mm (2 ft) of the cold water inlet to the unit;

(2) ~~Connected to an interior~~ Supplied by a park trailer circuit. ~~other than a small appliance branch circuit;~~

(3) ~~On a circuit where all the outlets are on the load side of the ground-fault circuit interrupter protection for personnel.~~ A single receptacle type where supplying plug-and receptacle-connected equipment.

(4) No change.

(E) Outdoor Receptacle Outlets. At least one readily accessible 125-volt, 15- or 20-ampere receptacle outlet shall be installed on the exterior of the unit. A single receptacle ~~outlet located in a compartment accessible from the outside of the park trailer~~ in accordance with Exception No. 1 or No. 2 for 552.41(C)(4) shall not be considered as ~~an~~ the outdoor receptacle required by this section. ~~Outdoor receptacle outlets shall be protected as required in 552.41(C)(4).~~

Substantiation:

Receptacles that serve kitchen countertop spaces farther than 6 ft from a sink or do not contain a sink should have GFCI protection, as is required in 210.8(A) and (B), for the same reasons. The potential hazard of a metal countertop or rims where a metal sink with a grounded disposal, and grounded surfaces of dishwashers, ovens, range tops, refrigerators, etc., are proximate, does not disappear beyond the 6 ft distance from a sink.

The proposed Exceptions No. 1 and No. 2 for (C)(4) are similar to other such exceptions in the Code for "dedicated" receptacle outlets. The present wording exempts single and multiple type receptacles from GFCI requirements and conflicts with (E). The proposal does not prohibit a multiple type receptacle which complies with (E). It is not clear whether the permitted receptacles in a lighting fixture applies only to those covered by (C) or all receptacles. Lighting fixtures may be ceiling or wall-mounted at a height difficult for many persons to reach. They should not be permitted as required receptacles.

Subsection (F)(1) better covers receptacles in shower or tub spaces as it doesn't limit shower spaces to combination tub-shower compartments and provides specifics re; spacing.

Subsection (D)(2) does not permit a small appliance branch circuit to supply a pipe heating cable. I do not find a requirement for a small appliance circuit, which is generally perceived as those covered in 210.11(C)(1) and 210.52(B). A single circuit for the unit is not specifically prohibited; 551.42(A) and (B) permit a single circuit system for units covered in that article. Section 552.46(A) "permits" two to five circuits. If one or two circuits are provided there cannot be small appliance circuits as covered in Article 210.

There is no apparent safety reason to justify the requirement for all outlets on a circuit supplying a pipe heating cable, (even if permanently connected) to be GFCI protected, although this would be automatically achieved by 551.40(C) if the park trailer is designated as a travel trailer.

The receptacle covered by (E) should be specifically required to be readily accessible; the last sentence is superfluous.

Panel Meeting Action: Accept in Part

The panel accepts the recommended revision to 552-41(C) and the recommended revision to 552-41(C)(1). The panel rejects the remainder of the recommendation.

Panel Statement:

The rejected parts of the recommendation do not provide additional clarity to this section and are lacking sufficient technical substantiation to support the revision.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-118 Log #627 NEC-P19 **Final Action: Reject**
(552-43(A) and (c))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
(A) Feeder. The power supply to the park trailer shall be a feeder assembly consisting of not more than one listed 15-20-30- or 50-ampere park power-supply cord with an integrally molded or securely attached cap in accordance with 551.46(C). ~~or a permanently installed feeder.~~
Delete (C).

Substantiation:

The proposal includes 15- and 20-ampere supply cords since 551.44 permits them for travel trailers which are similar. Park trailers may have a sq. ft. area equal to or less than travel trailers. Whether a unit is designated by Code as a park trailer and covered by this article, or designated as a camping or travel trailer covered by Article 551 appears to be primarily determined by the sq. ft. area of the unit.
There does not appear to be a compelling reason to permit a permanently installed feeder (with no rating indicated) for a unit designated as a park trailer but not for the units designated as a travel trailer in Article 551. A permanently installed feeder (presumed to be a wiring method of Chapter 3) is unlikely to be installed for a seasonal use unit with a maximum 400 square foot area.

Panel Meeting Action: Reject

Panel Statement:

The current text in 552-43(A) is not currently being misapplied. The substantiation does not support the recommended changes. It is necessary to retain the provisions of (C) as this covers a frequently used application.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-119 Log #1975 NEC-P19 **Final Action: Reject**
(552-43(C)(1))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(1) One mast weatherhead installation, installed in accordance with Article 230, containing four continuous, insulated, color-coded feeder conductors, one of which shall be an equipment ~~grounding~~ bonding conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Bonding is defined in the NEC as the permanent joining of metallic parts together to form a conductive path. Grounding is defined in the NEC as the connection of the bonded parts to earth. The proposed change to rename this conductor does not clarify the confusion indicated by the submitter.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 2

Ballot Not Returned: 1 Zieman

Explanation of Negative:

SABIN-MERCADO: "Grounded" and "grounding" sound similar but are intended to describe two totally different concepts. However, these terms are often used interchangeably by users of the NEC. In fact, there are places in the NEC where these terms are used interchangeably. The words ground, grounded and grounding will apply to the concept of connecting an electrical system to the earth. While the words bond, bonded and bonding will apply to the concept of connecting together noncurrent carrying conductive parts likely to become energized so that they form an effective ground fault path back to the source. If the terms are not similar, the concepts can be more easily differentiated by the users. I think this change will greatly improve usability and understanding of the NEC. This issue needs to be brought forth through the Technical Correlating Committee.
ZANICCHI: The term "bonding" is technically correct for this conductors application. This conductor is there to "bond" equipment to the "system grounded conductor, the grounding electrode conductor or both" at the service equipment as stated in Article 100. The use of the term "bonding" instead of "grounding" does not change the function of the conductor but it will help make the code more understandable. An example: A journeyman says to their apprentice "That 3 phase 208v mixer needs to be grounded". The apprentice asks themselves "does the journeyman mean that this mixer needs a grounded conductor brought to it? If we used the term "bonded" instead of "grounded" the journeyman would have said "That 3 phase 208v mixer needs to be bonded". Clearly, the separation of the terms grounded and bonded makes the journeyman's statement easier to understand. I hope that other panels consider making this change, especially Panel 5 which deals with Article 250, and that we "Accept in Principal" the change as I believe it will make a difference in the usability of the code.

19-120 Log #643 NEC-P19 **Final Action: Reject**
(552-44(C)(2))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add:
If a right-angle attachment plug is used, the configuration of the cap and receptacle shall be oriented so that when inserted the cord extends directly downward from the cap.

Substantiation:

This proposal is similar to 550.10(C) for 50-ampere 4-wire cords which used for park trailers are just as heavy and subject to strain from 90° or 180° bends.

Panel Meeting Action: Reject

Panel Statement:

The current text provides necessary requirements for the receptacle configuration. Arranging the receptacle so that the cord will hang freely is the responsibility of the receptacle installer.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-121 Log #630 NEC-P19 **Final Action: Reject**
(552-44(C)(3) (New))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add new text to read as follows:
(3) Attachment Plug Cap. If a right-angle cap is used, the configuration of the cap and receptacle shall be oriented so that when the cap is inserted the cord extends directly downward from the cap.

Substantiation:

It is difficult to ascertain which provisions of Articles 550 and 551 are intended to apply, since this is a separate article and contains many similar rules. The intent of the proposal is similar to that of 550.10(C).

Panel Meeting Action: Reject

Panel Statement:

The current text provides necessary requirements for the receptacle configuration. Arranging the receptacle so that the cord will hang freely is the responsibility of the receptacle installer.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-122 Log #2260 NEC-P19 **Final Action: Reject**
(552-45((A)))

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text as follows:
552.45 Distribution Panelboard.
(A) Listed and Appropriately Rated. A listed and appropriately rated distribution panelboard or other equipment specifically listed for the purpose shall be used. The ~~grounded~~ earth conductor termination bar shall be insulated from the enclosure as provided in 552.55(C). An equipment grounding terminal bar shall be attached inside the metal enclosure of the panelboard.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word "ground" or "grounded" is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP-19 that changing the existing terminology will result in enhanced understanding of this concept. CMP-19 does recommend to CMP-1 that a FPN referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-121a Log #CP1913 NEC-P19 **Final Action: Accept**
(552.45(A))

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and clarify the intended purpose of the listing. Is the intended purpose as a distribution panel, as a park trailer panel, or some other listing? This action will be considered by the panel as a public comment.

Submitter: Code-Making Panel 19

Recommendation:

Revise the first sentence as follows: A listed and appropriately rated distribution panelboard or other equipment specifically listed for this purpose shall be used.

Substantiation:

Based on the Usability Task Group's request to review all occurrences of the phrase "listed for the purpose" to ensure that it provides clear direction, the panel concludes the revised language clarifies its use in this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-123 Log #783 NEC-P19 **Final Action: Reject**
(552-46)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete present wording of this section and substitute:
Branch Circuits. Where branch circuits are installed, they shall be in accordance with 551.42.

Substantiation:

A park trailer (not over 400 sq. ft) covered by this article and a travel trailer (less than 320 sq. ft) covered by Article 551 appear to be primarily distinguished by the Code according to square foot area yet there are differences in Code provisions for a park trailer of 300 sq. ft and a travel trailer of 300 sq. ft. For example, 552.46 doesn't allow for one supply circuit; 551.42(A) and (B) do. Where more than five circuits are "needed" (or just provided?) 551.42(D) and 552.46(B) differ. Section 552.47 specifies load calculations for park trailer feeder assemblies and panelboards; 551.73 provides for load calculations for site service and feeders, not the vehicle. Small appliance branch circuits are apparently required in 552.46(B)(2) but not required in Article 551.

Panel Meeting Action: Reject

Panel Statement:

The submitter did not provide sufficient technical substantiation to support this change to equate park trailer requirements with those for dwelling units.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-124 Log #1329 NEC-P19 **Final Action: Accept**
(552-46(B)(3), FPN 2)

Submitter: National Electrical Code Technical Correlating Committee

Recommendation:

Replace the term "computed" with the term "calculated" in the following sections:
552.46(B)(3) FPN No. 2.

Substantiation:

This proposal is the result of an effort by the NEC Usability Task Group to standardize the language throughout the NEC relative to the use of the terms computed and calculated. After analyzing the usage, the group agreed that the term "calculated" was the best term for use throughout the NEC. This is one in a series of proposals to standardize on the term calculated.

The term "calculate" and its derivatives is presently used in the article title, section titles, and throughout portions of the existing article. Other Articles of the NEC such as for calculating conductor ampacties (under engineering supervision), calculating the size of enclosures, and in Annex D use the term calculate. Additionally, the term "calculate" is more commonly used in other NFPA codes and standards e.g. NFPA 70E, arc flash calculation. Adversely, the term "computation" has a connotation of using a computer, although "load calculations" are frequently determined using a calculator. It appears that the term "computation" was used more frequently beginning with the 1975 NEC based on an editorial revision project.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-125 Log #793 NEC-P19 **Final Action: Reject**
(552-47(A) and (C))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete present text of first paragraph and (A) and (C) and substitute:
The branch circuit and feeder assembly load shall be computed in accordance with Article 220 requirements for dwelling units.

Substantiation:

Separate requirements for park trailers, which are similar in most respects, but not all, to Article 220, are confusing and unnecessary since they are well covered by Article 220. Subsection (C) is unlikely to be usable for park trailers (limited to 400 sq. ft.) since 220.30 only applies where supply conductors have an ampacity of 100 or more. However, the permitted use of that section indicates Article 220 is adequate for load calculations.

Panel Meeting Action: Reject

Panel Statement:

The submitter did not provide sufficient technical substantiation to support this change to equate park trailer requirements with those for dwelling units.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-125a Log #CP1914 NEC-P19 **Final Action: Accept**
(552.48(P)(2))

Submitter: Code-Making Panel 19

Recommendation:

Revise the first sentence as follows: (2) The load end of the circuit shall terminate in a junction box with a blank cover or other listed enclosure

Substantiation:

Based on the Usability Task Group's request to review all occurrences of the phrase "listed for the purpose" to ensure that it provides clear direction, the panel concludes the revised language clarifies its use in this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-126 Log #2262 NEC-P19 **Final Action: Reject**
(552-50)

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text as follows:
552.50 ~~Grounded~~ Earth Conductors. The identification of ~~grounded~~ earth conductors shall be in accordance with 200.6.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word "ground" or "grounded" is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP-19 that changing the existing terminology will result in enhanced understanding of this concept. CMP-19 does recommend to CMP-1 that a FPN referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-127 Log #2261 NEC-P19 **Final Action: Reject**
(552-55(C))

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text as follows:
552.55 Grounding. (See also 552.57 on bonding of non-current-carrying metal parts.)
(A) Power-Supply Grounding. The grounding conductor in the supply cord or feeder shall be connected to the grounding bus or other approved grounding means in the distribution panelboard.
(B) Distribution Panelboard. The distribution panelboard shall have a grounding bus with sufficient terminals for all grounding conductors or other approved grounding means.
(C) Insulated Neutral. The ~~grounded~~ earth circuit conductor (neutral) shall be insulated from the equipment grounding conductors and from equipment enclosures and other grounded parts. The ~~grounded~~ earth ~~(neutral)~~ circuit terminals in the distribution panelboard and in ranges, clothes dryers, counter-mounted cooking units, and wall-mounted ovens shall be insulated from the equipment enclosure. Bonding screws, straps, or buses in the distribution panelboard or in appliances shall be removed and discarded. Connection of electric ranges and electric clothes dryers utilizing a ~~grounded~~ earth ~~(neutral)~~ conductor, if cord-connected, shall be made with 4-conductor cord and 3-pole, 4-wire, grounding type plug caps and receptacles.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word "ground" or "grounded" is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP-19 that changing the existing terminology will result in enhanced understanding of this concept. CMP-19 does recommend to CMP-1 that a FPN referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-128 Log #1976 NEC-P19 (552-56) **Final Action: Reject**

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:

(C) Grounding of Electrical Equipment. Where grounding of electrical equipment is specified, it shall be permitted as follows:

(1) Connection of metal raceway (conduit or electrical metallic tubing), the sheath of Type MC and Type MI cable where the sheath is identified for grounding, or the armor of Type AC cable to metal enclosures.

