

ARTICLE 430 — MOTORS, MOTOR CIRCUITS, AND CONTROLLERS

11-8a Log #1 NEC-P11 **Final Action: Accept in Principle**
(430)

Note: The Technical Correlating Committee understands that the intent is to use the revised text in this comment to change the 2005 draft text, not the 2002 NEC text.

Submitter: Jim Pauley Lexington, KY

Comment on Proposal No: 11-7

Recommendation: The panel should reconsider and reject the proposal.

Substantiation: The NEC Technical Correlating Committee asked the Usability Task Group to review this proposal and make any needed comment to CMP 11 on the subject. This comment reflects the review and conclusion of the UTG.

The Usability Task Group recommends that the panel reconsider the proposal and reject the recommendation of the submitter. The substantiation is correct that both FLA and FLC are used in Article 430. However, they are used in a consistent manner so that the use of “full load amperes” is in reference to motor nameplate values and “full load current” is in reference to the table values. This convention was used intentionally by CMP 11 in the past and serves a useful purpose in allowing the user to follow which current values are being used. The UTG spoke with various code instructors who gave input that the differences reflected by FLA and FLC are useful in teaching the application of the code.

Since the present usage of the terms are consistent and they do serve a useful usability purpose, the panel should keep the convention and use FLA and FLC as they are presently used.

This comment represents the position of the Usability Task Group.

Panel Meeting Action: Accept in Principle

In 430.7(A)(2) and 430.7(A)(10) change “full-load current (FLC)” to “full-load current”.

Panel Statement: The panel action makes the use of the terminology less confusing for the user and also keeps the terminology consistent with the use in other sections that refer to nameplate current such as 430.6(A) and 430.32. The panel action on Proposal 11-7 and this comment revises only 430.7(A)(2) and 430.7(A)(10).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-9 Log #1040 NEC-P11 **Final Action: Reject**
(430)

Submitter: Noel Williams, Noel Williams Consulting

Comment on Proposal No: 11-7

Recommendation: This proposal should be accepted in principal.

Substantiation: The submitter is correct that FLC is often interpreted as the “Table value” and FLA is often interpreted as the “nameplate value.” Article 430 could be clearer on this point. However, there are places in Article 430 where FLA is used rather than FLC. To make this clear, the terms “nameplate full-load ampere rating (FLA)” should be used in some locations and “full-load current (FLC)” in others. Otherwise this change may make matters worse. For example, Sections 430.6(A)(2), 430.6(B), 430.6(C), 430.7(A)(1), 430.32, refer to nameplate values, and Tables 430.148, 430.149, and 430.150 refer to both nameplate(FLA) and table values(FLC) if the notes are considered. Most of the rest of Article 430 refers to “FLC” in accordance with 430.6(A).

Panel Meeting Action: Reject

Panel Statement: The submitter has not provided a specific recommendation on how to accept this proposal in principle as is required by Section 4-5.5 of the NFPA Regulations Governing Committee Projects.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-10 Log #1594 NEC-P11 **Final Action: Accept in Principle**
(430)

Submitter: Alan Manche, Schneider Electric/Square D Co.

Comment on Proposal No: 11-6

Recommendation: The panel should continue to accept Proposal 11-6.

Substantiation: The proposed new Part X for ASDs will enhance the safety and reliability of this type of motor branch circuits.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel actions on Comments 11-50 and 11-51.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-11 Log #628 NEC-P11 **Final Action: Accept**
(430.2)

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 11-8

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel directs that the Fine Print Note to 430.2 be deleted.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-12 Log #404 NEC-P11 **Final Action: Accept**
(430.2)

Submitter: Charles B. Schram Scottsdale, AZ

Comment on Proposal No: 11-8

Recommendation: Delete the FPN.

Substantiation: The definition of a controller in Article 430 is more restrictive than the definition in Article 100. The FPN reference to Article 100 would only create confusion.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-13 Log #629 NEC-P11 **Final Action: Accept**
(430.3)

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 11-12

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel action on Comment 11-51 achieves the correlation recommended by the Technical Correlating Committee.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-14 Log #2572 NEC-P11 **Final Action: Accept in Principle**
(430.3)

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

Comment on Proposal No: 11-12

Recommendation: The second sentence of the first paragraph should be replaced by the following:

“Where the power conversion equipment satisfies the requirements of Part X, additional overload protection shall not be required.”

Substantiation: The acceptance of Proposal 11-6 provides text with requirements concerning the overload protection to be built into power conversion equipment. The existing sentence simply specifies a marking to enable waiving additional overload protection but all of the requirements in the new Part X should be satisfied to permit the waiver.

Panel Meeting Action: Accept in Principle

Panel Statement: The panel action on Comment 11-51 addresses the recommendation and substantiation. The panel notes that since 430.3 is deleted by this action, the recommendation in the comment to add a second sentence to this section is no longer necessary.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-15 Log #428 NEC-P11 **Final Action: Reject**
(430.7(A)(15) (New))

Submitter: Michael V. Glenn, Longview Fibre Co.

Comment on Proposal No: 11-17

Recommendation: Reject this proposal.

Substantiation: I request the panel reconsider and reject this proposal. The submitter in his substantiation is correct in saying that it is already covered under the requirements of 110.21. There is no need to duplicate the same requirement in this article.

Panel Meeting Action: Reject

Panel Statement: The text of the proposal is not identical to the content of

110.21. The panel agrees that auxiliary equipment ratings must be marked in addition to typical motor nameplate data. The proposal addresses a field problem raised by the submitter.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-16 Log #3454 NEC-P11 **Final Action: Accept in Principle**
(430.8 Exception No. 4 (New))

Note: The Technical Correlating Committee understands that the panel action adds a new Exception No. 4 to the accepted text of Proposal 11-19.
Submitter: Chip Pudims, Hubbell Inc.

Comment on Proposal No: 11-19

Recommendation: Add Exception No. 4:

Short circuit ratings are not required for controllers listed exclusively for general purpose branch circuits.

Substantiation: Due to the line impedance of the general purpose branch circuit and the overcurrent protection at their ampere rating, controllers intended for use on general purpose branch circuits are not subjected to fault currents at the magnitude as controllers used on motor-circuits. These controllers have been in use for over 25 years without any known safety problems associated with their application. They are currently listed by UL and not required to have a short circuit rating.

A new draft standard UL2372 and the proposed UL Guide Information defines that application and requirements for use of these controllers.

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

Panel Meeting Action: Accept in Principle

Revise exception No. 4 proposed in Proposal 11-19 to read:

“Short circuit ratings are not required for controllers rated less than 2hp, at 300V or less and listed exclusively for general purpose branch circuits.”

Panel Statement: The product standard for these controllers are currently required to bear a short circuit current rating when the controller is rated more than 2hp, 300V or more than 1hp, over 300V. The information supplied with the substantiation indicates these controllers have established short circuit current ratings. The maximum rating included in the revision is consistent with section 430.83(C) which permits snap-switches and switches without horsepower ratings to be used in motor circuits and these products do not have short circuit current ratings.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-17 Log #988 NEC-P11 **Final Action: Reject**
(430.26)

Submitter: Dorothy Kellogg, American Chemistry Council

Comment on Proposal No: 11-24

Recommendation: Panel should have accepted Proposal 11-24.

Substantiation: As the submitter states in the substantiation, the safety of persons or property will not be jeopardized, even if a miscalculation is made. Proper overcurrent 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 AHJ is involved with the installation. As a result, engineers are reluctant to pursue designs based on demand factors, concerned that the AHJ may not allow such designs during the construction phase. Demand factor based designs are the responsibility of the design engineer and based on engineering calculations, experience and supervision. Requiring the AHJ to approve such installations, especially as they do not constitute a safety hazard is not needed. However, it is reasonable that demand based calculations should be made available to the AHJ upon request, as proof that they have been completed.

Panel Meeting Action: Reject

Panel Statement: The Commentor has not shown why the permission given in 430.26 will not work for industrial installations, nor why the current language is inadequate or causing problems in the field. The panel disagrees with first sentence of substantiation. The sizing of motor feeder conductors is a safety issue. The feeder overcurrent protective device is sized to provide short circuit and ground fault protection. Overload protection for the feeder conductors is provided at the branch circuit level. Improper application of demand factors may result in overloading the feeder conductors.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

COX: As stated in the substantiation, AHJ permission to use 430.26 comes too late in industrial installation projects. Designers cannot take full advantage of this section, even though they know that the operating load will be much less than the load computed according to 430.24 and 430.25. In designing industrial power systems, demand factor plays a large roll in the equipment specified and purchased. This type equipment generally has long delivery times. If the AHJ disallows the chosen demand factor after the equipment/wiring is purchased and installed, the designer cannot remove, repurchase and reinstall new equipment/wiring and still meet the project time limitations; therefore the designer is tentative in using 430.26.

Conductors are required to be protected against overcurrent in accordance with their ampacities according to 240.4 (no exclusion for motors feeders). No matter what demand factor the designer chooses for the project, all wiring and equipment will be protected against overcurrent. If the demand factor chosen is wrong, there will still not be a safety issue.

11-18 Log #630 NEC-P11 **Final Action: Hold**
(430.28)

Note: The Technical Correlating Committee directs that this comment be reported as “hold” and returned to the Panel for further processing during the next code cycle.

The Technical Correlating Committee does not agree with the panel statement that 240.21(B) can be applied to motor branch circuits. If this were the case, 430.28 and 240.21(B) would be in conflict in a number of instances. Specifically, in the application of the 10 ft. and 25 ft. tap rules. The panel is directed to reconsider the issue during the next code cycle and ensure that, if the panel desires, 430.28 includes language to allow the use of other taps for motor circuits.

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 11-26

Recommendation: 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

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The proposed new exception would permit the use of 240.21(B)(5). Section 240.21(B)(5) is permitted to be used, if applicable to the given motor circuit, per 90.3. Redundant references are to be avoided per 4.1 of the NEC Style manual.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-18a Log #CC1100 NEC-P11 **Final Action: Accept**
(430.28)

Submitter: Code-Making Panel 11

Comment on Proposal No: 11-25

Recommendation: The panel accepts only the proposed revision to 430.28(3). Revert to the 2002 text for the first paragraph of 430.28 and revise (3) to read per Proposal 11-25:

(3) Have the same ampacity not less than as the feeder conductors.

Items (1) and (2) remain unchanged.

Substantiation: The panel reaffirms the requirement that the tap terminate in a fully-rated overcurrent protective device such as a thermal magnetic circuit breaker or in a set of fuses.

Panel Meeting Action: Accept

Panel Statement:

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-19 Log #1592 NEC-P11 **Final Action: Reject**
(430.28)

Note: The Technical Correlating Committee understands that the reference in the panel statement should be to Comment 11-18a instead of 11-3a.

Submitter: Alan Manche, Schneider Electric/Square D Co.

Comment on Proposal No: 11-28

Recommendation: The panel should reconsider and accept proposal 11-28 in principle referencing the panel action in proposal 11-25.

Substantiation: This action is necessary in order to ensure a technical correlation issue is not created from rejecting proposal 11-28 and then placing the proposed wording in the panel action found in proposal 11-25.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its action on Proposal 11-28 and via its action on Panel Comment

11-3a has rejected the text proposed in Proposal 11-25 for the first paragraph of 430.28.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

GOETZ: The panel statement should refer to action on panel comment 11-18a, Log #CC1100 instead of panel comment 11-3a.

11-20 Log #1986 NEC-P11 **Final Action: Hold**
(430.28)

Note: The Technical Correlating Committee directs that this comment be reported as “Hold and returned to the committee for further processing during the next cycle. See Technical Correlating Committee Note on Comment 11-18.

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

Comment on Proposal No: 11-26

Recommendation: Accept the proposed Exception No. 2 in the original proposal.