(2) A connection between the one or more equipment ~~grounding~~ bonding conductors and a metal box by means of a grounding screw, which shall be used for no other purpose, or a listed grounding device.

(3) The equipment ~~grounding~~ bonding conductor in nonmetallic-sheathed cable shall be permitted to be secured under a screw threaded into the luminaire (fixture) canopy other than a mounting screw or cover screw or attached to a listed grounding means (plate) in a nonmetallic outlet box for luminaire (fixture) mounting [grounding means shall also be permitted for luminaire (fixture) attachment screws].

(D) Grounding Connection in Nonmetallic Box. A connection between the one or more ~~grounding~~ bonding conductors brought into a nonmetallic outlet box shall be arranged so that a connection can be made to any fitting or device in that box that requires grounding.

(E) Grounding Continuity. Where more than one equipment ~~grounding~~ bonding conductor of a branch circuit enters a box, all such conductors shall be in good electrical contact with each other, and the arrangement shall be such that the disconnection or removal of a receptacle, fixture, including a luminaire, or other device fed from the box will not interfere with or interrupt the grounding continuity.

(F) Cord-Connected Appliances. Cord-connected appliances, such as washing machines, clothes dryers, refrigerators, and the electrical system of gas ranges, and so on, shall be grounded by means of an approved cord with equipment ~~grounding~~ bonding conductor and grounding-type attachment plug.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Bonding is defined in the NEC as the permanent joining of metallic parts together to form a conductive path. Grounding is defined in the NEC as the connection of the bonded parts to earth. The proposed change to rename this conductor does not clarify the confusion indicated by the submitter.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 2

Ballot Not Returned: 1 Zieman

Explanation of Negative:

SABIN-MERCADO: "Grounded" and "grounding" sound similar but are intended to describe two totally different concepts. However, these terms are often used interchangeably by users of the NEC. In fact, there are places in the NEC where these terms are used interchangeably. The words ground, grounded and grounding will apply to the concept of connecting an electrical system to the earth. While the words bond, bonded and bonding will apply to the concept of connecting together noncurrent carrying conductive parts likely to become energized so that they form an effective ground fault path back to the source. If the terms are not similar, the concepts can be more easily differentiated by the users. I think this change will greatly improve usability and understanding of the NEC. This issue needs to be brought forth through the Technical Correlating Committee.

ZANICCHI: The term "bonding" is technically correct for this conductors application. This conductor is there to "bond" equipment to the "system grounded conductor, the grounding electrode conductor or both" at the service equipment as stated in Article 100. The use of the term "bonding" instead of "grounding" does not change the function of the conductor but it will help make the code more understandable. An example: A journeyman says to their apprentice "That 3 phase 208v mixer needs to be grounded". The apprentice asks themselves "does the journeyman mean that this mixer needs a grounded conductor brought to it? If we used the term "bonded" instead of "grounded" the journeyman would have said "That 3 phase 208v mixer needs to be bonded". Clearly, the separation of the terms grounded and bonded makes the journeyman's statement easier to understand. I hope that other panels consider making this change, especially Panel 5 which deals with Article 250, and that we "Accept in Principal" the change as I believe it will make a difference in the usability of the code.

19-129 Log #1481 NEC-P19 (552-59(B)) **Final Action: Accept**

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and convert the SI dimension to millimeters. This action will be considered by the panel as a public comment.

Submitter: Steven W. Grant, Encompass Electrical Technologies

Recommendation:

Revise text to read as follows:

(B) Outside Heating Equipment, Air-Conditioning Equipment, or Both. A park trailer provided with a branch circuit designed to energize outside heating equipment or air-conditioning equipment, or both, located outside the park trailer, other than room air conditioners, shall have such branch-circuit conductors terminate in a listed outlet box or disconnecting means located on the outside of the park trailer. A label shall be permanently affixed ~~adjacent to the outlet box~~ within fifteen centimeters (six inches) from the listed box or disconnecting means, and shall contain the following information:

This Connection Is For Heating
And/Or Air-Conditioning Equipment.
The Branch Circuit Is Rated At Not More Than _____Amperes,
At_____Volts, 60-Hz, _____ Conductor Ampacity. A
Disconnecting Means Shall Be Located Within Sight Of The
Equipment.

The correct voltage and ampere rating shall be given. The tag shall not be less than 0.51 mm (0.020 in.) thick etched brass, stainless steel, anodized or alclad aluminum, or equivalent. The tag shall not be less than 75 mm x 45 mm (3 in. x 1 3/4 in.) minimum size.

Substantiation:

As stated in the 2002 Style Manual 3.2.1, the word adjacent is a possibly unenforceable word and leaves the positioning of the information label open to interpretation. The wordage I have suggested should be more enforceable.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12

Ballot Not Returned: 1 Zieman

19-130 Log #2263 NEC-P19 **Final Action: Reject**
(552-60(A & B))

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text as follows:
552.60 Factory Tests (Electrical). Each park trailer shall be subjected to the following tests.
(A) Circuits of 120 Volts or 120/240 Volts. Each park trailer designed with a 120-volt or a 120/240-volt electrical system shall withstand the applied potential without electrical breakdown of a 1-minute, 900-volt dielectric strength test, or a 1-second, 1080-volt dielectric strength test, with all switches closed, between ungrounded and ~~grounded~~ earth conductors and the park trailer ground. During the test, all switches and other controls shall be in the "on" position. Fixtures, including luminaires, and permanently installed appliances shall not be required to withstand this test. Each park trailer shall be subjected to the following:
(1) A continuity test to ensure that all metal parts are properly bonded
(2) Operational tests to demonstrate that all equipment is properly connected and in working order
(3) Polarity checks to determine that connections have been properly made
(4) Receptacles requiring GFCI protection shall be tested for correct function by the use of a GFCI testing device
(B) Low-Voltage Circuits. Low-voltage circuit conductors in each park trailer shall withstand the applied potential without electrical breakdown of a 1-minute, 500-volt or a 1-second, 600-volt dielectric strength test. The potential shall be applied between ungrounded and ~~grounded~~ earth conductors. The test shall be permitted on running light circuits before the lights are installed, provided the unit's outer covering and interior cabinetry have been secured. The braking circuit shall be permitted to be tested before being connected to the brakes, provided the wiring has been completely secured.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word "ground" or "grounded" is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.
I propose to change the word "grounded" to "earth" throughout the code book, when the word "grounded" is used in reference to a conductor.
The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.
I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject
Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP-19 that changing the existing terminology will result in enhanced understanding of this concept. CMP-19 does recommend to CMP-1 that a FPN referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 13
Ballot Results: Affirmative: 12
Ballot Not Returned: 1 Zieman

19-131 Log #1352 NEC-P19 **Final Action: Accept in Principle**
(553-4)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text:
The service equipment for a floating building shall be located adjacent to, but not in or on, the building or a floating pier, wharf, or dock.

Substantiation:

Service equipment is not presently prohibited on a floating pier, wharf, or dock. the proposal would correlate with 555.7 which prohibits service equipment on floating structures associated with marinas and boatyards, which if justified for safety, is equally justified for this article.

Panel Meeting Action: Accept in Principle
Revise 553.4 to read:
The service equipment for a floating building shall be located adjacent to, but not in or on, the building or any floating structure.
Panel Statement:

The panel revision to this section correlates with the requirement in 555.7.

Number Eligible to Vote: 8
Ballot Results: Affirmative: 8

19-132 Log #693 NEC-P19 (553-8) **Final Action: Accept in Principle**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise second sentence:
The grounding bus shall be grounded through a ~~green-colored~~ insulated conductor run with the feeder conductors and identified in accordance with 250.119, except that stripping the insulation shall not be permitted. (remainder unchanged).

Substantiation:

Insulated neutrals larger than 6 AWG are permitted by 553.9 to be identified by other than insulation color. There does not seem to be a safety reason not to permit the same for equipment grounding conductors larger than 6 AWG.

Panel Meeting Action: Accept in Principle

Revise 553.8 to read:

553.8 General Requirements. Grounding at floating buildings shall comply with 553.8 (A) through (D).
(A) Grounding of Electrical and Nonelectrical Parts. Grounding of both electrical and nonelectrical parts in a floating building shall be through connection to a grounding bus in the building panelboard.
(B) Installation and Connection of Equipment Grounding Conductor. The equipment grounding conductor shall be installed with the feeder conductors and connected to a grounding terminal in the service equipment.
(C) Identification of Equipment Grounding Conductor. The equipment grounding conductor shall be an insulated copper conductor with a continuous outer finish that is either green or green with one or more yellow stripes. For conductors larger than 6 AWG, or where multiconductor cables are used, re-identification of conductors as allowed in 250.119(A)(2) and (A)(3) or 250.119(B)(2) and (B)(3) shall be permitted.
(D) Grounding Electrode Conductor Connection. The grounding terminal in the service equipment shall be grounded by connection through an insulated grounding electrode conductor to a grounding electrode on shore.

Panel Statement:

The panel action correlates this requirement with that in 555.15(B) in regard to reidentification of conductors for use as equipment grounding conductors and also has revised this section for compliance with the NEC Style Manual.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-133 Log #1977 NEC-P19 **Final Action: Reject**
(553-8)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
553.8 General Requirements. Grounding of both electrical and nonelectrical parts in a floating building shall be through connection to a grounding bus in the building panelboard. The grounding bus shall be grounded through a green-colored insulated equipment ~~grounding~~ bonding conductor run with the feeder conductors and connected to a grounding terminal in the service equipment. The grounding terminal in the service equipment shall be grounded by connection through an insulated grounding electrode conductor to a grounding electrode on shore.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Bonding is defined in the NEC as the permanent joining of metallic parts together to form a conductive path. Grounding is defined in the NEC as the connection of the bonded parts to earth. The proposed change to rename this conductor does not clarify the confusion indicated by the submitter.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 6 Negative: 2

Explanation of Negative:

SABIN-MERCADO: "Grounded" and "grounding" sound similar but are intended to describe two totally different concepts. However, these terms are often used interchangeably by users of the NEC. In fact, there are places in the NEC where these terms are used interchangeably. The words ground, grounded and grounding will apply to the concept of connecting an electrical system to the earth. While the words bond, bonded and bonding will apply to the concept of connecting together noncurrent carrying conductive parts likely to become energized so that they form an effective ground fault path back to the source. If the terms are not similar, the concepts can be more easily differentiated by the users. I think this change will greatly improve usability and understanding of the NEC. This issue needs to be brought forth through the Technical Correlating Committee.

ZANICCHI: The term "bonding" is technically correct for this conductors application. This conductor is there to "bond" equipment to the "system grounded conductor, the grounding electrode conductor or both" at the service equipment as stated in Article 100. The use of the term "bonding" instead of "grounding" does not change the function of the conductor but it will help make the code more understandable. An example: A journeyman says to their apprentice "That 3 phase 208v mixer needs to be grounded". The apprentice asks themselves "does the journeyman mean that this mixer needs a grounded conductor brought to it? If we used the term "bonded" instead of "grounded" the journeyman would have said "That 3 phase 208v mixer needs to be bonded". Clearly, the separation of the terms grounded and bonded makes the journeyman's statement easier to understand. I hope that other panels consider making this change, especially Panel 5 which deals with Article 250, and that we "Accept in Principal" the change as I believe it will make a difference in the usability of the code.

19-134 Log #789 NEC-P19 **Final Action: Reject**
(553-9)

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Insulated ~~Neutral~~ Grounded Conductor (May be a neutral). The grounded circuit conductor (neutral) shall be an insulated conductor identified in conformance with 200.6. The ~~neutral~~ grounded conductor shall be... (remainder unchanged).

Substantiation:

Edit. The grounded conductor may or may not be a neutral even though this section is worded to suggest it always is.

Panel Meeting Action: Reject

Panel Statement:

The proposed text does not add clarity to this section.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-135 Log #2264 NEC-P19 (553-9) **Final Action: Reject**

Submitter: Ted L. Smith, Sr., Encompass Electrical Technologies-Rocky Mountains Inc.

Recommendation:

Revise text as follows:

553.9 Insulated Neutral. The ~~grounded~~ earth circuit conductor (neutral) shall be an insulated conductor identified in conformance with 200.6. The neutral conductor shall be connected to the equipment grounding terminal in the service equipment, and, except for that connection, it shall be insulated from the equipment grounding conductors, equipment enclosures, and all other grounded parts. The neutral circuit terminals in the panelboard and in ranges, clothes dryers, counter-mounted cooking units, and the like shall be insulated from the enclosures.