Substantiation: The proposed exception is in full agreement with the Style Manual. There is no hazard in running a tap conductor of indefinite length from outside the building, as the experience with this provision in 240.21(B) has demonstrated over the years.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 11-18.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-21 Log #3346 NEC-P11
(430.28) **Final Action: Reject**

Submitter: Daniel R. Neeser, Cooper Bussmann

Comment on Proposal No: 11-25

Recommendation: The proposal should be rejected.

Substantiation: The panel action permits the feeder tap conductor to terminate into a device as permitted in Part IV of Article 430. However, in Part IV, the provisions of 430.53 would apply and this would be considered "tapping a tap" since 430.53 is considered a motor circuit tap as indicated in 240.21(F).

In addition, similar to the provisions of 240.21, protection should be provided that will limit the current to the ampacity of the conductor. In a motor circuit, with the branch-circuit short-circuit and ground fault device sized to 430.52, this cannot be achieved, but the overload device (relay) used is intended to limit the current to the ampacity of the conductor. However, the overload relay could fail to achieve this goal due to welded contacts or improper settings of the overload relay. Thus, a branch-circuit overcurrent device best accomplishes limitation of the current to the ampacity of the conductor, especially for tap conductor applications.

Because of this, the overcurrent device that is used at the termination of the feeder tap must be of the same type as permitted by 240.21. An acceptable term for that type of device is a "branch-circuit protective device" as previously required in the text. Simply stating an overcurrent device with a mention that supplemental protective devices are not permitted does not clearly define what is required.

Panel Meeting Action: Reject

Panel Statement: See the panel recommendation and substantiation on Panel Comment CC 1100. This action addresses the concerns expressed in the submitter's substantiation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-22 Log #631 NEC-P11
(430.31) **Final Action: Accept**

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 11-29

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The intended level of protection required in Article 430 Part III is for overload and failure to start protection only, in order to protect against the motor from becoming a fire hazard. Part III is not intended to provide specific protection requirements against voltage imbalance, loss of phase and phase reversal conditions. This added protection is an option permitted by this Code.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

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." Now the panel has reversed itself and claims no intent to protect against phase loss, voltage imbalance or phase-reversal conditions. This clarification meets the TCC comment to clarify and state intent, but it does not address the submitter's proposal to include text to protect against the scenarios listed and the reasons substantiated by the failure data.

11-23 Log #1095 NEC-P11
(430.31) **Final Action: Reject**

Submitter: Neil F. LaBrake, Jr., Niagara Mohawk, a National Grid Company / Rep. Edison Electric Institute

Comment on Proposal No: 11-29

Recommendation: Accept the Proposal.

Substantiation: The Panel's statement has not clearly explained the intended level of protection. Nationally, motor failures due to overcurrent are not uncommon even though installed per the NEC. Edison Electric Institute's position is that:

1. Motors should be installed per the NEC at a minimum. The purpose of the NEC is to safeguard persons and property from hazards arising from the use of electricity and is the minimum requirement according to NEC Section 90.1(A).
2. Additional phase-loss protection is recommended to supplement the NEC. It is prudent to not only protect equipment from causing a hazard, but to protect the investment of the equipment itself.
3. Utilities do not guarantee continuity of power in total or in part, i.e., three-

phase and single-phase outages can be expected from time to time and should be planned for as part of the user's business emergency response plan.

In addition, please refer to the information provided (Motor Damage Cases.doc) for documented claims in the Oklahoma area.

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

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 11-22.

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. While the Code states overloads and failure to start, these other scenarios also result in the excessive heating and potential "...to cause damage or dangerous overheating of the apparatus." 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." The proposal should have been accepted, and the comment should be accepted.

11-24 Log #1956 NEC-P11
(430.43) **Final Action: Reject**

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 11-35

Recommendation: The proposal should be accepted.

Substantiation: The submitter has identified a significant safety issue and has proposed enforceable and usable text. This comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Reject

Panel Statement: The submitter of the comment has not provided further substantiation to support accepting the proposal.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

D'AMICO: This comment and proposal 11-35 should have been Accepted. Labeling the motor overload device and the motor(s) associated with it with the proposed wording, "Warning - Motor will restart upon overload reset" is a simple and enforceable requirement. This change would have still allowed the automatic restarting of motors upon overload reset where it was necessary. It would have also alerted anyone working within the vicinity, that the motor and driven machinery could possibly restart at any time. Along with the qualified persons who service and maintain the motors and equipment, there are people who work near motors and motor driven equipment such as custodial staff, outside contractors, etc..., who may have no knowledge that the motor and equipment associated with the motor may restart at any time. The label would make personnel aware of a potentially dangerous situation and increase employee safety in the workplace. Perhaps language similar to 110.16 for Flash Protection, which requires "field marking that is clearly visible", would be appropriate for this application in the 2008 Code cycle.

GARVEY: 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 an electrician who is attempting to service or trouble-shoot the motor. Automatic restart after overload reset is not the norm for most motors and warning of this condition is important information for the troubleshooter. The warning label would serve to alert such individuals to the potential for hazard and as such enhances safety. The marking could read "Warning-Motor will restart automatically upon overload reset."

A requirement for marking the equipment in the field is appropriate since the manufacturer of the motor may not know the intended application. 110.16 contains a similar requirement for field marking where service personnel are put at risk.**Comment on Affirmative:**

SAPORITA: The panel action to reject the comment was correct, but the original proposal and this comment raise a real safety concern that the existing 430.43 does not adequately address. Looking ahead to the 2008 NEC, a similar proposal with (2) turned into an exception, would accomplish the intent of both Proposal 11-35 and Comment 11-24.

11-25 Log #1987 NEC-P11
(430.52(C)(1) Exception No. 3 (New)) **Final Action: Reject**

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

Comment on Proposal No: 11-39

Recommendation: Accept the proposal in principle. Revise as follows:

Exception No. 3: For motors with a full-load current rating determined in accordance with 430.6(A)(1) of not more than 1 hp connected to a nominal 120-volt branch circuit, the branch-circuit short-circuit and ground-fault protective device shall be permitted to be 20 amperes provided the motor has

individual overload protection in accordance with 430.32 and the rating of the maximum short-circuit and ground-fault protective device marked on the controller is not exceeded.

Substantiation: These provisions come from 430.53. If a 20-ampere 120-volt circuit can be used for multiple motors on the same branch circuit, it should be safe to use it on a single motor. Remember that nothing in 430.53 requires all the connected motors to run at one time, and if only one motor runs, it would duplicate the conditions described in this comment. The 6-ampere limitation in 430.53 is not carried over to this exception, since its primary safety relevance concerns multiple higher voltage motors that could not be connected to a 20-ampere branch circuit.

Panel Meeting Action: Reject

Panel Statement: The proposal and comment would decrease the level of protection for a single small motor circuit. Group motor protection is a compromise which lowers the level of protection for the motor circuit components. No evidence has been provided to justify such a compromise in this situation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-26 Log #1988 NEC-P11
(430.53(A))

Final Action: Accept

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

Comment on Proposal No: 11-42a

Recommendation: Continue to reject the proposal.

Substantiation: Unlike proposal 11-39, this proposal would diminish safety by raising the allowable overcurrent protective device setting above 15 amperes for a range of over 120 volt motors that had no prior comparable allowance, whether as single motors or as multiple motors on a single branch circuit. The short-circuit and ground-fault protection parameters relate to many other circuit components than the size of the wire.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-27 Log #2941 NEC-P11
(430.53(C))

Final Action: Reject

Submitter: Gordon C. Davis, Moeller Electric Corp.

Comment on Proposal No: 11-44

Recommendation: Reconsider and reject Proposal 11-44.

Substantiation: The new item 6 reference to Article 240 contradicts the wording found in 430-53(B) and 450-53(C)(4) where the branch circuit protection specifically refers to 430-52 and not to Article 240. 430-53 General and 430-53(B) and 430-53(C) show the actual intent of 430-53 to include motor loads and other loads as a part of a motor circuit.

Article 240 and Article 210 both refer back to Article 430 for motor circuits.

The references to 430-52 shows the original intent of the section to provide for the protection of other loads in group motor circuits by the standards now existing in 430-53 and not standards found in Article 240.

Panel Meeting Action: Reject

Panel Statement: The provisions of 430.53 allow for loads, other than motor loads, to be connected, along with motor loads, to a single branch circuit protective device. The new item (6) makes it clear that these non-motor loads are not assumed to be protected by the single protective device. Their protection must be investigated with the single device to determine if protection does indeed exist. Some devices may need smaller overcurrent protection than that allowable for the protection of the motor circuits.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-28 Log #405 NEC-P11
(430.53(C)(3))

Final Action: Accept

Submitter: Charles B. Schram Scottsdale, AZ

Comment on Proposal No: 11-45

Recommendation: Continue to accept the proposal.

Substantiation: The submitter's substantiation is accurate and his reference to HACR circuit breakers is appropriately applied to this Section. Since the provisions of 430.53(C)(3) are not modified by the provisions of Part III of Article 440, 430.53(C)(3) is applicable under Article 440 in accordance with 440.3(A). The designation "HACR", as applied to circuit breakers, was originally developed by UL to meet the NEC requirement for circuit breakers "listed for group installation". Special tests were originally required to qualify a circuit breaker for the "HACR" marking.

Panel Meeting Action: Accept

Panel Statement:

Number Eligible to Vote: 14

Ballot Results: Affirmative: 10 Negative: 4

Explanation of Negative:

D'AMICO: The marking "HACR" has been longstanding. It is familiar text on a label which installers, electricians and inspectors have grown accustomed to.

They know that when selecting or inspecting over-current protection for group motor installations, particularly on HVAC applications, the breaker must be listed for the purpose, and have the HACR marking. If this change is accepted, it would not only remove the listing requirement for HVAC equipment, but it would also remove the special listing requirement for other types of factory and field installed assemblies that have not been tested to the same standards.

GARVEY: I would support Proposal 11-45 and Comment 11-28 if the issue were restricted solely to HACR markings on circuit breakers. There are other types of group installations of motors that are encountered by the Authority Having Jurisdiction. One example is a field constructed "industrial control panel" that is not listed. In this case, electricians and inspectors need clear guidance on proper application of protective devices used in group installations. While the controller manufacturer may provide guidance on selection of the proper circuit breaker, this information is not marked on the controller and is generally not readily available to the Authority Having Jurisdiction. UL 489 could be revised to provide testing of circuit breakers to meet "umbrella" values. The UL guide card information for motor controllers (NJOT) indicates "Motor Controllers" for group installations are marked with a maximum rating of fuse which is considered to suitably protect the controller for the group application." The motor controller standard should be revised to include similar marking requirements for circuit breakers.

SAPORITA: It is necessary to vote against panel action. Panel action needs to be changed to "reject". Section 430.53(C) covers the requirements for motor circuit overcurrent protection for more than one motor, or one or more motors and other loads. It covers both factory-assembled equipment and field-assembled equipment. Factory assembled equipment includes, but is not limited to, motor control panels, HVAC equipment, and industrial machinery. Original Proposal 11-45 and the subject Comment (11-28) are both focused solely upon HVAC equipment. Unfortunately, if this comment is to be accepted by the panel, the requirement for special group motor listing will not only be removed for HVAC equipment, it will also be removed for all other types of factory assembled and field assembled equipment.

The listing of circuit breakers for HVAC equipment is covered in UL Standard 489. However, the listing of circuit breakers used in group installations for other types of factory assembled equipment or for field assembled equipment is NOT covered. As such, removing this long-standing requirement for proper overcurrent protection from the code introduces an unwarranted safety problem.

I could support the original proposal and this comment if they were restricted solely to HVAC equipment, where short-circuit testing has occurred up to 5,000 amperes available. I must object, however, to the inclusion of this concept for other types of equipment for which no testing, nor special group motor listing has ever existed, for any available short-circuit current.