Substantiation:

The word "Grounded" is often times misused or misunderstood in general application. Misunderstandings arise when discussing grounded conductors and equipment grounding conductors. The general use of the word "ground" or "grounded" is often mistakenly used for either situation. A change of the word "grounded" to the word "earth" will help to resolve this misunderstanding and allow for more accurate communication of requirements and standards.

I propose to change the word "grounded" to "earth" throughout the code book, when the word "grounded" is used in reference to a conductor.

The NFPA has repeatedly stated its desire for unified international standards. The NEC is a great standard with the proper code making process to make it timely and effective. Any move to make the NEC the international standard will improve the building industry. Many countries currently refer to the grounded conductor or neutral as the "earth" conductor. Changing the NEC to this terminology will help to move the NEC towards an international standard.

I believe this change will help with the understanding of the NEC, improve the user friendliness of the NEC and help make the NEC more palatable as an international standard.

Panel Meeting Action: Reject

Panel Statement:

The terms "ground" and "grounded" are defined in Article 100. The submitter's substantiation has not convinced CMP 19 that changing the existing terminology would result in enhanced understanding of this concept. CMP 19 does recommend to CMP 1 that a fine print note referencing the term "earthing", as used in other parts of the world per IEC 60364, be added to the Article 100 definition of "grounded".

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-136 Log #1978 NEC-P19 (553-10(B)) **Final Action: Reject**

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(B) Cord-Connected Appliances. Where required to be grounded, cord-connected appliances shall be grounded by means of an equipment ~~grounding~~ bonding conductor in the cord and a grounding-type attachment plug.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Bonding is defined in the NEC as the permanent joining together of metallic parts to form a conductive path. Grounding is defined in the NEC as the connection of the bonded parts to earth. The proposed change to rename this conductor does not clarify the confusion indicated by the submitter.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 6 Negative: 2

Explanation of Negative:

SABIN-MERCADO: "Grounded" and "grounding" sound similar but are intended to describe two totally different concepts. However, these terms are often used interchangeably by users of the NEC. In fact, there are places in the NEC where these terms are used interchangeably. The words ground, grounded and grounding will apply to the concept of connecting an electrical system to the earth. While the words bond, bonded and bonding will apply to the concept of connecting together noncurrent carrying conductive parts likely to become energized so that they form an effective ground fault path back to the source. If the terms are not similar, the concepts can be more easily differentiated by the users. I think this change will greatly improve usability and understanding of the NEC. This issue needs to be brought forth through the Technical Correlating Committee.

ZANICCHI: The term "bonding" is technically correct for this conductors application. This conductor is there to "bond" equipment to the "system grounded conductor, the grounding electrode conductor or both" at the service equipment as stated in Article 100. The use of the term "bonding" instead of "grounding" does not change the function of the conductor but it will help make the code more understandable. An example: A journeyman says to their apprentice "That 3 phase 208v mixer needs to be grounded". The apprentice asks themselves "does the journeyman mean that this mixer needs a grounded conductor brought to it? If we used the term "bonded" instead of "grounded" the journeyman would have said "That 3 phase 208v mixer needs to be bonded". Clearly, the separation of the terms grounded and bonded makes the journeyman's statement easier to understand. I hope that other panels consider making this change, especially Panel 5 which deals with Article 250, and that we "Accept in Principal" the change as I believe it will make a difference in the usability of the code.

19-137 Log #692 NEC-P19 (555-12) **Final Action: Accept in Principle in Part**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text:

General lighting and other loads shall be calculated in accordance with Article 220, and in addition the load for each service and/~~or~~ feeder circuit supplying receptacles that provide shore power for boats shall be permitted to be calculated using the demand factor shown in Table 555.12. The calculations shall be permitted to be modified as indicted in Notes (1) and (2).

Exception: Where demand factors less than 100 percent are used, as permitted in Table 555.12, there shall be no reduction of the (capacity) (ampacity) of the neutral as permitted in 220.22. (alternate choices in parentheses).

Table 555.12 - No Change.

Delete present Note 1 and substitute: Where two or more shore power receptacles with different ratings are provided for an individual boat slip (for example, 30-ampere 125-volt, 50-amperes 125/250-volt, 100-ampere 125/250-volt), only the receptacle with the highest volt-ampere load capacity shall be required to be calculated where supplied from a common service or feeder.

Substantiation:

Demand factors that reduce the calculated load should be permitted, not required. Note 1 for Table 555.12 should allow for two or more receptacles. The difference in ratings should not be limited to voltages. For example, a boat slip with a 50-ampere 125/250-volt and a 100-ampere 125/250-volt receptacle; there is no difference in voltage and Note 1 is not literally applicable. In the absence of knowledge of what a boat load demand factor and power factor is virtually impossible to determine which receptacle has the larger kilowatt demand. Volt-amperes not watts, usually determine Code load values.

Since different rated receptacles may be supplied by different services or feeders, Note 1 should apply only where a common service or feeder is used.

For larger feeder or service conductors the application of Tables 555.12 and 220.22 could result in a demand factor applied to demand factor, which could result in an overloaded neutral where many 120 volt loads are supplied, especially if unbalanced.

Panel Meeting Action: Accept in Principle in Part

Revise 555.12 to read:

General lighting and other loads shall be calculated in accordance with Article 220, and, in addition, the demand factors set forth in Table 555.12 shall be permitted for each service and/or feeder circuit supplying receptacles that provide shore power for boats. These calculations shall be permitted to be modified as indicated in notes (1) and (2).

The remaining text, table, and notes remain unchanged.

Panel Statement:

The panel agrees in principle with the recommendation to modify the text in 555.12 regarding the mandatory use of demand factors and has revised the requirement to this effect. The substantiation submitted for the remaining recommendations is not sufficient to warrant the other proposed changes.

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

19-138 Log #1818 NEC-P19 (Table 555-12) **Final Action: Reject**

Submitter: Gilbert L. Thompson, MEIA Codes and Standards

Recommendation:

In Table 555.12 Demand Factors, under the heading titled, Number of Receptacles, add in parentheses (Connected Per Phase).

Substantiation:

Some marinas and boatyards have shore power outlets that feed different conditions that exist for an area. One pier sometimes will only accommodate 120 volt receptacles (individually metered). An example of the problem would be 16 slips fed at 120 volts, which would have 8 receptacles per phase. When using the table, the demand factor for 8 receptacles would be 90 percent. Whereas, if you took the total of 16 receptacles, the demand factor is 70 percent. There is a great difference in the calculation of the feeder required to serve these receptacles when using the lower demands.

Panel Meeting Action: Reject

Panel Statement:

This section was revised in the 1999 NEC based on extensive data supplied to CMP 19. This proposal would change the text to what was in the 1996 NEC. No technical data has been provided to indicate that the present requirement has led to overloaded conductors. During the 1999 NEC cycle the panel concluded that the method currently in this section provides realistic load calculations.

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

19-139 Log #2126 NEC-P19 **Final Action: Reject**
(Table 555-12)

Submitter: Leonard L. Johnson, Dept. of Insp, Licenses & Permits, Howard Cnty, MD

Recommendation:

Revise as follows:

INSERT TABLE 555.12 HERE

(Table shown on page 2786)

Substantiation:

As the table is currently written,there are circumstances where adding receptacles would make the service or feeder a lesser ampere rating than it would be for fewer receptacles. For example, you could have a lesser rated service for 34 receptacles than for 30 or a lesser rated service for 45 receptacles than for 40 or lesser for 60 than 50 or lesser for 90 than 70, etc. The new table would correct the problem without substantially changing the current demand factors.

Panel Meeting Action: Reject

Panel Statement:

This section was revised in the 1999 NEC based on extensive data supplied to CMP-19. No technical data has been provided to indicate that the present requirement has led to overloaded conductors. During the 1999 NEC cycle the panel concluded that the method currently in this section provides realistic load calculations.

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

19-140 Log #1979 NEC-P19 **Final Action: Reject**
(555-15)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
555.15 Grounding. Wiring and equipment within the scope of this article shall be grounded as specified in Article 250 and with the following additional requirements.
(A) Equipment to Be Grounded. The following items shall be connected to an equipment ~~grounding~~ bonding conductor run with the circuit conductors in the same raceway, cable, or trench:
(1) Metal boxes, metal cabinets, and all other metal enclosures
(2) Metal frames of utilization equipment
(3) Grounding terminals of grounding-type receptacles
(B) Type of Equipment ~~Grounding~~ Bonding Conductor. The equipment ~~grounding~~ bonding conductor shall be an insulated copper conductor with a continuous outer finish that is either green or green with one or more yellow stripes. The equipment ~~grounding~~ bonding conductor of Type MI cable shall be permitted to be identified at terminations. For conductors larger than 6 AWG, or where multiconductor cables are used, re-identification of conductors as allowed in 250.119(A)(2) and (A)(3) or 250.119(B)(2) and (B)(3) shall be permitted.
(C) Size of Equipment ~~Grounding~~ Bonding Conductor. The insulated copper equipment ~~grounding~~ bonding conductor shall be sized in accordance with 250.122 but not smaller than 12 AWG.
(D) Branch-Circuit Equipment ~~Grounding~~ Bonding Conductor. The insulated equipment ~~grounding~~ bonding conductor for branch circuits shall terminate at a grounding terminal in a remote panelboard or the grounding terminal in the main service equipment.
(E) Feeder Equipment Grounding Conductors. Where a feeder supplies a remote panelboard, an insulated equipment ~~grounding~~ bonding conductor shall extend from a grounding terminal in the service equipment to a grounding terminal in the remote panelboard.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Bonding is defined in the NEC as the permanent joining together of metallic parts to form a conductive path. Grounding is defined in the NEC as the connection of the bonded parts to earth. The proposed change to rename this conductor does not clarify the confusion indicated by the submitter.

Number Eligible to Vote: 9

Ballot Results: Affirmative: 7 Negative: 2

Explanation of Negative:

SABIN-MERCADO: "Grounded" and "grounding" sound similar but are intended to describe two totally different concepts. However, these terms are often used interchangeably by users of the NEC. In fact, there are places in the NEC where these terms are used interchangeably. The words ground, grounded and grounding will apply to the concept of connecting an electrical system to the earth. While the words bond, bonded and bonding will apply to the concept of connecting together noncurrent carrying conductive parts likely to become energized so that they form an effective ground fault path back to the source. If the terms are not similar, the concepts can be more easily differentiated by the users. I think this change will greatly improve usability and understanding of the NEC. This issue needs to be brought forth through the Technical Correlating Committee.
ZANICCHI: The term "bonding" is technically correct for this conductors application. This conductor is there to "bond" equipment to the "system grounded conductor, the grounding electrode conductor or both" at the service equipment as stated in Article 100. The use of the term "bonding" instead of "grounding" does not change the function of the conductor but it will help make the code more understandable. An example: A journeyman says to their apprentice "That 3 phase 208v mixer needs to be grounded". The apprentice asks themselves "does the journeyman mean that this mixer needs a grounded conductor brought to it? If we used the term "bonded" instead of "grounded" the journeyman would have said "That 3 phase 208v mixer needs to be bonded". Clearly, the separation of the terms grounded and bonded makes the journeyman's statement easier to understand. I hope that other panels consider making this change, especially Panel 5 which deals with Article 250, and that we "Accept in Principal" the change as I believe it will make a difference in the usability of the code.

19-141 Log #804 NEC-P19 **Final Action: Accept**
(555-19(A)(4))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Revise text to read as follows:
Ratings. Receptacles that provide shore power for boats shall be rated not less than 30-amperes and shall be single ~~outlet~~ type.

Substantiation:

Edit. Receptacles are generally referred to in the Code as single or multiple type. A single "outlet" may contain multiple receptacles.

Panel Meeting Action: Accept

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

19-142 Log #1056 NEC-P19 (555-21) **Final Action: Accept**

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and correlate the action with the action on Proposal 19-143. This action shall be considered by the panel as a public comment.

Submitter: Robert A. McCullough, Ocean County Construction Insp. Dept.,

Recommendation:

Revise text to read as follows:

555.21 ~~Gasoline~~ Motor Fuel Dispensing Stations - Hazardous (Classified) Locations. Electrical wiring and equipment located at or serving ~~gasoline~~ motor fuel dispensing stations shall comply with Article 514 in addition to the requirements of this article. All electrical wiring for power and lighting shall be installed on the side of the wharf pier, or dock opposite from the liquid piping system.

FPN: See NFPA 303-2000, Fire Protection Standard for Marinas and Boatyards, and NFPA 30A-2000, Motor Fuel Dispensing Facilities and Repair Garages, for additional information.

Substantiation:

The title is revised as "motor fuel" dispensing stations to reflect the change in terminology from Article 514 and NFPA 30A. This term is also used in the first sentence of text. The second sentence is added as this is an existing requirement from NFPA 30A 11.5.4. Since this is an installation requirement for the wiring system, it is felt that this should be stated here in the NEC rather than have to apply a reference to another document that may not be readily available to the installing contractor. The FPN is added back into this section as it was inadvertently deleted in the 2002 rewrite by an overzealous mouse click during the cut and paste operation by the submitter.

Panel Meeting Action: Accept

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

Comment on Affirmative:

TIPTON: I agree with the panel action to keep NFPA 70 as the primary standard for the electrical industry.

19-143 Log #2678 NEC-P19 (555-21) **Final Action: Accept in Principle**

TCC Action:

The Technical Correlating Committee directs the panel to reconsider the proposal and correlate the action with the action on Proposal 19-142. This action shall be considered by the panel as a public comment.

Submitter: Phil Simmons, Simmons Electrical Services

Recommendation:

Revise existing Section 555.21 as follows:

555.21 Gasoline Dispensing Stations — Hazardous (Classified) Locations.

(A) General. Electrical wiring and equipment located at or serving gasoline dispensing equipment ~~stations~~ located on shore shall comply with Article 514 ~~in addition to the requirements of this article.~~ For other than the classification of Class I, Division 1 and 2 areas, electrical wiring and equipment for gasoline dispensing equipment located on fixed or floating portions of docks or piers shall comply with Article 514.

(B) Classification of Class I, Division 1 and 2 Areas.

(1) Closed Construction. Where the construction of floating docks or piers is closed, such as concrete enclosed expanded foam or similar construction, and having integral service boxes with supply chases, the following shall be used for the purpose of applying Table 514.3(B)(1).

Exception: Where space between dock sections does not permit gasoline liquid or vapor to dissipate, the entire length of the assembled dock sections shall be classified Class I, Division 2.

(a) The space above the surface of the deck shall be a Class I, Division 2 location.

(b) The space below the surface of the deck shall be a Class I, Division 1location that shall extend to the surface of the water.

(2) Open Construction. Where the construction of floating docks or piers is open, such as decks built on stringers supported by floats or pontoons or similar construction, the following shall be used for the purpose of applying Table 514.3(B)(1)

(a) The space below the surface of the deck down to the water level shall be a Class I, Division 2location.

Substantiation:

This proposal intends to expand and clarify the requirements for installing electrical wiring to and in the vicinity of gasoline dispensing equipment installed at marinas and boatyards. It also intends to bring the requirements in this section up to date with actual construction practices.

Floating docks are being manufactured with expanded foam cores that are encapsulated in concrete. Flush mounted deck boxes are sometimes cast in place. One or more 4 in. PVC chases are installed between deck boxes and from the deck boxes to the end of the dock sections. This is done to accommodate installation of gasoline pipes, diesel fuel lines, water and waste disposal piping as well as for installation of power, communications, television and other wiring. Please see the drawings that are intended to illustrate typical cross-section views of this construction.

Note that this construction provides boxes at deck level that can easily collect gasoline liquid and vapors that are heavier than air. Gasoline spills can occur at marinas for all the same reasons they do at land-based fuel dispensing facilities. The PVC chases then allow gasoline liquid and vapor to travel throughout the length of the dock sections. As a result, the surface of the deck should be designated equivalent to the surface of the earth with the Class I, Division 2 space above the deck and Class I, Division 1 below the Class I, Division 2 area.

Depending on assembly of the dock sections, there may be from 1 inch to no air space between sections. Where adequate ventilation to atmosphere cannot be assured by design and assembly of the float sections, the Class I, Division 1 area should extend the full length of the dock sections as the PVC chases easily transmit the gasoline liquid or vapor.

Where docks are constructed in this manner, additional clarification of the extent of hazardous locations is required since Table 514.3(B)(1) and 514.8 clearly apply to land-based gasoline dispensing locations but not to dispensing equipment installed at marinas. Yet, 551.21 simply requires compliance with Article 514. Some of these requirements are difficult to apply to dock construction of the concrete encapsulated constructions.

For open dock construction, a framework of stringers or beams are installed on floats with a variety of flooring materials installed. This construction typically has fuel lines and electrical wiring installed under the decking. Like closed construction, gasoline dispensers are installed over fiberglass tubs. For this open type of construction, gasoline vapors can easily dissipate so the Class I, Division 2 area from the deck surface to the water surface seems appropriate and complies with NFPA 30A. There would be no Class I, Division 1 area for this type of construction.

Insert Artwork Here

Panel Meeting Action: Accept in Principle

Change "Gasoline Dispensing" to "Motor Fuel Dispensing" in the title and other locations in the proposed text.

Panel Statement:

The panel action reflects the terminology used in NFPA 30A and Article 514. See panel action on Proposal 19-142.

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

19-144 Log #798 NEC-P19 (555-23) **Final Action: Reject**

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete latter portion of the last sentence:

~~"...and be provided with an outer jacket of distinctive color for safety.~~"

Substantiation:

"Distinctive" is vague and not defined. This requirement is not in Articles 490 or 610.

Panel Meeting Action: Reject

Panel Statement:

The panel concludes that the term "distinctive" as used in numerous locations throughout the Code and as defined in the dictionary is sufficiently clear as to the intended meaning when taken in context. This requirement can also be found in NFPA 303.

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

18-105 Log #3136 NEC-P18 **Final Action: Accept in Principle**
(600)

Submitter: Stephen G. Kieffer, National Electric Sign Association

Recommendation:

International Sign Association Proposal #1 - "Low-Voltage Provisions":
Revised the following sections of Article 600 to provide for the use of low-voltage components in signs and outline lighting:
600.1 Scope.
This article covers the installation of conductors and equipment for electric signs and outline lighting as defined in Article 100.
FPN: As defined in Article 100, electric signs and outline lighting include all products and installations ~~utilizing neon tubing,~~ such as signs, decorative elements, skeleton tubing, or art forms utilizing all illumination sources.
600.4 Markings
(C) Class 2 Systems. Signs and outline lighting operating from Class 2 power source shall be marked with AC or DC ratings and each low voltage secondary circuit identified.
600.7 Grounding.
Other than individual sections of a Section Sign that contain only live parts connected to a qualifying Class 2 power source, signs and metal equipment of outline lighting systems shall be grounded.
600.21 Ballasts, Transformers, Electronic Power Supplies, and Class 2 Power Sources.
(A) Accessibility. Ballasts, transformers, ~~and~~ electronic power supplies, and Class 2 Power Sources shall be located where accessible and shall be securely fastened in place.
(B) Locations. Ballasts, transformers, electronic power supplies, and Class 2 Power Sources shall be installed as near to the lamps or neon tubing as practicable to keep the secondary conductors as short as possible.
(C) Wet Location. Ballasts, transformers, ~~and~~ electronic power supplies, and Class 2 Power Sources used in wet locations shall be of the weatherproof type or be of the outdoor type and protected from the weather by placement in a sign body or separate enclosure.
(D) Working Space. A working space at least 900 mm (3 ft) high, 900 mm (3 ft) wide, by 900 mm (3 ft) deep shall be provided at each ballast, transformer, ~~and~~ electronic power supply, and Class 2 Power Sources or its enclosure where not installed in a sign.
(E) Attic and Soffit Locations. Ballasts, transformers, ~~and~~ electronic power supplies, and Class 2 Power Sources shall be permitted to be located in attics and soffits, provided there is an access door at least 900 mm by 600 mm (3 ft by 2 ft) and a passageway of at least 900 mm (3 ft) high by 600 mm (2 ft) wide with a suitable permanent walkway at least 300 mm (12 in.) wide extending from the point of entry to each component.
(F) Suspended Ceilings. Ballasts, transformers, ~~and~~ electronic power supplies, and Class 2 Power Sources shall be permitted to be located above suspended ceilings, provided their enclosures are securely fastened in place and not dependent on the suspended ceiling grid for support. Ballasts, transformers, ~~and~~ electronic power supplies, and Class 2 Power Sources installed in suspended ceilings shall not be connected to the branch circuit by flexible cord.
600.25 Class 2 Supply Sources.
(A) Supply Source. A Class 2 transformer or power supply shall either be Listed as a Class 2 transformer or power supply or be within a Sign with each set of output terminals marked as a Class 2 output.
600.26 Class 2 Secondary Circuits Wiring Methods. Low voltage secondary circuits of 30 volts or less that are not current and power limited in accordance with the Class 2 requirements in Article 725 shall be wired in accordance with Class 1 wiring methods. Class 2 compliant circuits shall be wired in accordance with Class 1 wiring methods or with Listed Power Limited Circuit Cable, Types PLTC, CL2, and CL3 in accordance with Article 725.
International Sign Association Proposal #2
Revised the following sections of Article 600.
600.2 Definitions.
Section Sign. A listed sign or outline lighting system shipped in parts that requires field installed wiring between the parts to complete the overall sign.
600.8 Enclosures. Live parts other than lamps, ~~and~~ neon tubing and transformers or electronic power supplies provided with an integral enclosure, including a primary and secondary circuit splice enclosure shall be enclosed.
~~Exception: A transformer or electronic power supply provided with an integral enclosure, including a primary and secondary circuit splice enclosure, shall not be required to be provided with an additional enclosure.~~
600.9 Location
(F) Hazardous Locations. Signs and outline lighting systems for use in hazardous (classified) locations shall conform to requirements in Article 500.
600.31 ~~Neon~~ Secondary-Circuit Conductors, 1000 Volts or Less, Nominal.
600.32 ~~Neon~~ Secondary Circuit Conductors, Over 1000 Volts, Nominal.
(G) Conductors in Raceways.
(1) Dry, Damp or Wet Locations. In dry, damp or wet locations, the insulation on all conductors shall extend not less than 65 mm (2-1/2 in.) beyond the metal conduit or tubing.
~~(1) Damp or Wet Locations. In damp or wet locations, the insulation on all conductors shall extend not less than 100 mm (4 in.) beyond the metal conduit or tubing.~~
~~(2) Dry Locations. In dry locations, the insulation on all conductors shall extend not less than 65 mm (2 1/2 in.) beyond the metal conduit or tubing.~~
600.39 Installation Instructions. Field-installed skeleton tubing, and section signs and outline lighting are to be provided with installation instructions and be installed in conformance with those instructions.
II. Field-Installed Skeleton Tubing
~~600.30~~ 600.40 Applicability.
Part II of this article shall apply only to field-installed skeleton tubing. These requirements are in addition to the requirements of Part I.

Substantiation:

International Sign Association Proposal #1 - "Low-voltage provisions"
Article 600 does not presently contain provisions for the use of low-voltage illumination sources, such as Light Emitting Diodes, in

signs and outline lighting. Recent technical developments have resulted in LEDs becoming a rapidly growing alternative to other light sources. Article 600 needs to recognize and properly regulate low-voltage light sources when used in signs and outline lighting.

International Sign Association Proposal #2

1. Many listed signs are manufactured and shipped to the installation location in parts or segments, for example remote wired letters. Presently the NEC does not properly recognize this situation and the requirements for field wiring of secondary circuits. Further, the sign industry erred during the 1996 ROC cycle by recommending that Part II include 600.31 and 600.32. This had the unintended impact of removing all the modifications of Chapters 1-4 contained within these sections which are necessary, not only for field installed skeleton tubing, but also to enable the proper construction and field wiring of listed signs and outline lighting. The section sign definition, and movement of 600.31 and 600.32 to the General Part accomplish the changes necessary to correct this error and resulting problems.
2. Section signs involve field wiring of secondary circuits during installations. This often necessitates specialized equipment and instructions which are specific to the listed sign or outline lighting. 600.39 Installation Instructions is necessary to insure that the installation company, which is often different than the listed product manufacturing company, and the AHJ can properly install and safely wire the secondary circuits.
3. The 600.8 proposal removes an exception.
4. The 600.9 proposal for hazardous locations addresses situations where signs are installed in hazardous locations, yet it is presently not clear that the provisions of Article 500 are applicable.
5. The 600.32 G changes recognize the improved arc-tracking performance of high voltage GTO cable as a result of the 1996 change in 600.32 B and the resulting changes to the ANSI standard for this cable, UL 814.

Panel Meeting Action: Accept in Principle

Panel Statement:

The panel concludes that their actions on Proposals 18-106, 18-107, and 18-110 address the concerns expressed in the recommendation.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-106 Log #3137 NEC-P18Meeting Action: Accept in Principle (600) **Final Action: Reject**

TCC Action: Reject

The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee "Rejects" the Panel Action. The Technical Correlating Committee directs the panel to revisit the scope of Article 600 including the existing FPN and make appropriate revisions to the scope to include the contemplated installations and eliminate any FPN that provides interpretative or mandatory language. This action will be considered by the panel as a public comment.