TODD: I agree with the comments by Mr. D'Amico and Mr. Saporita and believe that before longstanding terms are removed from the Code that the effects of this removal be evaluated.

11-29 Log #2860 NEC-P11
(430.53(C)(3))

Final Action: Reject

Submitter: Todd F. Lottmann, Cooper Bussmann

Comment on Proposal No: 11-45

Recommendation: Reject this proposal.

Substantiation: This proposal should be rejected. The submitter refers to "continued misinformation supplied verbally to the panel at the comment stage," yet fails to identify what the information is and why it is incorrect. Additionally, the submitter provides indisputable facts as a means of substantiating change which do not provide technical substantiation for removal of this requirement and are informative in nature.

Each fact is addressed here:

1) The submitter states: "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."

While this is true after reviewing the requirements of UL489, this does not justify the removal of a requirement for circuit breakers to be listed for group installation. Rather than remove the requirement be because the product standard does not have a marking for group installation, the product standard should be revised to include such a marking.

2) The submitter states: "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."

While this statement does provide interesting information, it does not justify the removal of a listing protocol to filter out the circuit breakers, which are not suitable for group installation. Again, just because the product standard does not have a means of providing the evaluation for circuit breakers which are suitable for group installations does not justify removing this requirement from the NEC. The product standard should be revised to include such a testing protocol.

3) The submitter states: "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."

Cost should not outweigh the minimum levels of safety required by the NEC as stated in 90.1. Justification for the requirement in 430.53(C) would have been provided at the time the requirement was proposed and added through a consensus process to the NEC. Technical substantiation for removing the requirement is what should be provided as the submitter wants to change an existing requirement in the NEC.

In addition, the submitter states in his substantiation that: "The requirement that the breaker be "listed for the purpose" has no meaning and all listed molded cases circuit breakers are acceptable on group motor installations."

I disagree with this statement based upon the following reasons:

1. Group motor applications in and of themselves are provided with a lower level of short circuit and ground fault protection compared to that of a single motor circuits. This is due to the fact that the short circuit and ground fault protective device, in group motor applications is allowed to be sized much larger than allowed for single motor circuits. This increase in sizing decreases the level of short circuit and ground fault protection that is provided for the components and equipment used in the group motor application. There are specific conditions, which must be met, to qualify for the use of group motor installations, as shown in 430.53. However, that does not preclude the fact of assuring that the components and equipment, which is used in the group installation, must be able to handle the increased level of ground faults and short circuit currents which will be available due to the increased size of the ground fault and short circuit protective device.

2) Circuit breakers do not have short circuit let through limits to which they must adhere. Rather, evaluation of conductors and the circuit breaker itself are used to determine whether or not a circuit breaker provides suitable short circuit protection. Therefore, one manufacturer's circuit breaker can have different short circuit performance than other manufacturers' circuit breakers as long as they meet the evaluation criteria provided in UL 489. This variance in short circuit performance in and of itself justifies the need to evaluate and mark which circuit breakers are suitable for protection of components and equipment used in a group motor application, thus leaving out the ones that are not.

3) Industrial control equipment, such as motor starters, tested to UL 508 are not required to be marked with the specific manufacturer and part number of the circuit breaker used in the sort circuit testing. This deficiency along with the varying short circuit performance of circuit breakers discussed in item 2 above supports the need for the requirement contained in existing 430.53(C). While some manufacturers make both motor starters and circuit breakers, leading to the assumption that testing was conducted with starters and circuit breakers built by that manufacturer, not all of them do. There is no marking requirement for the starter to guide the installer and AHJ as to which manufacturer's circuit breaker and part number to use. How will the installer and inspector know whether the circuit breaker used in the group installation will provide a level of protection which meets the minimum safety levels that this code is supposed to provide per NEC 90.1?

Finally, the HACR marking, which is referenced by the submitter, is specific to the type of group motor installations covered by Article 440. This change, as accepted, opens the door for the use of any listed circuit breaker in any group motor application without any technical substantiation to justify the change.

Given all the above information, this requirement should remain in the code and the product standards should be revised to include testing and marking to comply with this requirement. Deficiencies in product standards should never justify the removal of an existing safety requirement without technical substantiation that justifies such a change.

Panel Meeting Action: Reject

Panel Statement: In his analysis of this issue the submitter provided a logical argument that the requirements in the product standards be reviewed for possible revision. The prior Code language had no impact on this perceived need. Removal of the text requiring a specific group installation listing also did not result in a change in the listing standard.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 10 Negative: 4

Explanation of Negative:

D'AMICO: If this comment is rejected, the requirement for special group motor listings will be removed for ALL types of factory assembled and field assembled equipment as well as HVAC equipment. Removal of this requirement will not result in a safer Code change.

GARVEY: The submitter of this comment indicated that "The product standard should be revised to include such a testing protocol" where circuit breakers are used in group applications. I agree with this statement. Inspectors need guidance on proper application of protective devices used in such a fashion. Does the code currently require a breaker be listed specifically for the group application? Yes. Will the removal language permit any listed breaker to be used in a group application? It seems so. Do listing standards such as UL 508 address this issue? I am not sure, especially if the application involves fault currents less than 10,000-amperes. Have all safety-related issues been addressed by the submitter of proposal 11-45? Not to the satisfaction of the authority having jurisdiction.

SAPORITA: It is necessary to vote against panel action. Panel action needs to be changed to "accept". Section 430.53(C) covers the requirements for motor circuit overcurrent protection for more than one motor, or one or more motors, and other loads. It covers both factory-assembled equipment and field-assembled equipment. Factory assembled equipment includes, but is not limited to, motor control panels, HVAC equipment, and industrial

machinery. Original Proposal 11-45 is focused solely upon HVAC equipment. Unfortunately, if this comment is to be rejected by the panel, the requirement for special group motor listing will not only be removed for HVAC equipment, it will also be removed for all other types of factory assembled and field assembled equipment.

The listing of circuit breakers for HVAC equipment is covered in UL Standard 489. However, the listing of circuit breakers used in group installations for other types of factory assembled equipment or for field assembled equipment is NOT covered. As such, removing this long-standing requirement for proper overcurrent protection from the Code introduces an unwarranted safety problem.

I could support the original proposal if it were restricted solely to HVAC equipment, where short-circuit testing has occurred up to 5,000 amperes available. I must object, however, to the inclusion of this concept for other types of equipment for which no testing, nor special group motor listing has ever existed, for any available short-circuit current.

TODD: I agree with the comments by Mr. D'Amico and Mr. Garvey that this change does not make it easier to provide a compliant installation in the field.

11-30 Log #218 NEC-P11
(430.53(C)(4))

Final Action: Reject

Submitter: Gordon C. Davis, Moeller Electric Corp.

Comment on Proposal No: 11-47

Recommendation: Recommend reconsideration and acceptance of proposal 11-47 with new text at end of 430.53(C)(4).

"Motor controller with thermal magnetic trips additionally evaluated for group installation and used in group motor loads and other 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: 1. The Code Panel statement that only motor controllers evaluated as Tap Conductor Protectors provide short circuit protection is inaccurate. Motor controllers with thermal magnetic trips have also been evaluated per UL 508 with hi cap short circuit ratings when used with fuse or circuit breaker. UL 508 requires that all motor controllers with integral thermal magnetic trips pass the short circuit test with both their magnetic trips operational and their overload function in calibration. Because of these enhanced protective features, the ability to be used as motor circuit disconnects, and the capacity for an integral magnetic controller, many control panels have motor controllers with thermal magnetic trips which have not been evaluated as Tap Conductor Protectors (TCP). These non-TCP motor controllers with integral thermal magnetic trips overcurrent protective features should be considered supplementary when used in group motor circuits with resistance heaters or luminaries. Branch protection remains three times amp rating of tap conductors.

2. Tap conductor protectors also provide the same protection, but have undergone additional tests to show they also protect the tap conductors, allowing a fuse or circuit breaker ten times amp rating of taps.

3. 240-21(A) refers to 210-19 which refers to 430 for the overcurrent protection of conductors. 430-53 is presently where the requirements for overcurrent protection of group motor circuits and other loads are found. References to Article 240 only brings the reader back to Article 430. Proposal 11-47 eliminates some confusion by indicating that the ampere rating of fuse or circuit breaker branch protection cannot be increased for motor controllers with thermal magnetic trips used per 430-53(C)(4).

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

Panel Meeting Action: Reject

Panel Statement: The comment seems to imply that the size of the branch circuit overcurrent device is based upon the size of the motor controllers. This is incorrect. The size of the branch circuit overcurrent device is based upon the ratings of the motors and other connected loads.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-31 Log #219 NEC-P11
(430-53(C)(6))

Final Action: Reject

Submitter: Gordon C. Davis, Moeller Electric Corp.

Comment on Proposal No: 11-44

Recommendation: Reconsider and reject proposed 430-53(C)(6).

Substantiation: The proposed 430-53(C)(6) should be rejected for the following reasons:

1. Every branch circuit found in 430-53 now is protected by circuit breaker or fuse. There are no unsafe circuits in 430-53. 240.21(B) refers to feeder taps that do not require any overcurrent protection. Proposed 430-53(C)(6) could effectively negate the branch circuit protective devices now mandatory in 430-53.

2. 240.21(A) refers to 210.19 for branch circuit conductors. 210.19 then refers back to Article 430. The proposed 430-53(C)(6) is a circular reference and misses the intent of the original standard.

3. The conductors in 430-53 are sized in accordance with "one-third" rule

which is also found in 240-21(B). The exception being conductors protected by Tap Conductor Protectors (TCP) which are suitable for conductor protection. TCP allow the branch circuit protective device to be sized not greater than ten times the ampere rating of the smallest conductor in the branch circuit. Because of the ability for the Tap Conductor Protectors to protect conductors they are also suitable as protective conductors for devices in heater and lighting circuits found in 430-53.

4. The proposed 430-53(C)(6) should be rejected because it sends control panel manufacturers and others in the controls industry to a part of the NEC about which they would be less familiar, easily causing confusion as seen in the reference in 210.19.

Panel Meeting Action: Reject

Panel Statement: The provisions of 430.53 allow for loads, other than motor loads, to be connected, along with motor loads, to a single branch circuit protective device. The new item (6) makes it clear that these non-motor loads are not assumed to be protected by the single protective device. Their protection must be investigated with the single device to determine if protection does indeed exist. Some devices may need smaller overcurrent protection than that allowable for the protection of the motor circuits.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-32 Log #1955 NEC-P11
(430.71-Motor Control Circuit)

Final Action: Reject

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 11-49

Recommendation: The proposal should be accepted.

Substantiation: The submitter has identified a safety concern that should not be overlooked. I echo Mr. Garvey's explanation of negative on this proposal. I urge the panel to reconsider their vote on this issue. This comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Reject

Panel Statement: The submitter has not provided any further substantiation to support the proposed revision of the definition. The panel reaffirms its action and statement on Proposal 11-49.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

D'AMICO: This comment and Proposal 11-49 should have been Accepted. The circuits which the submitter refers to are allowed to remain energized while the motor controller disconnecting means is locked out. This places the person who is servicing or maintaining the equipment at an unnecessary risk of electric shock. Means to disconnect such circuits should be addressed with proposals for the 2008 Code cycle. Perhaps a requirement for field marking such circuits could be an alternative step in the direction of safety.

GARVEY: The submitter of Proposal 11-49 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. The latter direction is the one taken by NFPA 79 for exempted circuits on industrial machinery (2002 NFPA 79, 5.3.5.4).