Submitter: Stephen G. Kieffer, National Electric Sign Association

Recommendation:

International Sign Association Proposal # 1 - "Low voltage provisions"
Revised the following sections of Article 600 to provide for the use of low-voltage components in signs and outline lighting:
600.1 Scope.
This article covers the installation of conductors and equipment for electric signs and outline lighting as defined in Article 100.
FPN: As defined in Article 100, electric signs and outline lighting include all products and installations ~~utilizing neon tubing,~~ such as signs, decorative elements, skeleton tubing, or art forms utilizing all illumination sources.
600.4 Markings
(C) Class 2 Systems. Signs and outline lighting operating from Class 2 power source shall be marked with AC or DC ratings and each low voltage secondary circuit identified.
600.7 Grounding.
Other than individual sections of a Section Sign that contain only live parts connected to a qualifying Class 2 power source, signs and metal equipment of outline lighting systems shall be grounded.
600.21 Ballasts, Transformers, Electronic Power Supplies, and Class 2 Power Sources.
(A) Accessibility. Ballasts, transformers, ~~and~~ electronic power supplies, and Class 2 Power Sources shall be located where accessible and shall be securely fastened in place.
(B) Locations. Ballasts, transformers, electronic power supplies, and Class 2 Power Sources shall be installed as near to the lamps or neon tubing as practicable to keep the secondary conductors as short as possible.
(C) Wet Location. Ballasts, transformers, ~~and~~ electronic power supplies, and Class 2 Power Sources used in wet locations shall be of the weatherproof type or be of the outdoor type and protected from the weather by placement in a sign body or separate enclosure.
(D) Working Space. A working space at least 900 mm (3 ft) high, 900 mm (3 ft) wide, by 900 mm (3 ft) deep shall be provided at each ballast, transformer, ~~and~~ electronic power supply, and Class 2 Power Sources or its enclosure where not installed in a sign.
(E) Attic and Soffit Locations. Ballasts, transformers, ~~and~~ electronic power supplies, and Class 2 Power Sources shall be permitted to be located in attics and soffits, provided there is an access door at least 900 mm by 600 mm (3 ft by 2 ft) and a passageway of at least 900 mm (3 ft) high by 600 mm (2 ft) wide with a suitable permanent walkway at least 300 mm (12 in.) wide extending from the point of entry to each component.
(F) Suspended Ceilings. Ballasts, transformers, ~~and~~ electronic power supplies, and Class 2 Power Sources shall be permitted to be located above suspended ceilings, provided their enclosures are securely fastened in place and not dependent on the suspended ceiling grid for support. Ballasts, transformers, ~~and~~ electronic power supplies, and Class 2 Power Sources installed in suspended ceilings shall not be connected to the branch circuit by flexible cord.
600.25 Class 2 Supply Sources
(A) Supply Source. A Class 2 transformer or power supply shall either be Listed as a Class 2 transformer or power supply or be within a Sign with each set of output terminals marked as a Class 2 output.
600.26 Class 2 Secondary Circuits Wiring Methods. Low voltage secondary circuits of 30 volts or less that are not current and power limited in accordance with the Class 2 requirements in Article 725 shall be wired in accordance with Class 1 wiring methods. Class 2 compliant circuits shall be wired in accordance with Class 1 wiring methods or with Listed Power Limited Circuit Cable, Types PLTC, CL2 and CL3 in accordance with Article 725.

Substantiation:

Article 600 does not presently contain provisions for the use of low-voltage illumination sources, such as Light Emitting Diodes, in signs and outline lighting. Recent technical developments have resulted in LEDs becoming a rapidly growing alternative to other light sources. Article 600 needs to recognize and properly regulate low-voltage light sources when used in signs and outline lighting.

Panel Meeting Action: Accept in Principle

Revise the Fine Print Note to 600.1 to read:
FPN: Neon art forms are considered to be covered by these requirements.

Panel Statement:

The panel concludes that their action on Proposal 18-110 addresses all of the concerns expressed in the recommendation other than to revise the fine print note. The scope statement of this article clearly indicates its applicability to signs and outline lighting thus it is not necessary to provide this information in the fine print note. However, the fine print note is retained and revised to provide the guidance regarding neon art forms. CMP 18 refers the revision to the revision of the fine print note to the Technical Correlating Committee.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-107 Log #3138 NEC-P18 **Final Action: Accept in Principle**
(600)

TCC Action:

It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. In addition, the Technical Correlating Committee directs the panel to reconsider the new 600.9(E) since the articles referenced would always apply to electrical equipment installed in those hazardous locations. This action will be considered by the panel as a public comment.

Submitter: Stephen G. Kieffer, National Electric Sign Association

Recommendation:

International Sign Association Proposal #2
Revised the following sections of Article 600.
600.2 Definitions.
Section Sign. A listed sign or outline lighting system shipped in parts that requires field installed wiring between the parts to complete the overall sign.
600.8 Enclosures.
Live parts other than lamps, ~~and~~ neon tubing and transformers or electronic power supplies provided with an integral enclosure, including a primary and secondary circuit splice enclosure shall be enclosed.
~~Exception: A transformer or electronic power supply provided with an integral enclosure, including a primary and secondary circuit splice enclosure, shall not be required to be provided with an additional enclosure.~~
600.9 Locations
(F) Hazardous Locations. Signs and outline lighting systems for use in hazardous (classified) locations shall conform to requirements in Article 500.
600.31 ~~Neon~~ Secondary-Circuit Conductors, 1000 Volts or Less, Nominal.
600.32 ~~Neon~~ Secondary Circuit Conductors, Over 1000 Volts, Nominal.
(G) Conductors in Raceways.
(1) Dry, Damp or Wet Locations. In dry, damp or wet locations, the insulation on all conductors shall extend not less than 65 mm (2-1/2 in.) beyond the metal conduit or tubing.
~~(1) Damper or Wet Locations. In damp or wet locations, the insulation on all conductors shall extend not less than 100 mm (4 in.) beyond the metal conduit or tubing.~~
~~(2) Dry Locations. In dry locations, the insulation on all conductors shall extend not less than 65 mm (2 1/2 in.) beyond the metal conduit or tubing.~~
600.39 Installation Instructions. Field-installed skeleton tubing, and section signs and outline lighting are to be provided with installation instructions and be installed in conformance with those instructions.
II Field-Installed Skeleton Tubing
~~600.30~~ 600.40 Applicability.
Part II of this article shall apply only to field-installed skeleton tubing. These requirements are in addition to the requirements of Part I.

Substantiation:

1. Many listed signs are manufactured and shipped to the installation location in parts or segments, for example remote wired letters. Presently the NEC does not properly recognize this situation and the requirements for field wiring of secondary circuits. Further, the sign industry erred during the 1996 ROC cycle by recommending that Part II include 600.31 and 600.32. This had the unintended impact of removing all the modifications of Chapters 1 - 4 contained within these sections which are necessary, not only for field installed skeleton tubing, but also to enable the proper construction and field wiring of listed signs and outline lighting. The section sign definition, and movement of 600.31 and 600.32 to the General Part accomplish the changes necessary to correct this error and resulting problems.
2. Section signs involve field wiring of secondary circuits during installations. This often necessitates specialized equipment and instructions which are specific to the listed sign or outline lighting. 600.39 Installation Instructions is necessary to insure that the installation company, which is often different than the listed product manufacturing company, and the AHJ can properly install and safety wire the secondly circuits.
3. The 600.8 proposal removes an exception.
4. The 600.9 proposal for hazardous locations addresses situations where signs are installed in hazardous locations, yet it is presently not clear that the provisions of Article 500 are applicable.
5. The 600.32 G changes recognize the improved arc-tracking performance of high-voltage GTO cable as a result of the 1996 change in 600.32 B and the resulting changes to the ANSI standard for this cable , UL 814.

Panel Meeting Action: Accept in Principle

Revise Article 600 by making the following changes:
(1) Add a new definition to 600.2 to read:
Section Sign. A listed sign or outline lighting system shipped in parts that requires field installed wiring between the parts to complete the overall sign.
(2) Revise 600.8 to read:
Live parts other than lamps, neon tubing, and transformers or electronic power supplies provided with an integral enclosure, including a primary and secondary circuit splice enclosure, shall be enclosed.
(3) Add a new 600.9(E) to read:
(E) Hazardous Locations. In addition to the requirements of Article 600, signs and outline lighting systems installed in hazardous (classified) locations shall comply with the requirements of Articles 500 through 517.
(4) Add a new 600.11 to read:
Installation Instructions. Field-installed skeleton tubing, section signs, and outline lighting shall be provided with installation instructions and shall be installed in compliance with those instructions.
(5) Add a new 600.12 to read:

(5) Add a new 600.12 to read:

Field Installed Secondary Circuit Wiring. The field installed secondary circuit wiring of listed section signs shall comply with 600.32.

(6) Revise 600.32(G) to read:

(G) Conductors in Raceways. The insulation on all conductors shall extend not less than 65 mm (2 1/2 in.) beyond the metal conduit or tubing.

Panel Statement:

The panel has revised the recommendation for the following reasons:

(1) The requirement for new 600.9(E) to clarify the applicability and Articles 500 through 517 applies to signs installed in hazardous (classified) locations.

(2) The combination of the changes in items (5) and (6) of the panel action clarifies the intent that some of the requirements of Part II apply to the field installation of secondary circuit wiring and address the proposed change to relocate the requirements of 600.30 to 600.40.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

BER: The panel's action on this proposal has solved a large, heretofore, unrealized problem in the sign industry. The problem of not having guidelines to inspect the field wiring of section signs has been brought to light by a recent review of the standard that covers signs. However, there are some additional concerns that need to be addressed, including what about the need for including some of the provisions of 600.31?

FETZER: UL recognizes that the panel added a definition for section signs under 600.2 and required that section signs be listed. However, by using the word listed in 600.12 for field installed secondary circuit wiring, it is redundant. The proposed text, if including the word "listed", could be interpreted to exempt section signs that are not listed from compliance with the field installed secondary circuit wiring requirements. In addition, by requiring that the field installed secondary circuit wiring of section signs comply with 600.32 precludes any section signs with a secondary output less than 100 volts to comply with the requirements in 600.31 for under a 1000 volts.

OWENS: After rereading the panel's action and comments and with information obtained in discussions on a proposed TIA, I discovered that an item was overlooked. The new section 600.12 should read:

Field Installed Secondary Circuit Wring. The field installed secondary circuit wiring of listed section signs shall comply with 600.31 or 600.32.

This addition will cover secondary circut wiring 1000 volts or less as well as wiring over 1000 volts.

ROSENBAUM: The Panel Action does not take into account the possibility for the secondary output of a Section Sign to be less than 1000 volts. To account for this, the proposed 600.12 should be rewritten as follows:

"Field Installed Secondary Wiring: The field installed secondary circuit wiring of section signs shall comply with 600.32 if over 1000 volts or 600.31 if 1000 volts or less."

18-109 Log #2885 NEC-P18 **Final Action: Reject**

(600-1–Scope)

Submitter: Muhammad Khan, Everbrite, Inc.

Recommendation:

Revise text to read as follows:

600.1 Scope. This article covers the installation of conductors and equipment for electric signs and outline lighting ~~as defined in Article 100.~~

Substantiation:

It is redundant, therefore, should be deleted. The format of the NEC clearly suggests that all definitions are in Article 100 except those specially added in an Article. Therefore it is not necessary to reiterate in the scope.

Panel Meeting Action: Reject

Panel Statement:

The reference to the definition in Article 100 is a necessary part of the statement of this article's scope. It is not redundant.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-108 Log #2886 NEC-P18 **Final Action: Accept in Principle**

(600-1, FPN)

Submitter: Muhammad Khan, Everbrite, Inc.

Recommendation:

Revise text to read as follows:

FPN: ~~As defined in Article 100~~ electric signs...utilizing <u>all forms of illumination sources, neon...or art forms.</u>

Substantiation:

By deleting the reference to Article 100 removes redundancy. The new wording is also needed to expand the meaning of the FPN and make it applicable to all forms of illumination sources now used with signs and outline lighting equipment.

Panel Meeting Action: Accept in Principle

Panel Statement:

The panel concludes that their action on Proposal 18-106 addresses the concern expressed in the recommendation.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-110 Log #2887 NEC-P18 **Final Action: Accept in Principle**
(600-3(C) (New))

TCC Action:

The Technical Correlating Committee directs that the panel reconsider this proposal and address the requirement of 4.1.1 of the NEC Style Manual which prohibits cross references to entire articles. This action will be considered by the panel as a public comment.

Submitter: Muhammad Khan, Everbrite, Inc.

Recommendation:

Add text to read as follows:
(C) Electric Signs and Outline Lighting Systems. When operating from Class 2 power limited source shall conform to requirements in Article 725.

Substantiation:

The Article 600 does not have requirements for signs and outline lighting equipment now being installed with Class 2 power limited sources. The proposed wording will provide that information.

Panel Meeting Action: Accept in Principle

Add a new 600.24 to read:
"Class 2 Power Sources. In addition to the requirements of Article 600, signs and outline lighting systems supplied by Class 2 transformers, power supplies, and power sources shall comply with Article 725."

Panel Statement:

The panel agrees with the recommendation to add requirements for signs and outline lighting systems supplied by Class 2 power sources and concludes that it should not be located in 600.3 as this section covers listing requirements. The panel has revised the proposed text to correlate with the terminology in Article 725.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-111 Log #2888 NEC-P18 **Final Action: Accept in Principle**
(600-3(D) (New))

Submitter: Muhammad Khan, Everbrite, Inc.

Recommendation:

Add text to read as follows:
(D) Electric Signs and Outline Lighting. Electric signs and outline lighting equipment installed in hazardous (classified) locations shall conform to requirements in Chapter 5.

Substantiation:

The Article 600 does not have requirements for signs and outline lighting equipment installed in hazardous (classified) locations. The proposed wording will provide that information.

Panel Meeting Action: Accept in Principle

Panel Statement:

The panel concludes that their action on Proposal 18-107 addresses the concern expressed in the recommendation.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-112 Log #2889 NEC-P18 **Final Action: Accept in Principle**
(600-4(C))

Submitter: Muhammad Khan, Everbrite, Inc.