Comment on Affirmative:

SAPORITA: The panel action to reject the proposed change to the definition of a motor control circuit was correct, but the original proposal and this comment raise a real safety concern. As written, 430.74 does not require the disconnection of signal circuits when the disconnecting means is in the open position. Looking ahead to the 2008 NEC, a proposal to expand part VI to include signal circuits along with a proposal to include signal circuits with the requirements of 430.74 would accomplish the intent of both Proposal 11-49 and Comment 11-32.

11-33 Log #1954 NEC-P11
(430.74(A))

Final Action: Accept

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 11-51

Recommendation: The proposal should be rejected.

Substantiation: The proposed change accepted in principle by this CMP introduces a safety hazard. I point to the explanation of negative offered by Mr. Saporita and Mr. D'Amico on this proposal in the published ROP. I ask the committee to reconsider their position on this issue. I would suggest that when change is made, it should be safer code. I am not certain that has taken place in this instance. This comment represents the official position of the International

Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

D'AMICO: Accepting this comment, reaffirms the panel's commitment to safety by keeping long-standing text in the Code that will continue to promote safety and protect workers in the field.

11-34 Log #451 NEC-P11
(430.83(C))

Final Action: Reject

Submitter: Dan Leaf Rancho Santa Margarita, CA

Comment on Proposal No: 11-58

Recommendation: Accept the proposal.

Substantiation: Many proposals are accepted based on reasoning that does not substantiate a field problem. I venture to say many Authorities Having Jurisdiction accept the provisions of this section for portable motors as it doesn't seem to be a valid technical reason not to. Electrical parameters do not change for a motor dependent on whether it is stationary or portable. 550.15(G)(2) has similar wording as (C)(2) without limitations of being stationary for mobile homes and manufactured homes.

Does the type of premises have relevance?

Panel Meeting Action: Reject

Panel Statement: The panel does not agree with the statement that "many authorities having jurisdiction accept the provisions of this section for portable motors".

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

1-253a Log #2005 NEC-P01
(Table 430.91)

Final Action: Accept

Submitter: Julian R. Burns, Burns Electrical/Quality Power Solutions, Inc.

Comment on Proposal No: 1-157

Recommendation: CMP-1 should have rejected Proposal 1-157, all enclosure types are not appropriate for fittings, conduits and raceways as covered under CMP-8 purview.

Substantiation: Review of Proposal was per the request of the TCC.

Panel Meeting Action: Accept

Panel Statement: See panel action and statement on Comment 1-185.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-253b Log #3533 NEC-P01
(Table 430.91)

Final Action: Accept

Submitter: Julian R. Burns, Burns Electrical/Quality Power Solutions, Inc.

Comment on Proposal No: 1-157

Recommendation: CMP 1 should have rejected Proposal 1-157. All enclosure types are not appropriate for fittings, conduits and raceways as covered under CMP 8 purview.

Substantiation: Review of the proposal was per the request to the Technical Correlating Committee.

Panel Meeting Action: Accept

Panel Statement: See panel action and statement on Comment 1-185.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-253c Log #3580 NEC-P01
(430.91 and Table 430-91)

Final Action: Reject

Submitter: Michael W. Smith, Schaeffer Electric Co.

Comment on Proposal No: 1-157

Recommendation: I agree with the Panel's action on this proposal, yet there is one fix that needs to be done on the Table notes. Note 1 should be revised to "Motor Controller enclosures shall be marked with the type number." This will then make the Table generic to all enclosures. Or we could omit Note 1 and make this part of the new text in 110.20. If it is the intent of the original submitter to have all enclosures marked with the type, then I would agree with that intent. Thus, making the installation of enclosures more user friendly and ease of inspection.

Substantiation: none

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 1-188.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-253d Log #632 NEC-P01 **Final Action: Reject**
(430.91, FPN (New))

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 11-61

Recommendation: 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.

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: Reject

Panel Statement: See CMP 1 action and statement on Comment 1-231. It is the intent of the panel that the fine print note to 430.91 to be retained with Table 430.91.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

(Note: The sequence nos. 11-35; 11-36; 11-37 and 11-38 were not used)

11-39 Log #1234 NEC-P11 **Final Action: Accept in Principle**
(430.102(B))

Submitter: Donald A. Ganiere Ottawa, IL
Comment on Proposal No: 11-66

Recommendation: Panel should accept this proposal.

Substantiation: Having the lock out independent of the cover assembly is very important when there are multiple work projects going on at the same time. It is not unusual to have someone working in the panel at the same time as others are working in the field on equipment that is supplied by breakers in the panel. Yes, the panel would be locked out on its supply side while the panel work is being done, but it may be reenergized for check out purposes without the cover being reinstalled placing the other work crews at risk because their locks require the cover to be in place to function. Also, with some of the lockout systems that require the cover to be functional, the lock holding device itself becomes a hazard as the cover is being removed. In many cases, the device falls off and could possibly produce a fault between energized parts or energized and grounded parts.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action on Comment 11-42. This action addresses the submitter's recommendation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-40 Log #1593 NEC-P11 **Final Action: Accept in Principle**
(430.102(B))

Submitter: Alan Manche, Schneider Electric/Square D Co.

Comment on Proposal No: 11-67

Recommendation: The panel should reconsider proposal 11-67 and accept in principle using the wording suggested by Mr. Wright in his negative comment.

Substantiation: Mr. Dollard's concerns for proposing the wording change to this section of the 2002 NEC were well founded and needed in order to address the use of portable devices. However, the word "permanently" continues to receive a variety of interpretations by the inspection community across the country. The most extreme example is the installation or removal of such a lockout device by a tool is not interpreted as being permanent. Using such logic would say that the entire panelboard mounted on the wall is not permanent as it could be removed using a tool. The proposed wording change by Mr. Wright preserves the enforceable text for the inspector, addresses Mr. Dollard's concern, and clarifies the requirement for the lockout means to remain in place at all times.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action on Comment 11-42. This action addresses the submitter's recommendation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-41 Log #1952 NEC-P11 **Final Action: Accept in Principle**
(430.102(B))

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 11-66

Recommendation: The proposal should be accepted.

Substantiation: I urge the panel to reconsider their position on this proposal. Personnel working on energized equipment that was placed in an electrically

safe work condition, including installing a lock(s), should not have their lives placed in peril by this crucial link in the safety chain being able to be compromised in a relatively easy manner. This proposal is an attempt to raise the bar on safety and better ensure that deenergized equipment stays that way until personnel remove the lock themselves. This comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action on Comment 11-42. This action addresses the submitter's recommendation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-42 Log #2574 NEC-P11 **Final Action: Accept**
(430.102(B) Exception)

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

Comment on Proposal No: 11-67

Recommendation: Reconsider and accept this proposal, revised as follows: 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.

Substantiation: 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.

Panel Meeting Action: Accept

Panel Statement:

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

COX: No evidence has been provided that a safety problem has resulted from the present text. A portable locking mechanism can provide lockout protection just as well as one that remains after the lock is removed. Lockout effectiveness is determined more by personnel training and management resolve than the equipment used.

11-43 Log #1354 NEC-P11 **Final Action: Accept in Principle**
(430.109(7))

Submitter: Gordon C. Davis, Moeller Electric Corp.

Comment on Proposal No: 11-74

Recommendation: Reconsider and the accept proposal.

Substantiation: A UL standard to which the Safety Lockout System (a.k.a. Safety Isolation Equipment) would be listed is now in the UL standard STP process. The new standard requires the subcomponents of the Safety Lockout System device to be equivalent or better than the other related devices found in 430-109. The Safety Lockout system device is required by the new UL standard to meet safety performance category 4.

The Safety Lockout System device is needed outside of NFPA 79 installation in those applications which has multiple maintenance entry points, such as ski lifts and construction equipment.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel recommendation and substantiation on Comment 11-45a.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

WRIGHT: 430.109 specifically addresses the types of motor disconnecting means. The proposed addition to 430.109(A)(7) is attempting to add a specific motor control function for contactors that must be located on the load side of a motor disconnect currently found in 430.109. The contactor is already permitted on the load side of the disconnecting means and adding the specific function to 430.109 is not necessary and may cause confusion. The proposed isolation system is not a substitute for the disconnect types already found in 430.109 and, therefore, should not be located in 430.109 as a disconnecting means. This is a machinery issue and is covered in NFPA 79 and should not be handled as a general motor disconnect.

In addition, in this case NEMA is not comfortable with a Code requirement that relies completely on the product listing and the UL standards Technical Panel has not seen any draft of the requirements.

11-44 Log #450 NEC-P11 **Final Action: Reject**
(430.109(A)(1))

Submitter: Dan Leaf Rancho Santa Margarita, CA

Comment on Proposal No: 11-75

Recommendation: Accept the proposal.

Substantiation: The proposal was intended for clarification. A motor circuit switch is defined in Article 100 as capable of interrupting current of a motor with a horse power reading of the same horse power reading of the switch. However, this does not address the condition of a 3-phase horse power rated switch used for a single motor with a horse power rating equal to the switch rating, or a 2 pole single-phase switch used in a corner grounded delta system or an AC rated switch used on DC. It is uncommon for installers to add horse power rating of multi-motor equipment including those with 3-phase and single phase motors arithmetically to arrive to a horse power rating which is less than required and not be questioned by Authority Having Jurisdiction. I have seen this many times. Ratings determined by 430.110(C)(1) almost invariably result in a rating higher than the arithmetical sum of horse power.

Panel Meeting Action: Reject

Panel Statement: The panel does not agree that adding the additional required ratings into the rule will assist the user in selecting the correct switch for the application. The submitter has failed to substantiate the contention that installers are incorrectly applying 430.110(C)(1).

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-45 Log #731 NEC-P11 **Final Action: Accept**
(430.109(A)(6))

Submitter: Gordon Davis, Moeller Electric Corporation

Comment on Proposal No: 11-73

Recommendation: Accept the proposal, modified as follows:

430.109(A)(6) Manual Motor Controller. Listed manual motor controllers additionally marked "Suitable as Motor Disconnect" shall be permitted as a disconnecting means where installed between the final motor branch-circuit short-circuit protective device and the motor. Listed manual motor controllers additionally marked "Suitable as Motor Disconnect" shall be permitted as branch disconnecting means for on the line side of the fuses permitted devices in 430-52(C)(5). In this case, the fuses permitted in 430-52(C)(5) shall be considered supplementary fuses, and suitable branch-circuit short-circuit and ground-fault protective devices shall be installed on the line side of the manual motor controller additionally marked "Suitable as Motor Disconnect."

Substantiation: The original proposal contained incorrect references, which have been corrected by this comment, and the comment clarifies the intent of the proposal.

Semiconductor fuses are permitted to be used as branch-circuit fuses under 430-52(C)(5). However, they are often used as supplementary fuses, to protect electronic equipment, and may be located on the load side of Listed manual motor controllers marked as "Suitable for Motor Disconnect." Since, as branch-circuit fuses, they are technically the final motor branch-circuit protective device, use after these manual motor controllers violates the Code. The proposed change permits the use of these fuses in this location, as supplementary protective devices. The manual motor controllers additionally marked "Suitable as Motor Disconnect" will be suitably protected by the branch-circuit protective devices located on their line side.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-45a Log #CC1102 NEC-P11 **Final Action: Accept**
(430.109(A)(7))

It was the action of the Technical Correlating Committee that the recommendation be revised as follows:

Revise new 430.109(A)(7) to read as follows:

"(7) System Isolation Equipment. System isolation equipment shall be listed for disconnection purposes. System isolation equipment shall be installed on the load side of the overcurrent protection and its disconnecting means. The disconnecting means shall be one of the types permitted by 430.109(A)(1) through (A)(3)."

Relocate the definition from proposed 430.107(A)(7)(a) to 430.2 as a new definition.

The Technical Correlating Committee has relocated the definition to be consistent with the NEC Style Manual.