Recommendation:

Add new text to read as follows:
(C) Signs and outline lighting systems operating from Class 2 power source shall be clearly marked with AC or DC voltage ratings and each limited energy supply circuit be identified.

Substantiation:

To avoid the confusion of wiring requirements for low voltage circuits and for Class 2 limited energy voltage circuits it is necessary that the equipment is properly labeled. By adding this requirement will solve that problem.

Panel Meeting Action: Accept in Principle

Panel Statement:

The panel concludes that their action on Proposal 18-110 addresses the concern expressed in the recommendation.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-112a Log #CP1802 NEC-P18 **Final Action: Accept**
(600-6(A)(1))

Submitter: Code-Making Panel 18

Recommendation:

Revise 600.6(A)(1) to read:
(A)(1) Within Sight of the Sign. The disconnecting means shall be within sight of the sign or outline lighting system that it controls. Where the disconnecting means is out of the line of sight from any section that is able to be energized, the disconnecting means shall be capable of being locked in the open position.

Substantiation:

Proposal 18-3 recommended replacing the "may" with "can." Both these words are contained in Table 3.2.1 of the NEC Style Manual as terms that are vague or possibly unenforceable. Section 600.6 was found to contain "may." The panel concludes that the proposed wording adds clarity to this section and removes vague wording.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-113 Log #1982 NEC-P18 **Final Action: Reject**
(600-7(E) and (F))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(E) Metal Building Parts. Metal parts of a building shall not be permitted as a secondary return conductor or an equipment ~~grounding~~ bonding conductor.
(F) Signs in Fountains. Signs or outline lighting installed inside a fountain shall have all metal parts and equipment ~~grounding~~ bonding conductors bonded to the equipment ~~grounding~~ bonding conductor for the fountain recirculating system. The bonding connection shall be as near as practicable to the fountain and shall be permitted to be made to metal piping systems that are bonded in accordance with 680.53.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects this proposal for the following reasons:
1. The proposal contained no substantiation regarding the proposal on Article 250.
2. See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

COSTELLO: See my Explanation of Negative Vote on Proposal 18-1.
OWENS: See my Explanation of Negative Vote on Proposal 18-1.
WALL: See my Explanation of Negative Vote on Proposal 18-1.

Comment on Affirmative:

FETZER: UL recognizes that this proposal extends beyond the scope of this panel, and therefore understands that the ultimate resolution will reside with the TCC and Panels 5 and/or 1, which have jurisdiction over the basic requirements for grounding and the definition of terms involving such.

18-114 Log #2890 NEC-P18 **Final Action: Reject**
(600-9(D)(4))

Submitter: Muhammad Khan, Everbrite, Inc.

Recommendation:

Add text to read as follows:
(4) Drain holes are optional in signs and outline lighting systems connected to Class 2 limited energy power source.

Substantiation:

Signs and outline lighting equipment connected to Class 2 limited energy source as compared to Class 1 source connected equipment does not pose any threat. Therefore it is unnecessary to require drain holes.

Panel Meeting Action: Reject

Panel Statement:

Drain holes are necessary to allow the escape of moisture from within enclosures regardless of the voltage of the installed equipment.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-115 Log #1980 NEC-P18 **Final Action: Reject**
(600-10(C)(1))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(1) Cords. All cords shall be junior hard service or hard service types as designated in Table 400.4 and have an equipment ~~grounding~~ bonding conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects this proposal for the following reasons:
1. The proposal contained no substantiation regarding the proposal on Article 250.
2. See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

COSTELLO: See my Explanation of Negative Vote on Proposal 18-1.
OWENS: See my Explanation of Negative Vote on Proposal 18-1.
WALL: See my Explanation of Negative Vote on Proposal 18-1.

Comment on Affirmative:

FETZER: UL recognizes that this proposal extends beyond the scope of this panel, and therefore understands that the ultimate resolution will reside with the TCC and Panels 5 and/or 1, which have jurisdiction over the basic requirements for grounding and the definition of terms involving such.

18-116 Log #408 NEC-P18 (600-30) **Final Action: Accept in Principle**

Submitter: Jeffrey A. Fecteau, City of Peoria, Arizona

Recommendation:

Delete text as follows:

~~II. Field-Installed Skeleton Tubing~~

~~600.30 Applicability. Part II of this article shall apply only to field-installed skeleton tubing. These requirements are in addition to requirements of Part I.~~

Substantiation:

As currently written, the NEC does not address the installation of secondary GTO wiring of listed Neon Signage.

Part II. Field-Installed Skeleton Tubing by definition would not pertain to Listed Neon Sign installation, Skeleton Tubing; Neon tubing that is itself the sign or outline lighting and not attached to an enclosure of sign body. This definition would seem to exclude Listed Neon Sign installations from these requirements. Especially since Section 600.30 stated that "Part II of this article shall apply only to field-installed skeleton tubing. These requirements are in addition to the requirements of part I".

Sections 600.5 through 600.23 would apply to general sign installation. During my review of Part I of Article 600, I could not find anything that addresses how the installation of secondary conductors (GTO Cable) from the transformers to the letters of a listed sign are to be installed. These are field installed conductors from the transformer to the letters and back to the transformers. This is not a listed self-contained sign but individual listed letters that has GTO Cable that interconnects the letters and transformers.

One of the simplest options would be to delete Part II Field-Installed Skeleton Tubing, and Section 600.30 in its entirety. By deleting these sections, this would allow Sections 600.31 and 600.32 to be applied to the field wiring of listed neon sign assemblies.

By reading the 2000 UL Green Book, Signs (UXYT) would require each major sub-assembly to bare an "Electric Sign Section" Listing Mark. I would consider the Secondary Wiring System a Major Sub-Assembly, but have never seen this labeled as a section of the sign. I have provided a copy of a letter from Lee Dosedlo Global Chief engineer of UL Conformity Assessment Services. This letter clearly states that the acceptability of the primary and secondary wiring between assembled sign sections in the field rests with the Authority Having Jurisdiction. The materials for the installation of the electrical service to the sign and the secondary wiring needed in the field to energize the sign are not included with UL Listed signs. How can I, as the Authority Having Jurisdiction, accept an installation that the Listing, Instructions, or the NEC do not properly address?

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

Panel Meeting Action: Accept in Principle

Panel Statement:

See the panel action and statement on Proposal 18-107. The panel concludes that the action on that proposal addresses the concern expressed in the recommendation.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-117 Log #1589 NEC-P18 (600-30) **Final Action: Accept in Principle in Part**

Submitter: Michael J. Johnston, Int'l Assn. of Electrical Inspectors

Recommendation:

Revise the title of part II of Article 600 as follows:

II. Field-Installed Secondary Circuits, Skeleton Tubing, and Electrode Connections

600.30 Applicability.

Part II of this article shall apply ~~only~~ to field-installed secondary circuits, skeleton tubing, and electrode connections. These requirements are in addition to the requirements of Part I of this Article.

Substantiation:

The revision is needed for clarification regarding the applicable installation rules for neon secondary circuits. Currently, part II as titled, is only applicable to field installed skeleton tubing installations. These are not the only installations that require secondary neon circuitry that must be wired in accordance with the provisions included in Part II of this article. For example, a listed section sign required secondary circuit wiring from the transformer or power supply to the channel letters. By the requirements of the standards, listed section signs require a field installed secondary circuit that is to be approved by the authority having jurisdiction in addition to meeting the requirements of any installation instructions. The requirements for neon secondary circuit wiring only appear in Part II. The revision is needed to reflect what is actually already in practice in the industry.

Panel Meeting Action: Accept in Principle in Part

Panel Statement:

See the panel action and statement on Proposal 18-107. The panel concludes that the action on that proposal addresses the concern expressed in the recommendation regarding field installed secondary circuit wiring. The panel rejects the Part II title revision which would have added "electrode connections". These connections are a portion of the field-installed skeleton tubing requirements in Part II. See 600.42.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-117a Log #CP1808 NEC-P18 **Final Action: Accept**
(600-31(B))

Submitter: Code-Making Panel 18

Recommendation:

Revise 600.31(B) to read:
Insulation and Size. Conductors shall be listed, insulated, and not smaller than 18 AWG.

Substantiation:

Based on the Usability Task Group's request to review all occurences of the phrase "listed for the purpose" to ensure that it provides clear direction, the panel concludes the revised language clarifies its use in this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-118 Log #1981 NEC-P18 **Final Action: Reject**
(600-32(A)(5))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(5) Metal Building Parts. Metal parts of a building shall not be permitted as a secondary return conductor or an equipment ~~grounding~~ bonding conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects this proposal for the following reasons:
1. The proposal contained no substantiation regarding the proposal on Article 250.
2. See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 8 Negative: 3

Explanation of Negative:

COSTELLO: See my Explanation of Negative Vote on Proposal 18-1.
OWENS: See my Explanation of Negative Vote on Proposal 18-1.
WALL: See my Explanation of Negative Vote on Proposal 18-1.

Comment on Affirmative:

FETZER: UL recognizes that this proposal extends beyond the scope of this panel, and therefore understands that the ultimate resolution will reside with the TCC and Panels 5 and/or 1, which have jurisdiction over the basic requirements for grounding and the definition of terms involving such.

18-118a Log #CP1809 NEC-P18 **Final Action: Accept**
(600-32(H))

Submitter: Code-Making Panel 18

Recommendation:

Revise 600.32(H) to read:
Between Neon Tubing and Midpoint Return. Conductors shall be permitted to run between the ends of neon tubing or to the secondary circuit midpoint return of listed transformers or listed electronic power supplies and provided with terminals or leads at the midpoint.

Substantiation:

Based on the Usability Task Group's request to review all occurrences of the phrase "listed for the purpose" to ensure that it provides clear direction, the panel concludes the revised language clarifies its use in this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-119 Log #318 NEC-P18 **Final Action: Reject**
(600-32(I))

Submitter: Samuel Bull, Home Builders Institute

Recommendation:

Delete entire paragraph.

Substantiation:

There is no reason neon can be mounted in 1000 room hotels lobbies on plastic, which is much more flame marble than wallboard, mounted on metal studs, which provide a path to ground (unlike wood used in homes) and ban neon completely from dwellings. Neon is safe in a home environment especially when installed in a soffet with a TX with an internal CKTBKR!

Panel Meeting Action: Reject

Panel Statement:

The submitter's substantiation does not convince the panel that the proposed installation is safe for use in dwellings. The safety concerns relative to unqualifed persons coming in contact with the live parts of field installed skeleton tubing is the reason for limiting the use in dwellings. Comparing hotel lobbies to dwellings is not a valid comparison.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-119a Log #CP1810 NEC-P18 **Final Action: Accept**
(600-42(D) and (G))

Submitter: Code-Making Panel 18

Recommendation:

Revise 600.42 (D) and (G) to read:
(D) Receptacles. Electrode receptacles shall be listed.
(G) Electrode Enclosures. Electrode enclosures shall be listed.

Substantiation:

Based on the Usability Task Group's request to review all occurrences of the phrase "listed for the purpose" to ensure that it provides clear direction, the panel concludes the revised language clarifies its use in this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

19-145 Log #2818 NEC-P19 **Final Action: Reject**
(604-1)

Submitter: Michael I. Callanan, NJATC / Rep. IBEW

Recommendation:

Revise the Scope of 604.1 to read as follows:
604.1 Scope. The provisions of this article apply to field-installed wiring using off-site manufactured ~~subassemblies~~ wiring assemblies, wiring systems, wiring assembly kit, conduit kit or surface raceway kit for branch circuits, remote-control circuits, signaling circuits, and communications circuits in accessible areas.

Substantiation:

Article 604 of the NEC covers wiring systems intended to be used in accessible applications as described in Underwriters Laboratories General Information for Electrical Equipment 2002 edition page 94 ("White Book" QQVX). The problem is also listed in the "White Book" on page 95 (QQYZ) are other wiring assemblies, kits, etc. that are not covered by the National Electrical Code. Therefore, an electrical inspector is put into an awkward position of being requested to approve an electrical system that is UL listed but not a part of the National Electrical Code.

A second problem is installing a prefabricated wiring system in a concealed location with conductors and devices already installed on a construction site at the rough in stage where the system would be exposed to concrete, drywall, nails, screws, cleaning solvents etc., which is probably a violation of 110.12(C).

This proposal represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Reject

Panel Statement:

The panel recognizes that scope statements are under the jurisdiction of the Technical Correlating Committee. The panel recommends rejecting the proposed language. Article 604 is specifically written for manufactured wiring systems conforming to UL 183, in the UL White Book, these are described in product category (QQVX). The substantiation is incorrect in stating that wiring assemblies (QQYZ) are not covered by the National Electrical Code. These assemblies incorporate listed or recognized component wiring methods that are intended for field installation in accordance with the National Electrical Code. Throughout the product category description, reference is made to conformance with the NEC, and the AHJ has the ultimate responsibility for acceptance of the field assembly. There is nothing in the NEC that precludes devices from being installed at the rough-in stage whether conventional wiring methods or prefabricated assemblies are used. Compliance with 110.12(C) is a requirement to be enforced by the AHJ regardless.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-146 Log #3376 NEC-P19 **Final Action: Reject**
(604-1)

Submitter: William J. Tipton, I.B.E.W. Local 575

Recommendation:

Revise text to read as follows:
The provisions of this article apply to field-installed wiring using off-site manufactured ~~subassemblies~~ wiring assemblies, wiring systems, wiring assembly kit, conduit kit or surface raceway kit for branch circuits, remote-control circuits, signaling circuits, and communications circuits in accessible areas.