Submitter: Code-Making Panel 11

Comment on Proposal No: 11-74

Recommendation: Add a new 430.109(A)(7) to read:

(7) System Isolation Equipment.

(a) Definition. System Isolation Equipment. A redundantly monitored, remotely operated contactor-isolating system, packaged to provide the disconnection/isolation function, capable of verifiable operation from multiple remote locations by means of lockout switches, each having the capability of being padlocked in the OFF (open) position.

(b) System Isolation Equipment Installation. System isolation equipment shall be listed for disconnection purposes. System isolation equipment shall be installed on the load side of the overcurrent protection and its disconnecting means. The disconnecting means shall be one of the types permitted by

430.109(A)(1) through (A)(3).

Substantiation: The new 430.109(A)(7) recognizes the use of system isolation equipment as a disconnecting means. This comment integrates the concepts from Comment 11-46 and provides a definition for this type of equipment. Additionally the proposed text clarifies that this equipment be specifically listed for disconnection purposes.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

WRIGHT: See my Explanation of Negative Vote on Comment 11-

43. **Comment on Affirmative:**

GOETZ: UL agrees with the definition in subitem a) of the new 430.109(A)(7), but does not agree with its location as it is in conflict with the NEC Style manual clause 2.2.2.2.

11-46 Log #1564 NEC-P11 **Final Action: Accept in Principle**
(430.109(A)(7))

Submitter: William E. Anderson, The Procter & Gamble Company

Comment on Proposal No: 11-74

Recommendation: In light of a new standard becoming available and the continuing need to provide equipment that can be safely accessed, I believe the panel should reconsider the rejection of the proposed addition to 430-109.

Because the term "Safety Lockout System" may create some confusion I would suggest that the proposed [new text] added wording to NEC section 430-109 Type (A) General to read:

(7) Safety Lockout System System Isolation Equipment: A redundantly monitored, remotely operated contactor-isolating system that incorporates control lockout provisions and is listed for disconnection purposes.

Substantiation: The panel statement from the May 2004 ROP indicated that there was a concern about which acceptable standard the proposed equipment could potentially be listed. Underwriters Laboratories has issued for comment and ballot a proposed first edition of UL 60947-4-20 "Standard for Low-Voltage Switchgear and Control Gear - Part 4-20: Contactors and motor-starters - Equipment used for system isolation and Rated as a Single Unit". The UL standard also addresses the other concerns contained in the panel statement. It is expected that the new standard would be published before the publication of NFPA 70: 2005 edition.

The publication of UL 60947-4-20 provides the assurance of an appropriate level of design performance.

The inclusion of this disconnecting means in the 430-109(A) list satisfies the applications that fall under NFPA 70 as well as NFPA 79.

The substantiation to revise the proposed addition:

It is noted that the new proposed description [System Isolation Equipment] reflects the terminology used in the proposed first edition of UL 60947-4-20.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel recommendation and substantiation on Comment 11-45a.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 13 Negative: 1

Explanation of Negative:

WRIGHT: See my Explanation of Negative Vote on Comment 11-43.

11-47 Log #42 NEC-P11 **Final Action: Reject**
(430.113 (New))

Submitter: Timothy O'Hearn Tulsa, OK

Comment on Proposal No: 11-81

Recommendation: Write an exception to exclude the requirement for separate local disconnects for motor space heaters, lube oil heaters, and other auxiliary electrical equipment that are part of the motor and driven equipment (pump, compressor, etc.).

Substantiation: These circuits typically have disconnects that are lockable but not located at the equipment. It is standard practice in the industry to not furnish individual local disconnects for these types of loads and, in my opinion, their isn't sufficient justification to require these disconnects and these should be added to the list of exceptions.

Panel Meeting Action: Reject

Panel Statement: The comment does not contain any recommended text.

Section 4-5.5 of the NFPA Regulations Governing Committee Projects requires that a comment include the proposed wording to be added.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-48 Log #427 NEC-P11 **Final Action: Reject**
(430.113 Exception (New))

Submitter: Timothy O'Hearn Tulsa, OK

Comment on Proposal No: 11-57

Recommendation: Write an exception to exclude the requirement for separate local disconnects for motor space heaters, lube oil heaters, and other auxiliary electrical equipment that are part of the motor and driven equipment (pump, compressor, etc.).

Substantiation: These circuits typically have disconnects that are lockable but not located at the equipment. It is standard practice in the industry to not furnish individual local disconnects for these types of loads and, in my opinion,

there isn't sufficient justification to require these disconnects and these should be added to the list of exceptions.

Panel Meeting Action: Reject

Panel Statement: The comment does not contain any recommended text. Section 4-5.5 of the NFPA Regulations Governing Committee Projects requires that a comment include the proposed wording to be added.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-49 Log #72 NEC-P11
(430.120)

Final Action: Reject

Submitter: Michael V. Glenn, Longview Fibre Co.

Comment on Proposal No: 11-6

Recommendation: Reject this proposal.

Substantiation: I request the panel reconsider and reject this proposal. Each of the items, 430.120 – 430.126 are already covered by the code or appears to be an unsubstantiated attempt by the submitter to make the installation requirements for ASDs more restrictive. The submitter's substantiation about the NEC being inadequate for adjustable drives systems is not supported because of the many years of successful non-problematic existing installations. The code is adequate and this change is unnecessary. The following are just a few examples of duplication or excessive requirements:

430.122(B) by-pass device conductor sizing, already covered by code.
430.124 Overload protection, already covered by code
430.126B requiring motors with external cooling to have over temperature protection could be accomplished by interlocking the cooling supply with the controller.

430.126D Automatic restarting, already covered by code.

430.128 already covered by code.

On the surface this might look like a good proposal or a good idea. However, the code is now adequate as substantiated by the thousands of existing installations. Please reject this proposal.

Panel Meeting Action: Reject

Panel Statement: The panel does not agree that creating the new section on ASD will duplicate existing requirements. The panel in accepting Proposal 11-6 concurred with the submitter that the NEC is inadequate in addressing the growing popularity of ASD installation. Installers and AHJ's will use 430-X as the basis for installing and inspecting an ASD installation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-50 Log #2571 NEC-P11
(430-Part X -(New))

Final Action: Accept

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

Comment on Proposal No: 11-6

Recommendation: Throughout 430.126(A) - change all references to "430.32" to read "430.31" based on acceptance of Proposal 11-29.

In proposed 430.126(A)(1) - delete the word "Integral".

In proposed 430.126(A)(2) - the word "detention" should be "retention".

{add new} "430.126(A)(4) - Thermal sensor embedded in the motor which is received and acted upon by an adjustable speed drive."

In proposed 430.126(B) - delete "overttemperature".

{add new} FPN: Protection against cooling system failure can take many forms. Some examples of protection against inoperative or failed cooling systems are direct sensing of the motor temperature as described in 430.32(A)(1), (3) and (4) or sensing of the presence or absence of the cooling media (flow or pressure sensing).

Substantiation: Correction of typographical error to ensure concept of maintaining protection.

Thermal detection can be accomplished without an integral sensor.

It is necessary to ensure that the motor be protected against overheating even if the cooling system fails.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-51 Log #1983 NEC-P11
(430-Part X -(New))

Final Action: Accept in Part

Note: The Technical Correlating Committee understands that the recommendation to delete 430.3 is referring to 430.3 of the 2005 NEC draft.

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

Comment on Proposal No: 11-6

Recommendation: Accept the proposal in principle. Make two editorial changes:

1. In 430.126(A)(2) change "detention" to "retention".

2. In 430.126(B) revise as follows: Motors that utilize external forced air or liquid cooling systems shall be provided with overtemperature protection that shall be continuously enabled or enabled automatically if the cooling system fails.

In addition, delete 430.3 and relocate 430.3 FPN to follow 430.120.

Substantiation: 1. This change may be in error but it is proposed on the assumption that what is intended is automatic means to account for residual waste heat in the event of frequent cycling that would defeat a simple time based protective function.

2. This change responds to the explanatory tone of the proposed wording, which seems to say why the protection is necessary rather than requiring the protection. In addition, this wording (which may or may not be the intent, and that confusion is the point of the comment) clarifies how the overtemperature arrangements are supposed to interact with forced cooling.

3. The final change is for correlation. The proposal overall is outstanding, one of the very best in this cycle.

Panel Meeting Action: Accept in Part

The panel does not accept the inclusion of the word "overttemperature" in the recommended revision of 430.126(B).

Panel Statement: Deletion of the word "overttemperature" was necessary to correspond with the new Fine Print Note resulting from the panel action on Comment 11-50.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-52 Log #1989 NEC-P11
(430.143(B))

Final Action: Reject

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

Comment on Proposal No: 11-88

Recommendation: Reject the proposal.

Substantiation: The panel action is better than the proposal, but still represents a misapplication of this section unless other language is changed. A very important phrase in the existing section (and not being changed now) is "the leads to the motor". Motor leads come with the motor and extend to the motor windings. They are not branch-circuit conductors. This section is about how to properly wire motors with extended leads that are capable of reaching a remote junction box, which becomes the outlet. As such, the only proper wiring methods would be flexible raceway methods, not cable assemblies. Over the years, this section has been extended from time to time (including this proposal) by submitters who point out that their wiring method grounds as well as the allowed methods. This is not completely unreasonable given that this section is located in the grounding part of the article, but it is completely inconsistent with the wording of the paragraph as a whole. CMP 11 should act in the 2008 cycle to remove all cabled wiring methods from this paragraph.

Panel Meeting Action: Reject

Panel Statement: Cables are and have been permitted choices for connection of motor leads to remote terminal enclosures. The panel does not agree to restrict a motor manufacturer's permitted choices of wiring methods without technical substantiation.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-53 Log #633 NEC-P11
(430.145)

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 11-86

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Revise the first sentence of 430.145 to read: Where required, grounding shall be done in the manner specified in Part VI of Article 250.

Panel Statement: The panel accepts the Technical Correlating Committee's recommendation to review this section and has revised the first sentence of this section to reference Part VI of Article 250.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-54 Log #3688 NEC-P11
(430.145(B))

Final Action: Reject

Submitter: George W. Flach, National Armored Cable Manufacturers Assn.

Comment on Proposal No: 11-88

Recommendation: Revise the proposal as revised by the panel to include Type MC cable with an insulated equipment-grounding conductor 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 stranded conductors within Type AC cable, interlocked metal tape Type MC cable with an equipment ground conductor or 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.

Substantiation: The original proposal was to include MC cable of any construction. The panel revision of the proposal excluded MC with an equipment ground conductor. Since an equipment grounding conductor is not prohibited by 430.145(B), this comment suggests text and a location for its inclusion. The panel may wish to alternately locate the suggested text to the second paragraph of 430.145(B) where flexible nonmetallic conduit with an equipment ground conductor is located.

Panel Meeting Action: Reject

Panel Statement: Listed interlocked metal tape Type MC cable is required to have an equipment grounding conductor by both 250.118(10)a. (2005 ROP Draft) and listing requirements. The proposed additional text does not clarify the requirement. The proposed text changes the requirement to permit either non-listed metal tape Type MC or any type MC cable listed and identified by 250.118(10). The panel does not intend to permit smooth or corrugated tube Type MC in this application.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-55 Log #406 NEC-P11 **Final Action: Accept**
(Table 430.148, Table 430.149, Table 430.150 and 430.6(A)(1))

Submitter: Charles B. Schram Scottsdale, AZ

Comment on Proposal No: 11-88a

Recommendation: In addition to the added sentence to 430-6(A)(1), add the following at beginning of the first sentence:

“Other than for motors built for low speeds (less than 1200 RPM) or high torques, and for multispeed motors,” continuing with the existing “the values given...”.