Substantiation:

Article 604 of the NEC covers wiring systems intended to be used in accessible applications as described in Underwriters Laboratories General Information for Electrical Equipment 2002 edition page 94 ("White Book" QQVX). The problem is also listed in the "White Book" on pages 95 (QQYZ) are other wiring assemblies, kits, etc., that are not covered by the National Electrical Code. Therefore, an electrical inspector is put into an awkward position of being requested to approve an electrical system that is UL, listed but not a part of the National Electrical Code.
A second problem is installing a prefabricated wiring system in a concealed location with conductors and devices already installed on a construction site at the rough-in stage where the system would be exposed to concrete, drywall, nails, screws, cleaning solvents, etc., which is probably a violation of 110.12(C).

Panel Meeting Action: Reject

Panel Statement:

See panel action and statement on Proposal 19-145.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 7 Negative: 1

Explanation of Negative:

TIPTON: If it is not possible to include wiring systems in concealed areas within the scope of Article 604, then the Technical Correlating Committee should establish a new Article for these systems.
To say that if a system is comprised of all listed components it does not need to be covered by the National Electrical Code is not a good argument. If we were to follow that line of thinking we could eliminate all of Article 604 and probably several other specialty Articles.
Prefab assemblies are going to become common items in all wiring methods in the future and I believe each will have installation requirements that will need to be followed if the user is to have a safe dependable electrical installation. Therefore, they should be in the National Electrical Code.

19-147 Log #653 NEC-P19 **Final Action: Reject**
(604-3, FPN (New))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Add new text to read as follows:
FPN: The provisions of 348.26 and 350.26 are not applicable.

Substantiation:

Edit. Since the conductors are preinstalled, these systems are essentially cable systems and there are no pull points. The proposal would clarify that there is no limit on the number of bends.

Panel Meeting Action: Reject

Panel Statement:

Manufactured wiring systems constructed in accordance with 604.6(A)(2) are not cable systems. As such , the installation requirements for flexible conduits are to be adhered to. The panel concludes that it is not appropriate to literally install flexible conduits in a coil. Additionally the proposed language would not be appropriate as mandatory language in a Fine Print Note.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-148 Log #1742 NEC-P19 (604-4) **Final Action: Accept**

TCC Action:

It was the action of the Technical Correlating Committee that this proposal be sent to Code-Making Panel 3 for information.

Submitter: Marcelo M. Hirschler, GBH International / Rep. Fire Retardant Chemicals Association, Plenum Cable Association, and Vinyl Institute EOTS

Recommendation:

Revise text to read as follows:
604.4 Uses Permitted.
The manufactured wiring systems shall be permitted in accessible and dry locations and in ducts, plenums, and other air-handling spaces ~~plenums and spaces used for environmental air,~~ where listed for this application and installed in accordance with 300.22.
Exception No. 1: In concealed spaces, one end of tapped cable shall be permitted to extend into hollow walls for direct termination at switch and outlet points.
Exception No. 2: For use in outdoor locations where listed for the purpose.

Substantiation:

[Text of Proposal 19-148 substantiation is shown on page 2682]

Panel Meeting Action: Accept

Panel Statement:

The panel accepts the proposed language only to be consistent with 300.22. The other issues raised in the substantiation are not within the purview of this panel.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

Comment on Affirmative:

TIPTON: I agree with the panel action to keep NFPA 70, Article 300.22 as the primary standard for the electrical systems in ducts, plenums, and other air-handling spaces.

19-148a Log #CP1915 NEC-P19 (604.4 Exception No. 2) **Final Action: Accept**

Submitter: Code-Making Panel 19

Recommendation:

Revise this section as follows: Exception No. 2: Manufactured wiring system assemblies installed outdoors shall be listed for use in outdoor locations.

Substantiation:

Based on the Usability Task Group's request to review all occurrences of the phrase "listed for the purpose" to ensure that it provides clear direction, the panel concludes the revised language clarifies its use in this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-149 Log #1983 NEC-P19 **Final Action: Reject**
(604-6)

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
604.6 Construction.
(A) Types.
(1) Cables. Cable shall be listed armored cable or metal-clad cable containing nominal 600-volt 10 or 12 AWG copper-insulated conductors with a bare or insulated copper equipment ~~grounding~~ bonding conductor equivalent in size to the ungrounded conductor.
Other cables as listed in 725.61, 800.50, 820.50, and 830.5 shall be permitted in manufactured wiring systems for wiring of equipment within the scope of their respective articles.
(2) Conduits. Conduit shall be listed flexible metal conduit or listed liquidtight flexible conduit containing nominal 600-volt 10 or 12 AWG copper-insulated conductors with a bare or insulated copper equipment ~~grounding~~ bonding conductor equivalent in size to the ungrounded conductor.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

Bonding is defined in the NEC as the permanent joining together of metallic parts to form a conductive path. Grounding is defined in the NEC as the connection of the bonded parts to earth. The proposed change to rename this conductor does not clarify the confusion indicated by the submitter.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 6 Negative: 2

Explanation of Negative:

SABIN-MERCADO: "Grounded" and "grounding" sound similar but are intended to describe two totally different concepts. However, these terms are often used interchangeably by users of the NEC. In fact, there are places in the NEC where these terms are used interchangeably. The words ground, grounded and grounding will apply to the concept of connecting an electrical system to the earth. While the words bond, bonded and bonding will apply to the concept of connecting together noncurrent carrying conductive parts likely to become energized so that they form an effective ground fault path back to the source. If the terms are not similar, the concepts can be more easily differentiated by the users. I think this change will greatly improve usability and understanding of the NEC. This issue needs to be brought forth through the Technical Correlating Committee.
ZANICCHI: The term "bonding" is technically correct for this conductors application. This conductor is there to "bond" equipment to the "system grounded conductor, the grounding electrode conductor or both" at the service equipment as stated in Article 100. The use of the term "bonding" instead of "grounding" does not change the function of the conductor but it will help make the code more understandable. An example: A journeyman says to their apprentice "That 3 phase 208v mixer needs to be grounded". The apprentice asks themselves "does the journeyman mean that this mixer needs a grounded conductor brought to it? If we used the term "bonded" instead of "grounded" the journeyman would have said "That 3 phase 208v mixer needs to be bonded". Clearly, the separation of the terms grounded and bonded makes the journeyman's statement easier to understand. I hope that other panels consider making this change, especially Panel 5 which deals with Article 250, and that we "Accept in Principal" the change as I believe it will make a difference in the usability of the code.

19-150 Log #663 NEC-P19 **Final Action: Accept**
(604-6(A)(1))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Change the phrase "copper-insulated" to "insulated copper".

Substantiation:

Edit. Syntax indicates the conductors are insulated with copper.

Panel Meeting Action: Accept

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-151 Log #2668 NEC-P19 **Final Action: Reject**
(604-6(A)(1))

Submitter: Phil Simmons, Simmons Electrical Services

Recommendation:

Revise 604.6(A)(1) as follows:
(1) Cables. Cable shall be listed armored cable or metal-clad cable containing nominal 600-volt 10 or 12 AWG copper-insulated conductors. The cable shall provide a ground fault return path in accordance with 250.118. ~~with a bare or insulated copper equipment grounding conductor equivalent in size to the ungrounded conductor.~~
Other cables as listed in 725.61, 800.50, 820.50, and 830.5 shall be permitted in manufactured wiring systems for wiring of equipment within the scope of their respective articles.

Substantiation:

This section should refer to Section 250.118 for the size and type of equipment grounding rather than stating a specific type and size of equipment grounding conductor. Section 250.118 provides a list of acceptable equipment grounding conductors for all wiring methods.
In addition, cables used for this article are required to be listed. As such, the qualified electrical testing laboratory verifies that Type AC and MC cables meet the applicable product safety standard before allowing the manufacturer to put a listing mark on the cable.

Panel Meeting Action: Reject

Panel Statement:

Since the inception of this article in the 1981 Code, manufactured wiring systems have been required to be provided with a separate equipment grounding conductor. Manufactured wiring system components may be and are subject to frequent relocation, raising the likelihood of interruption of the equipment grounding path if the metal armor or sheath was the only fault current path.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-152 Log #3259 NEC-P19 **Final Action: Accept in Principle in Part**
(604-6(A)(1))

TCC Action:

The Technical Correlating Committee directs that the panel action text be revised to read "…600-volt 10 or 12 AWG insulated..." to be consistent with the identification of the conductor size throughout the NEC.

Submitter: Gary J. Locke, Lockheed Martin Systems Integration

Recommendation:

Revise as follows:
604.6 Construction.
(a) Cable or Conduit Types.
1. Cable shall be listed armored cable; Type AC, or metal-clad cable; Type MC, or tray cable; Type TC with the crush and impact rating of Type MC cable, containing nominal 600-volt No. 10 or 12 copper-insulated conductors with a bare or insulated copper equipment grounding conductor equivalent in size to the ungrounded conductor.

Substantiation:

The addition of the terms "Type AC" and "Type MC" is more consistent with references to armored and metal-clad cables throughout the NEC-2002.
Tray cable; Type TC constructed to satisfy the crush and impact resistance of metal-clad cable (Type TC with MC properties) is technically viable and has been extensively and effectively implemented as manufactured wiring systems in industrial establishments on industrial machinery systems. The hybrid Type TC with MC properties technology is equally viable for use in a manufactured wiring system for Article 604 purposes as it is for manufactured wiring systems applied to exceptionally harsh and demanding industrial applications. (Note; the requirements of 336.10 have encouraged the creation of this type of hybrid cable Type TC with MC properties construction. This new type of hybrid cable may truly constitute a new wiring method, and therefore may warrant a separate article in Chapter 3 of the NEC. A separate wiring method article, however, may be premature for this NEC cycle and more appropriately addressed in the 2008 NEC cycle. In the interim, this proposal permits the safe and effective application of a very serviceable technology in a proven system application.

Panel Meeting Action: Accept in Principle in Part

Revise 604.6(A)(1) to use the acronyms for Types AC and MC cables. The text is revised to read:
604.6 Construction.
(A) Cable or Conduit Types.
1. Cable shall be listed Type AC cable or listed Type MC cable containing nominal 600-volt No. 10 or 12 insulated copper conductors with a bare or insulated copper equipment grounding conductor equivalent in size to the ungrounded conductor.
The panel rejects the remainder of the recommendation.

Panel Statement:

The panel accepts in principle in part the recommendation to revise this section to use the acronyms for Types AC and MC cables. The panel has decided to use the only the acronyms for these cables. The panel rejects the proposed addition of Type TC cable with the crush and impact rating of Type MC cable, since its use in a manufactured wiring system would be inconsistent with 336.10(6).

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-153 Log #1071 NEC-P19 **Final Action: Accept in Part**
(604-6(A)(2))

Submitter: Michael Everhart, Steelcase Inc.

Recommendation:

Revise text to read as follows:
(2) Conduits. Conduit shall be listed flexible metal conduit or listed liquidtight flexible conduit containing nominal 600-volt 8 to 12 AWG or (minimum 12 AWG) copper insulated conductors with a bare or insulated copper equipment grounding conductor equivalent in size to the ungrounded conductor.

Substantiation:

Currently, this product is length restricted due to the existing 10 to 12 AWG conductor requirement. Changing the wording to "a minimum of 12 AWG" for conductor size will allow for larger conductors to be used for voltage drop considerations.

Panel Meeting Action: Accept in Part

The panel accepts the recommendation to expand the permitted conductor size to 8 AWG.

Panel Statement:

The proposed text to specify a minimum wire size only is rejected, as the increase to 8 AWG accepted by the panel addresses the typical branch circuit uses where voltage drop is a consideration.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 7 Negative: 1

Explanation of Negative:

TIPTON: These systems are used extensively for the installation of branch circuits supplying luminaries in open and suspended ceiling construction. These systems should never be used as a feeder or ran for long distances where voltage drop would be a problem. I don't believe these systems should replace a fixed wiring method.

19-153a Log #CP1910 NEC-P19 **Final Action: Accept**
(604.6(A)(2))

Submitter: Code-Making Panel 19

Recommendation:

In 604.6(A)(2) change the phrase "copper-insulated" to "insulated copper".

Substantiation:

This action correlates with the same action taken in 604.6(A)(1) by Proposal 19-150.

Panel Meeting Action: Accept

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-153b Log #CP1916 NEC-P19 **Final Action: Accept**
(604.6(A)(2) Exception No. 2 to (1) and (2))

Submitter: Code-Making Panel 19

Recommendation:

Revise as follows: Exception No. 2 to (1) and (2): Listed manufactured wiring assemblies containing conductors smaller than 12 AWG shall be permitted for remote-control, signaling, or communication circuits.

Substantiation:

Based on the Usability Task Group's request to review all occurrences of the phrase "listed for the purpose" to ensure that it provides clear direction, the panel concludes the revised language clarifies its use in this section.

Panel Meeting Action: Accept

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-155 Log #2697 NEC-P19 **Final Action: Reject**
(604-6(A)(3))

Submitter: Phil Simmons, Simmons Electrical Services / Rep. National Armored Cable Manufacturers Assn.