Substantiation: The added sentence is in direct conflict with the existing text. The recommended change is to conform with the NFPA Style Manual.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-56 Log #529 NEC-P11 **Final Action: Accept**
(Table 430.151(B))

Note: It was the action of the Technical Correlating Committee that the word “NEMA” be deleted in the recommendation so that the text reads: “Design A motors are not limited to a maximum starting current or locked rotor current.”

The Technical Correlating Committee deleted the NEMA reference to be consistent with the reference to motor “Design” throughout Article 430. In addition, the “slash” was replaced with “or” to make it clear as to what is not limited in the design.

Submitter: David Sroka Turner Falls, MA

Comment on Proposal No: 11-89

Recommendation: Add a second Table note as follows:

** “NEMA Design “A” motors are not limited to a maximum starting current/locked rotor current.”

Substantiation: 1. No direction is currently given for the NEMA Design “A” motors.

2. Undersizing of overcurrent protection devices and disconnect switches can occur with the present Table.

References: Baldor Motor catalog and the Electrical Engineering Pocket Handbook.

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

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

ARTICLE 440 — AIR-CONDITIONING AND REFRIGERATING EQUIPMENT

11-57 Log #2884 NEC-P11 **Final Action: Reject**
(440.2, 440.60 and 440.65)

Submitter: Joel G. Solis, Air-Conditioning & Refrigeration Institute

Comment on Proposal No: 11-93

Recommendation: Proposal 11-93 should be accept in principle in part but with changes in the proposed wording of the part. Changes suggested in this comment would meet the submitter’s intent and address the panel’s statements.

Revise Proposal 11-93, Log #3142 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.

Exception: Packaged terminal air-conditioners and heat pumps.

FPN: The term “packaged terminal air conditioner (PTAC)” means a wall sleeve and a separate unencased combination of heating and cooling assemblies designed as a unit for mounting through the wall for the purpose of delivering conditioned air to an enclosed space. It includes a prime source of refrigeration, separable outdoor louvres, forced ventilation, and heating availability by means of hot water, steam, or electricity. The term “packaged terminal heat pump” means a PTAC that utilizes reverse cycle refrigeration as its primary heat source, with secondary supplemental heating by means of hot water, steam, or electricity.

Substantiation: The original proposal, Proposal 11-93, was submitted on behalf of the Air-Conditioning and Refrigeration Institute and its intent was to correct the inadvertent and unjustified inclusion of package terminal air-conditioners and heat pumps (PTAC) in 440.65. The original proposal tried to do this by adding definitions for PTACs and room air conditioners (RAC) in 440.2 and deleting the definition of RAC in 440.60. However, the original proposal inadvertently deleted the last sentence of the first paragraph in 440.60. After a careful review of the panel’s statements, it is apparent the proposal should not have exempted PTACs from all of the provisions in Article 440, Section VII, with the exception of 440.65. The intent of the original proposal could have been accomplished simply by providing an exception from 440.65 for PTACs and defining them using a fine print note which this public comment does. This would get PTACs correctly defined while requiring it to comply with the rest of provisions in Article 440, Section VII. The changes suggest ed in this comment would meet the intent of our original proposal and addresses the concerns noted in the panel’s statements.

PTAC equipment was inadvertently and unjustifiably included in 440.65. The intent of ARI’s original proposal, Proposal 11-93, was to exclude PTACs from 440.65. The substantiation for 440.65 did not justify the inclusion of nonportable commercial/industrial air-conditioning equipment. Therefore, the panel erred in rejecting our original proposal.

It is well known that PTACs are commercial/industrial equipment. On the federal level, the U.S. Census Bureau in its Current Industry Report for Refrigeration, Air Conditioning, and Warm Air Heating Equipment, clearly distinguishes between PTACs and RACs by listing each as a distinct product category. The commercial/industrial nature of PTACs is well established by federal energy legislation, see Part B of Title III of the Energy Policy Act of 1992 (EPACT), Pub. L 102-486. Most states distinguish PTACs as commercial/industrial equipment intended for use in commercial buildings. This would include those states which have incorporated either NFPA 5000 or “the International Building Code.” Both of these codes recognize PTACs as commercial/industrial equipment. Finally, the product-to-market avenues for PTACs and RACs do not mix.

At its May 2001 ROP meeting, Panel 11 considered Proposal 11-104 for consideration in the 2002 edition of NFPA 70. This proposal recommended single-phase cord-and-plug connected RAC shall be provided with factory-installed LCDI or AFCI protection. The substantiation was based on statistical data cited from “The U.S. Home Product Report,” tables titled “Portable Refrigerator or Air Conditioner Fires in U.S. Homes”, “Room Air Conditioner Fires in U.S. Homes”, and news clippings. The scope of the statistical reports and news clippings is limited to residential fires. It is inappropriate to use the statistical data and news clippings to justify requiring 440.65 to apply to nonportable commercial/industrial air conditioning equipment not intended for use residential use. In addition, according to an e-mail from an NFPA principal electrical specialists: “Based on the substantiation submitted with the proposal for the 2002 NEC requiring LCDI for single-phase cord-and-plug connected Room Air Conditioners, it is my opinion that the requirement was not intended to apply to “Packaged Terminal Air Conditioners.”

PTACs are readily identified by its physical dimensions which comply with an industry standard (16 in. x 42 in.) sleeve size and weighs between 120 and 140 pounds. PTAC’s function, size, and weight would make it highly unlikely to be confused as a “portable refrigerator or air conditioner.” Secondly, PTACs are not portable; they are fixed in place through an outside wall and is not removed seasonally without extensive and costly alterations to the wall. Therefore, “portable refrigerators or air conditioners” and PTACs are not comparable equipment.

According to the 2002 U.S. Census Bureau Data, the ratio of PTAC shipments to the total number of RAC shipment is less than 5.5 percent. Typically, PTACs are installed in hotel/motel rooms. Only an infinitesimal number of PTACs could erroneously end up being applied in a residential application. The statistic report concerning Room Air Conditioner Fires in U. S. Homes specifically excludes hotels and motels among other types of buildings. Therefore, it would be incorrect to infer a problem exists with PTACs based on a report concerning residential fires attributed to RACs.

Comprehensive statistical analysis of fire incidents involving fixed and portable RAC does not support that a safety problem exist with PTAC equipment. According to Heiden Associates, see Annex A of Proposal 11-109 for a biography of Dr. Edward J. Heiden, it is their expert opinion that “there are between 11 and 24 fire department attended fires annually that can be potentially attributed to PTAC and RAC cords and plugs that have not been spliced or inserted into extension cords or overloaded/malfunctioning home wiring systems” see Exhibit 1. The Heiden analysis clearly shows that the overall magnitude of fires attributed to PTACs and fixed and portable RAC cords and plugs is substantially less than was first perceived. As stated previously, only an extremely small number of PTACs could erroneously end up being applied in a residential application.

Requiring PTACs to comply with 440.65 will increase the incident fires involving receptacle outlets. Based on experience with hair care products, cord type arc-fault circuit-interrupters (AFCI) would require over 3 cubic inches to

accommodate the AFCI device. This means that the blades of the plug would have to support the plug body including the weight of the AFCI circuit along with the wire termination. The receptacle outlet performs a clamping action to hold the blades of the plug. With time, this clamping action weakens and no longer maintains a positive plug to receptacle connection. The cord type AFCI required for PTAC units will be left unattended for long periods, months or years without any inspection. Over time, the weight of the AFCI device, along with the overall wear of the receptacle will cause the receptacle outlet to start to overheat. The failure mechanism is known as a high-impedance fault condition, commonly referred to as a glowing connection. The AFCI will not be able to detect the intense heating caused by the high impedance fault condition and the deterioration will continue until failure; a fact supported by paragraph 1.3 of UL 1699, Arc-Fault Circuit-Interrupters, which states: "These devices are not intended to detect glowing connections."

As an example, the photo below shows the early affect of a high-impedance fault conditioned. Note that the overheating is occurring at the tip of the left blade of the plug. The ground pin and neutral blade are still clean. The outlet receptacle not being able to properly retain the plug or the plug not being fully inserted into the receptacle causes overheating conditions such as this.

As we have shown, "portable refrigerators or air air conditioners" and PTACs are not comparable equipment. The function, size, and weight of PTACs and that they are installed through an outside wall clearly distinguish it from "portable refrigerators or air conditioners". PTACs are nonportable commercial/ industrial equipment and are not marketed as a consumer product for use in a residential application. In addition, a comprehensive statistical analysis of residential fires attributed to fixed and portable RAC does not support that a safety problem exists with PTAC cords and plugs. Without any substantial evidence to indicate a problem exists with PTACs, we believe providing an exclusion statement for PTACs from 440.65 and defining PTACs in a fine print note is the appropriate solution.

Panel Meeting Action: Reject

Panel Statement: The substantiation contains erroneous information. Multi-family dwellings are regulated by commercial building codes such as NFPA 5000 and the International Building Code. As such, the cord-and-plug connected packaged terminal air-conditioner in a multi-family dwelling unit is exposed to many of the same conditions as room air conditioners in any type of dwelling unit. The panel does not agree with the statement in the substantiation that indicates "requiring packaged terminal air conditioners to comply with 440.65 will increase the number of fire incidents involving receptacle outlets." Product testing and listing is inherent to the North American Safety System. Nationally recognized testing laboratories have demonstrated the ability to recognize such potential hazards in packaged terminal air conditioners, room air conditioners, free standing hydromassage units, hand-held hair dryers, and high pressure spray washers, and require any needed changes to receptacle design or construction.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 11 Negative: 3

Explanation of Negative:

BUNCH: Panel action on Comment 11-57 should be reversed, and the item approved. Comment 11-57 correctly responded to all of the panel comments made during the Panel 11, ROP meeting and was supported by statistical evidence. The panel did not respond to the statistical arguments presented in the Heiden report submitted with the proponents reason, nor to the NFPA data presented at the meeting that clearly showed that, historically, there was not a life safety or property protection problem from Package Terminal Air Conditioners (PTACs) without the Arc Fault Circuit Interrupter (AFCI) or Leakage Current Detection and Interruption (LCDI) protection required by Section 440.65. Data from the NFPA Fire Analysis and Research from 1994 to 1998 showed a very small number of fires and minimal dollars loss, and zero deaths from any air conditioner fires in nonresidential and hotel occupancies where PTACs are used, justifying exempting PTACs from Section 440.65.

Section 440.65 was originally adopted based on "Home", not commercial, fire reports which did not apply to PTACs. Also, argument in support of 440.65, i.e., that "the units are seasonal and removed and stored at the end of the season, removal will occur many times, and there is likelihood of cord damage when accidentally set on the cord", do not apply to PTACs because they are not removed seasonally. PTACs should not have been included in Section 440.65.

The panel failed to comply with the Regulations Governing Committee Projects, Section 4.4.6.3 which requires that Technical Committees must provide a statement substantiating their action that is "preferably technical in nature, on the reason for the TC action." Further "Such statement shall be sufficiently detailed so as to convey the TC's rationale for its action so that rebuttal may, if desired, be offered when the committee presents its Technical Committee Report to the association for consideration." The panel's reasons for rejection of Comment 11-57 at the ROC meeting, that the proponent's reason statement indicated that PTACs are not subject to the building code, and that high-impedance fault conditions are not a risk, is incorrect and immaterial. The panel did not respond to the Heiden analysis submitted as technical justification nor to the NFPA statistical information added at the ROC meeting.

The requirement is not based on reasonable technical justification, and thus, the panel's action should be reversed and Comment 11-57 approved.

COX: Although I agree that this will make the equipment safer to use, requirements for this equipment should be included in the product standards and not in the NEC. The NEC's scope is to cover installations, not portable equipment.

TODD: The requirements for additions to products should be contained in product standards and not installation standards. Enforcement of this requirement will be difficult as many portable and PTAC type air conditioners are not installed until after inspection. Also, upon replacement how will it be enforced? When this is added to the product requirements, then the testing labs will require the use of these devices and the products listed would have the protection thought necessary.

Also, the number of fires and limited loss do not convince me that these products are any more hazardous than other electrical products. Product standard writing organizations consider all this information in determining the need for various requirements, which is circumvented by the addition of product requirements in the code.

11-58 Log #2576 NEC-P11
(440.2 and 440.60)

Final Action: Accept

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

Comment on Proposal No: 11-93

Recommendation: The CMP should continue to reject this proposal.

Substantiation: There is no evidence provided by the submitter that indicates that package terminal air conditioners are not subject to cord fires. These units are used in high risk applications including schools, nursing homes, and hotels.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

BUNCH: The submitter stated there is no evidence that PTAC's are not subject to cord fires. In fact, evidence was provided to panel as noted here therefore panel action on Comment 11-57 should be reversed, and the item approved. Comment 11-57 correctly responded to all of the panel comments made during the panel 11, ROP meeting and was supported by statistical evidence. The panel did not respond to the statistical arguments presented in the Heiden report submitted with the proponents reason, nor to the NFPA data presented at the meeting that clearly showed that, historically, there was not a life safety or property protection problem from Package Terminal Air Conditioners (PTACs) without the Arc Fault Circuit Interrupter (AFCI) or Leakage Current Detection and Interruption (LCDI) protection required by Section 440.65. Data from the NFPA Fire Analysis and Research from 1994 to 1998 showed a very small number of fires and minimal dollars loss, and zero deaths from any air conditioner fires in nonresidential and hotel occupancies where PTACs are used, justifying exempting PTACs from Section 440.65.

Section 440.65 was originally adopted based on "Home", not commercial, fire reports which did not apply to PTACs. Also, arguments in support of 440.65, i.e., that "the units are seasonal and removed and stored at the end of the season, removal will occur many times, and there is likelihood of cord damage when accidentally set on the cord", do not apply to PTACs because they are not removed seasonally. PTACs should not have been included in Section 440.65.

The panel failed to comply with the Regulations Governing Committee Projects, Section 4.4.6.3 which requires that Technical Committees must provide a statement substantiating their action that is "preferably technical in nature, on the reason for the TC action." Further, "Such statement shall be sufficiently detailed so as to convey the TC's rationale for its action so that rebuttal may, if desired, be offered when the committee presents its Technical Committee Report to the association for consideration." The panel's reasons for rejecting of Comment 11-57 at the ROC meeting, that the proponent's reason statement indicated that PTACs are not subject to the building code, and that high-impedance fault conditions are not a risk, is incorrect and immaterial. The panel did not respond to the Heiden analysis submitted as technical justification nor to the NFPA statistical information added at the ROC meeting.

The requirement is not based on reasonable technical justification, and thus, the panel's action should be reversed and Comment 11-57 approved.

COX: See my explanation of negative vote on Comment 11-57.

11-59 Log #2865 NEC-P11
(440.4(B))

Final Action: Accept in Principle

Submitter: Brandon Wiltse Tampa, FL

Comment on Proposal No: 11-95

Recommendation: Accept this proposal in principle and revise the original recommendation by adding an exception for one and two family dwellings. 440.4(B) (wording as recommended in Proposal 11-95).

Exception: Multimotor and Combination-Load equipment used in one and two family dwellings shall not be required to be marked with a short circuit current rating.

Substantiation: Proposal 11-95 provides a very important step towards assuring the safe installation and resulting inspection of multimotor and combination load equipment. The change from acceptance to rejecting during the balloting is a step backwards in safety for a number of issues of which the important ones are covered here:

Issue 1: Multimotor and combination-load equipment are not marked with a short circuit current rating or a maximum level of fault current for which they have been evaluated.

To assure the safe installation of multimotor and combination-load equipment for all overcurrents, the maximum level of short circuit current for which the equipment has been evaluated needs to be provided. This philosophy is supported by Mr. Bried's negative comment "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." While this is a step in the right direction, this would not take into account damage encountered by the components and conductors in the equipment. Most product standards evaluate equipment for performance under short circuit conditions and deem suitability by containing the damage that occurs inside the enclosure without creating a shock or fire hazard. Mr. Closson states that "the installer has no need to know the short circuit current rating of the end product for a safe installation." Since "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." While this may be true depending on the product standard involved it still does not indicate the level of fault current to which the product was evaluated and at which the enclosure can contain the event without creating a shock and fire hazard. Does the product testing and listing cover all levels of available fault current, can I safely connect this equipment in an installation where 40ka, 50ka, or 200ka of fault current is available? If the product standards evaluate the equipment for suitability under short circuit conditions, then the level of current used should be marked.

Issue 2: Multimotor and combination-load equipment contain similar equipment and devices as those used in panelboards, switchboards and motor control centers, which are required to be marked with a short circuit current rating, yet the multimotor and combination-load equipment is not required.

Not all product standards require a short circuit current rating to be marked on the equipment. Mr. Closson states that all control panels that control power to equipment beyond the confines of the control panel enclosure are currently required to be marked with a short circuit current rating. This is not true, industrial machinery, industrial control panels, and elevator controllers, just to name a few, do not currently require this marking. Why? Short circuit currents do not discern the type of equipment involved in a fault and react differently according to the equipment involved. In order to assure a safe installation per the minimum requirements of the National Electrical Code, this information needs to be known.

Issue 3: Short circuit currents can cause considerable damage to equipment.

Equipment which is not rated or evaluated for the level of short circuit current available where it is installed, can create an unsafe situation likely resulting in fire or a shock condition. Whether the fault current levels are significant or not, as addressed by Mr. Goetz in his negative comment, equipment needs to be installed within the parameters for which the equipment was evaluated. If it is tested at 2ka and found suitable then mark it 2ka. If its 10ka, then mark it 10ka. As it exists today the level of short circuit current used during the evaluation of multimotor and combination-load equipment is not known because the information is not provided on the nameplate or in this code.

Issue 4: The short circuit current marking should not apply to one and two family dwellings.

The substantiation provided does not include one and two family dwellings. Therefore, the exception recommended above should be added, as recommended by Mr. Garvey in his affirmative comment, to exclude these occupancies.

Given the above information and issues, the requirement for short circuit current marking is a must. As Mr. Garvey points out in his affirmative comment, "the panel action to accept this proposal is an important first step." This proposal should be accepted in principle and revised per the recommendations provided.

Panel Meeting Action: Accept in Principle

Revise text recommended in Proposal 11-95 to read:

(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, the maximum rating of the branch-circuit short-circuit and ground-fault protective device, and the short circuit current rating of the motor controllers or industrial control panel. 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.

Revise exception recommended in Comment 11-59 to read:

Exception No.3 to read: Multimotor and combination-load equipment used in one and two family dwellings, cord-and- attachment-plug connected equip-

ment, or equipment supplied from a branch circuit protected at 60A or less shall not be required to be marked with a short circuit current rating.

Panel Statement: The revision to 440.4(B) applies to motor controllers of air conditioning and refrigeration equipment where a discernible control panel is not provided.

The revision to the exception to 440.4(B) excludes cord and attachment plug connected equipment which is not likely to be installed and/or replaced by qualified persons having knowledge of the available current at the receptacle. The exclusion of devices supplied from a branch circuit protected by a 60A or smaller devices recognizes that many motor controllers and motor circuit components for use with fractional horsepower motors are not typically marked with short circuit current ratings and are likely to have available currents of 5kA or less.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 12 Negative: 2

Explanation of Negative:

BUNCH: I vote negative on this panel action because there is no substantiation for requiring this marking on air conditioning and refrigeration equipment. The submitter has presented no evidence that such marking will provide any increase in safety nor that any hazard has been demonstrated. Moreover, this panel action is in violation of the Guidelines for Technical Committee Action on comments, paragraph 4.4.6.2.2 which states "The TC shall hold for processing as a proposal for the next revision cycle a comment that is as follows: (a) Would introduce a concept that has not had public review by being included in a related proposal as publicized in the ROP." The concept in the exception "or equipment supplied from a branch circuit protected at 60A or less" has not had an opportunity for public review. This panel has gone from requiring technical substantiation for code changes to requiring no technical substantiation. The action should be to reject the proposal.

HAAS: This proposal should have been rejected. 110.10 does state that component short-circuit ratings shall be used in circuit design. This was intended for MCCs, switchgear, bus ways, and other apparatus containing bus bars 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, multimotor 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 the need for this added marking.

11-60 Log #448 NEC-P11
(440.12(A)(1) Exception)

Final Action: Reject

Submitter: Dan Leaf Rancho Santa Margarita, CA

Comment on Proposal No: 11-96

Recommendation: Accept that part of the proposal relating to listed nonfusible molded case switches.

Substantiation: Nonfusible molded case switches are suitable for use as motor controllers and disconnecting means.

Panel Meeting Action: Reject

Panel Statement: The proposed term does not add clarity to the requirement. No evidence has been submitted to support the submitter's substantiation the current term "nonfused" as used in this section is misunderstood.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-61 Log #1247 NEC-P11
(440.14 Exception No. 1)

Final Action: Reject

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

Comment on Proposal No: 11-101

Recommendation: This proposal should be Accepted in Principle. Do not delete as the proposal suggests but rather add a second and third paragraph to the exception to read:

The name(s) of the qualified person(s) shall be kept in a permanent record at the office of the establishment in charge of the completed installation and at the office of the Authority Having Jurisdiction. Notification of any changes in the employment of the designated qualified person(s) shall be made to the office of the Authority Having Jurisdiction.

A person designated as a qualified person shall possess the skills and knowledge related to the construction and operation of the electrical equipment and installation and shall have received documented safety training on the hazards involved. Documentation of their qualifications shall be on file with the office of the Authority Having Jurisdiction and the office of the establishment in charge of the completed installation.

Substantiation: It was not necessarily my desire to have the wording in Exception No. 1 deleted, if the wording could be changed to include prescriptive requirements that could ensure that qualified persons are actually performing the maintenance and supervision as required by the exception. The National Electrical Code is a prescriptive code and it is the technical committees' responsibility to ensure that prescriptive requirements are present for the Authority Having Jurisdiction to use. The panel statement is correct, this phrase also occurs in 430.102(B) I missed it but maybe you could find a way to change it.

It is difficult to understand how it is possible to relax requirements for safety in a Code that tells us in 90.1(B), "this Code contains provisions that are considered NECESSARY for safety." This section further states that "Compliance therewith and proper maintenance will result in an installation that is ESSENTIALLY free from hazard but NOT NECESSARILY efficient, convenient, or ADEQUATE for good service or future expansion of electrical use." It appears to me that this tells us that these requirements are the MINIMUM requirements for safety and anything less will result in an installation that is NOT FREE FROM HAZARD.

Proponents of this travesty, knowing the truth in this, attempt to circumvent the obvious degradation of safety by using phraseology such as "the installation is under engineering supervision" or "a qualified person will monitor the system." What is monitoring the installation? What does engineering supervision mean?

I have submitted several proposals to delete these exceptions to requirements for safety but they were all rejected. Perhaps in the comment stage, enough persons will comment in favor of accepting these proposals or at least accepting them in a manner where some prescriptive requirements will be added to accurately describe what "engineering supervision" entails. What does "monitoring" the installation mean, what type of record keeping is necessary to assure compliance, what is a "monitor" or what is a "qualified person?" How is documentation of the qualifications and presence of a "qualified person" accomplished by the Authority Having Jurisdiction?

Without these prescriptive requirements, these exceptions to the requirements for safety appear to be "just another subterfuge to avoid compliance with the safety requirements of the National Electrical Code without regard to putting persons and equipment at risk."