Recommendation:

Revise existing Section 604.6(A)(3) as follows:
(3) Connection to Utilization Equipment ~~Flexible Cord.~~ Type AC or Type MC cables that are listed, and flexible cord suitable for hard usage with minimum 12 AWG conductors, shall be permitted as part of a listed factory-made assembly not exceeding 1.8 m (6 ft) in length when making a transition between components of a manufactured wiring system and utilization equipment not permanently secured to the building structure. Where flexible cord is used, the cord shall be visible for its entire length and shall not be subject to strain or physical damage.

Substantiation:

Due to the existing wording of this section, some AHJs are not permitting connections to be made to utilization equipment such as high bay luminaires by Type AC or Type MC cable even if the cable extensions are produced by the same manufacturer as the Manufactured Wiring System. Type AC and Type MC cables that are used for the Manufactured Wiring System are certainly suitable to be used for the connection of utilization equipment.

Panel Meeting Action: Reject

Panel Statement:

Section 604.6(A)(3) was introduced specifically to allow for flexible cord usage with limited application in manufactured wiring systems. The current requirements do not preclude the use of Type AC or Type MC cable manufactured wiring systems for the connection of luminaires. Acceptance of this proposal would actually limit the now permitted uses of Type AC or Type MC cable.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-154 Log #2323 NEC-P19 **Final Action: Accept**
(604-6(A)(3) and (F))

TCC Action:

It was the action of the Technical Correlating Committee that this proposal be sent to Code-Making Panel 18 for information.

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

Recommendation:

Add new text as follows:
604.6 Construction.
(A) Types
(1) Cables. [No Change]
(2) Conduits. [No Change]
(3) Flexible Cord. Flexible cord suitable for hard usage, with minimum 12 AWG conductors, shall be permitted as part of a listed factory-made assembly not exceeding 1.8 m (6 ft) in length when making a transition between components of a manufactured wiring system and utilization equipment, other than luminaires (fixtures), not permanently secured to the building structure. The cord shall be visible for its entire length and shall not be subject to strain or physical damage.
(B) Marking. [No Change]
(C) Receptacles and Connectors. [No Change]
(D) Other Component Parts. [No Change]
(E) Support. [No Change]
(F) Luminaires (Fixtures). Installation of listed electric-discharge luminaires (fixtures) complying with 410.30(C) shall be permitted.

Substantiation:

This proposal is a companion proposal to that submitted for 410.30(C)(2)(c).

These proposals are intended to expand the use of flexible cord in manufactured wiring systems. These proposals are intended to clarify the confusion and perceived inconsistencies in the application of 604.6(A)(3) and 410.30(C) to manufactured wiring system connectors involving electric-discharge luminaires. Since the addition of the content of 604.6(A)(3) to the Code in 1999, local authorities having jurisdiction have questioned the applicability of these products in three different known cases and have received differing opinions.

Prior to 1999, the use of flexible cords with conductors smaller than 12 AWG with manufactured wiring system connectors was allowed for installation of electric-discharge luminaires, and these products were listed in accordance with 410.30(C). The intent of 604.6(A)(3), as originally submitted, was to allow the use of flexible cord in the transition between manufactured wiring system and non-lighting utilization equipment. In these applications, unlike electric discharge luminaires, the load is unknown, so the conductors must be sized to carry the full capacity of the circuit. The addition of 604.6(A)(3) in 1999 disallowed the use of any conductors smaller than 12 AWG in flexible cord making a transition between the components of a manufactured wiring systems and utilization equipment. The unintended effect was to create confusion and, on the part of some local authorities having jurisdiction, to question the acceptability of conductors smaller than 12 AWG in wiring electric-discharge luminaires.

These proposals clearly distinguish between the proper uses of 12 AWG cord with manufactured wiring system connectors for utilization equipment in general and cord smaller than 12 AWG for electric-discharge luminaires.

400.7 permits flexible cord including the wiring of luminaires. 410.30(C) specifies the conditions under which flexible cord may be used to wire electric-discharge luminaires. Article 410.30(C)(2) provides guidance for conductor sizing by referring to 240.5(B)(1). A luminaire supplied by a branch circuit rated at 20 A may be connected using 18 AWG or larger conductor. Table 400.5(A) shows that the allowable ampacity for a flexible cord with two 18 AWG current-carrying conductors is 10 A and two 16 AWG current-carrying conductors is 13 A. These two commonly used conductor sizes are more than adequate for typical luminaire loads.

As part of the listing process, manufactured wiring systems connectors have been evaluated to UL 183 that has been derived from UL 498. Thus, they are evaluated to the same requirements as grounding-type attachment plugs referred to in 410.30 and should be considered equivalent.

Finally, there have been no reported safety issues involving electric-discharge luminaires connected using flexible cord and manufactured wiring connectors since their introduction in 1984. Since their introduction, over 6 million electric-discharge luminaires have been installed using flexible cord with 16 AWG conductors and manufactured wiring system connectors.

Panel Meeting Action: Accept
Number Eligible to Vote: 8
Ballot Results: Affirmative: 8

19-155a Log #CP1918 NEC-P19 **Final Action: Accept**
(604.6(E))

Submitter: Code-Making Panel 19

Recommendation:

Revise this paragraph to read:
Securing and Supporting. Manufactured wiring systems shall be secured and supported in accordance with the applicable cable or conduit article for the cable or conduit type employed.

Substantiation:

In the 2002 cycle, the Chapter 3 articles were reformatted into a common numbering format. The applicable section is now identified as .30 in the wiring method articles and is titled "Securing and Supporting". This revision clarifies that manufactured wiring systems have to be secured and supported in accordance with the respective article covering the type of wiring method used in the system.

Panel Meeting Action: Accept

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

18-120 Log #1984 NEC-P18 **Final Action: Reject**
(605-5(B))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(B) Connection. Where cord and plug connection is provided, the cord length shall be suitable for the intended application but shall not exceed 2.7 m (9 ft) in length. The cord shall not be smaller than 18 AWG, shall contain an equipment ~~grounding~~ bonding conductor, and shall be of the hard usage type. Connection by other means shall be identified as suitable for the condition of use.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects this proposal for the following reasons:
1. The proposal contained no substantiation regarding the proposal on Article 250.
2. See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 7 Negative: 3

Explanation of Negative:

COSTELLO: See my Explanation of Negative Vote on Proposal 18-1.
OWENS: See my Explanation of Negative Vote on Proposal 18-1.
WALL: See my Explanation of Negative Vote on Proposal 18-1.

Comment on Affirmative:

FETZER: UL recognizes that this proposal extends beyond the scope of this panel, and therefore understands that the ultimate resolution will reside with the TCC and Panels 5 and/or 1, which have jurisdiction over the basic requirements for grounding and the definition of terms involving such.

18-120a Log #CP1803 NEC-P18 **Final Action: Accept**
(605-6)

Submitter: Code-Making Panel 18

Recommendation:

Add a new second sentence to 605.6 to read:
"Multi-wire branch circuits supplying power to the partition shall be provided with a means to disconnect simultaneously all ungrounded conductors at the panelboard where the branch circuit originated."

Substantiation:

The panel's action adds a requirement for disconnecting the ungrounded conductors of multi-wire branch circuits that supply fixed-type partitions to correlate with the same requirement for freestanding-type partitions resulting from the action on Proposal 18-121.

Panel Meeting Action: Accept

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-121 Log #2743 NEC-P18 **Final Action: Accept in Principle in Part**
(605-7)

Submitter: Christopher R. Pharo, IBEW-ECAG

Recommendation:

Amend 605.7 as follows:
605.7 Freestanding-Type Partitions. Partitions of the freestanding type (not fixed) shall be permanently connected to the building electrical system by one of the wiring methods of Chapter 3. Multi-wire branch circuits supplying power to the partition shall be provided with a means to disconnect simultaneously all ungrounded conductors at the panelboard where the branch circuit originated.

Substantiation:

This equipment is often supplied with circuits from different panelboards. These circuits are present in the same junction box used to feed this partition furniture. The FPN at the end of the article refers to 210.4 for circuits supplying partitions in 605.6 and 605.7, but this is really not an enforceable part of the code article. Often times the architect/engineer calls for the installer to use circuit 3, 12, and 13 for the install. The maintenance staff is not usually familiar with the installation and when they get the trouble call for a problem with the partition furniture they wind up getting hurt. Because these types of partitions are moved frequently, the electrician/contractor is asked to disconnect and reconnect the furniture. Those individuals not familiar with the original install will get hurt. By grouping the circuits together in the panelboard and by terminating the conductors on a multi-pole circuit breaker, this hazard would be eliminated.

Panel Meeting Action: Accept in Principle in Part

Revise 605.7 to read:
605.7 Freestanding-Type Partitions. Partitions of the free standing type (not fixed) shall be permitted to be connected to the building electrical system by one of the wiring methods of Chapter 3. Multi-wire branch circuits supplying power to permanently connected free-standing partitions shall be provided with a means to disconnect simultaneously all ungrounded conductors at the panelboard where the branch circuit originated.

Panel Statement:

The first sentence of the submitter's recommendation completely changes the requirement of this section by requiring permanent connections of all free standing partitions. This is contrary to the permission in 605.8 to allow for cord-and-plug connection and is not supported by the substantiation. The panel accepts in principle the recomendation to require simultaneous disconnection of the ungrounded conductors of multi-wire branch circuits.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-122 Log #1985 NEC-P18 **Final Action: Reject**
(605-8(A))

Submitter: Donald A. Ganiere Ottawa, IL

Recommendation:

Revise text as follows:
(A) Flexible Power-Supply Cord. The flexible power-supply cord shall be extra-hard usage type with 12 AWG or larger conductors with an insulated equipment ~~grounding~~ bonding conductor and not exceeding 600 mm (2 ft) in length.

Substantiation:

This is a coordinating proposal to my proposal to change the term "equipment grounding conductor" to "equipment bonding conductor" in Article 250.

Panel Meeting Action: Reject

Panel Statement:

The panel rejects this proposal for the following reasons:
1. The proposal contained no substantiation regarding the proposal on Article 250.
2. See panel action and statement on Proposal 18-1.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 7 Negative: 3

Explanation of Negative:

COSTELLO: See my Explanation of Negative Vote on Proposal 18-1.
OWENS: See my Explanation of Negative Vote on Proposal 18-1.
WALL: See my Explanation of Negative Vote on Proposal 18-1.

Comment on Affirmative:

FETZER: UL recognizes that this proposal extends beyond the scope of this panel, and therefore understands that the ultimate resolution will reside with the TCC and Panels 5 and/or 1, which have jurisdiction over the basic requirements for grounding and the definition of terms involving such.

18-123 Log #647 NEC-P18 **Final Action: Reject**
(605-8(C))

Submitter: Dan Leaf Palmdale, CA

Recommendation:

Delete present wording and substitute:
Branch Circuit Load. Outlets contained in or on partitions for lighting, receptacles, and other equipment shall be computed in accordance with applicable provisions of 220.3 to determine the branch circuit load.

Substantiation:

The requirement of (C) appears intended to limit the computed load on the supply circuit, since 15-ampere 125 volt general use receptacles computed at 180 va each in accordance with 220.3(A)(9) would be limited to thirteen on a 15-ampere circuit. However, this section is virtually meaningless since each outlet may contain more than one receptacle. This section does not clarify how the load is to be calculated for the supply circuit, if cord and plug connected; is the supply circuit to be computed at 180 va for each supply circuit receptacle? The supply circuit receptacle is not a general-use receptacle. How is the load to be calculated for a permanent type supply connection? One or more of the thirteen outlets may supply stationary equipment rated more than 180 va, since general-use receptacles are not specified. Can lighting outlets be installed in addition to the thirteen receptacle outlets?
The limitation to 15-ampere receptacles is not warranted for safety where the supply is a permanently connected 20-ampere circuit or the attachment plug connection is rated 20-amperes.

Panel Meeting Action: Reject

Panel Statement:

The building load calculation is made in accordance with the requirements of the separate circuit supplying the receptacle into which the partition(s) are plugged. The number of receptacles in the partitions does not enter into the load calculation.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-124 Log #3471 NEC-P18 **Final Action: Reject**
(605-8(C))

Submitter: Charles M. Trout, Maron Electric Co. Inc.

Recommendation:

Delete the section in its entirety.

Substantiation:

There is no reason to restrict the number of receptacles on individual partitions or groups of individual partitions as long as it is assured that proper load calculation are followed.

Panel Meeting Action: Reject

Panel Statement:

The substantiation has not provided a technical basis for removing the limitation on the number of receptacle outlets in cord-and-plug connected free standing partitions.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-125 Log #2850 NEC-P18 **Final Action: Reject**
(605-9)

Submitter: Ronald Mahinske, Loftus Associates c/o NETL

Recommendation:

Add new text to read as follows:
605.9 Required Outlets, Spacing. Receptacles shall be installed so that no point along the floor in any wall space is more than 1.8 m (6 ft) from an outlet.

Substantiation:

Office employees create a fire hazard by adding extension cords to extension cords. This proposal eliminates the need to do so.

Panel Meeting Action: Reject

Panel Statement:

The substantiation provides no technical basis to equate receptacle spacing requirements for office partitions with receptacle spacing requirements for dwelling units.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10