Panel Meeting Action: Reject

Panel Statement: It is the owner's responsibility to respond to the authority having jurisdiction in a manner that is acceptable and provides the confidence that the conditions of supervision are appropriate to permit the use of this exception to the main requirement of 440.14. If the response is not adequate, the AHJ has the responsibility to not permit the use of this exception.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-62 Log #3649 NEC-P11 **Final Action: Reject**
(440.14 Exception No. 1)

Submitter: W. Creighton Schwan Hayward, CA
Comment on Proposal No: 11-101

Recommendation: Reconsider and accept proposal to delete 440.14 Exception No. 1.

Substantiation: The existing wording weakens the Code, and places an unacceptable burden on the AHJ. To expect the AHJ to judge that all of the maintenance personnel on a property meet the definition of "Qualified Person" in Article 100 is an onerous charge, and even if it could be done, considering the frequency of personnel changes in the usual industrial occupancy, it is an impossible task for the AHJ to continuously monitor the qualifications of the maintenance personnel.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 11-61.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-63 Log #1990 NEC-P11 **Final Action: Accept in Part**
(440.32)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 11-105

Recommendation: Either reject the proposal, or (not as good) accept the panel action in principle. Revise as follows: "... shall have an ampacity of not less than 72 percent of either the ..."

Revise the fine print note as follows:

The individual motor circuit conductors of wye-start, delta-run connected motor-compressors carry 58 percent of the rated load current. The multiplier of 72 percent is obtained by multiplying 58 percent by 1.25.

Substantiation: If the proposal is accepted, the rule needs to be worded differently. The NEC now says what the submitter proposes, but many misunderstand that this is true. The rule does not tell you to size the conductors at 58%; it says to base the calculation on 58%. In 430.22(C) this is essential because different duty cycles produce different multipliers. In this case there is only one multiplier so the rule can be restated, but only in a way that will not have people increasing the 72% by another 125%.

Panel Meeting Action: Accept in Part

The panel accepts the revision of the Fine Print Note. The panel rejects the action to revise the text recommended in Proposal 11-105.

Panel Statement: The panel rejects the recommendation to revise the text because not all motor compressors are wye-start, delta-run, so it would be inappropriate to use the 72 percent multiplier for the first paragraph.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-64 Log #527 NEC-P11 **Final Action: Reject**
(440.36)

Submitter: Robert J. Friebe, Delaware Technical & Community College
Comment on Proposal No: 11-106

Recommendation: Add the information that is found in 210.63 to 440.36 as follows:

Heating, Air-conditioning and Refrigeration Equipment Outlet. A 125-volt, single-phase, 15- or 20-ampere rated receptacle outlet shall be installed at an accessible location for servicing of heating, air-conditioning, and refrigeration equipment. The receptacle shall be located on the same level and within 7.5 m (2.5 ft) of the heating, air-conditioning and refrigeration equipment. The receptacle outlet shall not be connected to the load side of the disconnecting means.

Substantiation: In Article 440, there is not any mention of the maintenance receptacle for "Heating, Air-Conditioning, and Refrigeration Equipment." It can be found in 210.63.

I would suggest that we add the above information for the receptacle in 440.36, or at least put a Fine Print Note in Article 440, referring to 210.63.

Panel Meeting Action: Reject

Panel Statement: Section 210.63 applies to the application described and it is not necessary to repeat the requirement in Article 440.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-65 Log #2843 NEC-P11 **Final Action: Accept**
(440.60)

Submitter: Edward A. Schiff, Technology Research Corp.
Comment on Proposal No: 11-93

Recommendation: The CMP should reject this proposal.

Substantiation: The commentor wishes to express his appreciation to the members of CMP 11 for their time, consideration, and stance on safety.

The packaged terminal equipment discussed by this proposal is used in hotels, motels, nursing homes, and schools. These are high risk applications where the power supply cords of plug connected units are subject to damage from more pedestrian traffic, from cleaning equipment, and movement of furniture and, therefore, require the protection afforded by AFCI or LCDI protected power supply cords.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

Comment on Affirmative:

BUNCH: I agree it is OK to accept this proposal which was to reject Proposal 11-93 but only because 11-57 addressed the panel's original concerns of 11-93. The basic issue that PTACs should not have to be included in the new 440.65 requirement is still ARI's position. This has been documented with statistical evidence in the Heiden report.

11-66 Log #1096 NEC-P11 **Final Action: Accept**
(440.64)

Submitter: Neil F. LaBrake, Jr., Niagara Mohawk, a National Grid Company / Rep. Edison Electric Institute

Comment on Proposal No: 11-108

Recommendation: Reject the Proposal.

Substantiation: This proposal should have been rejected. This should be part of a product standard and is not part of the premise wiring system.

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 NEC, the product safety standard process would be weakened resulting in the entire process being weakened.

Edison Electric Institute's position is that the requirements for listed end-use electrical devices that are not installed as part of the permanent premises wiring system are best covered by the appropriate product standard. It is not the NEC's intent or scope to set requirements to be provided as part of a listed end-use electrical device 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 and maintenance, electric supply system characteristics, and the 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.

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

11-67 Log #1566 NEC-P11 **Final Action: Accept**
 (440.64)

Submitter: William Keezer, WJ Keezer Associates
Comment on Proposal No: 11-108

Recommendation: This proposal submitted by the proponent representing AHAM, should be rejected and revert to the text of the 2003 National Electrical Code by revising the proposed text as follows:

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: By accepting this proposal in isolation, and not in combination with Proposals 11-109 and 11-110, the Code Making Panel has failed to take into account of the intent of the proponent. In the last paragraph of the substantiation, the proponent stated: "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." That proposal became Proposal 11-110.

Substantiation: The original intent of Proposals 11-108; -109 and -110 was to provide an alternative set of provisions to that introduced in Paragraph 440.65 of the 2002 edition of the Code. There remains genuine concern among the manufacturers of room air conditioners concerning the reliability and effectiveness of in-cord protective devices. Although they have never accepted that an inherent problem exists with power supply cord safety, the manufacturers made an offer to adopt alternative additional protective methods based on proven technologies. As such, all three proposals should have been accepted or rejected concurrently. Proposal 11-108 and 11-110, when both adopted would have resulted in an air conditioner cordset that would exceed the current cordset requirements for safety AND reliability. Without adopting both proposals, the panel is creating unnecessary difficulties not only for the appliance manufacturers but also for suppliers of LCDI cord sets. Only three years after having to amend their designs, listings, purchasing specifications and packaging arrangements to accommodate paragraph 440.65, the appliance makers will be obliged to repeat the whole exercise a second time to adopt the use of listed "hard usage" cord.

When the use of in-cord LCDI or AFCI devices was made mandatory in the 2002 Code, there was no discussion of any need to further improve the mechanical protection of the cord itself. It was assumed that the addition of interrupter devices would achieve the level of protection perceived to be necessary. To presume that the proponent of Proposal 11-108 had intended to apply an additional and unnecessary level of protection above and beyond the implied protection provided by an in-cord LCDI or AFCI device is an unwarranted assumption on the part of the Code Making Panel.

As for LCDI cord sets, it should be remembered that the cord is a unique type that forms an integral part of the protection. It is constructed in a manner that does not align with any of the regular cord types. For listing purposes, UL has been obliged to examine and test the cord in order to be able to "recognize" it as being mechanically equivalent to SPT-3, during which process a number of specification changes were needed. If the cord is to meet "hard usage" specification, the whole process will need to be repeated.

We respectfully suggest that the Code Making Panel reconsider their decision in the light of the above. If they are not able to accept Proposal 11-110, they should dismiss 11-108 as well. Adoption of the "hard usage" cord specification as a separate requirement will provide no additional safety benefit and cause unnecessary stress to the manufacturing sector.

Clarification on the intent of Proposal 11-109:

Proposal 11-109 proposed to revise 440-65 by placing a device for the protection of room air conditioner circuits where it properly belongs - prior to all flexible cordage used by the room air conditioner. This proposal was submitted with Proposals 11-108 and 11-110, and was offered as the only effective way to address the real rather than perceived hazards in the use of flexible cordage with room air conditioners. While the Code Making Panel's decision to ignore the substantiation for adoption of this proposal was unfortunate, it was not an explicit requirement of the proponent that it be adopted along with Proposals 11-108 and 11-110. The mutual adoption of Proposals 11-108 and 11-110 WAS the intent of the submitter, as was made clear in the proposal and expressed personally before the committee at their 2005 NEC Report on Proposals deliberations in January, 2003. Finally, it should be noted that the adoption of Proposal 11-109 would NOT have required the adoption of Proposal 11-108.

Panel Meeting Action: Accept
Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

11-68 Log #2841 NEC-P11 **Final Action: Accept**
 (440.64)

Submitter: Edward A. Schiff, Technology Research Corp.
Comment on Proposal No: 11-108

Recommendation: The CMP should continue to reject this proposal.

Substantiation: The submitter recommends the incorporation of extra hard usage cord. Since the power supply cord is being provided with AFCI or LCDI protection, this likely will not add a lot of additional protection.

In addition, the submitter recommends a longer cord to avoid the need for splicing. No evidence was presented to support that this is the reason for splicing. More likely, splicing is the result of cord damage (consumers will use extension cords before going to the effort to splice the cord).

Panel Meeting Action: Accept

Panel Statement: The panel understands that this comment is in support of rejecting Proposal 11-108.

Number Eligible to Vote: 14
Ballot Results: Affirmative: 14

11-69 Log #2994 NEC-P11 **Final Action: Accept**
 (440.64)

Submitter: Richard J. Cripps, Association of Home Appliance Manufacturers

Comment on Proposal No: 11-108

Recommendation: This proposal, submitted by the proponent representing AHAM, should be rejected and revert to the text of the 2002 National Electric Code by revising the proposed text as follows:

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:

By accepting this proposal in isolation, and not in combination with Proposals 11-109 and 11-110, the code making panel has failed to take into account the intent of the proponent. In the last paragraph of the substantiation, the proponent stated: "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". That proposal became Proposal 11-10.

Substantiation:

The original intent of Proposals 11-108, 1-109 and -110 was to provide an alternate set of provisions to that introduced in Paragraph 440-65 of the 2002 Edition of the Code. There remains genuine concern among the manufacturers of room air conditioners concerning the reliability and effectiveness of in-cord protective devices. Although they have never accepted that an inherent problem exists with power supply cord safety, the manufacturers made an offer to adopt alternative additional protective methods based on proven technologies. As such, all three proposals should have been accepted or rejected concurrently. Proposals 11-108 and 11-110, when both adopted would have resulted in an air conditioner cordset that would exceed the current cordset requirements for safety and reliability. Without adopting both proposals, the panel is creating unnecessary difficulties not only for the appliance manufacturers but also for suppliers of LCDI cord sets. Only three years after having to amend their designs, listings, purchasing specification and packaging arrangements to accommodate 440.65, the appliance makers will be obliged to repeat the whole exercise a second time to adopt the use of listed "hard usage" cord.

When the use of in-cord LCDI or AFCI devices was made mandatory in the 2002 code, there was no discussion of any need to further improve the mechanical protection of the cord itself. It was assumed that the addition of interrupter devices would achieve the level of protection perceived to be necessary. To presume that the proponent of Proposal 11-108 had intended to apply an additional and unnecessary level of protection above and beyond the implied protection provided by an in-cord LCDI or AFCI device is an unwarranted assumption on the part of the code making panel.

As for LCDI cord sets, it should be remembered that the cord is a unique type that forms an integral part of the protection. It is constructed in a manner that does not align with any of the regular cord types. For listing purposes, UL has been obliged to examine and test the cord in order to be able to "recognize" it as being mechanically equivalent to SPT-3, during which process a number of specification changes were needed. If the cord is to meet "hard usage" specification, the whole process will need to be repeated.

We respectfully suggest that the code making panel reconsider their decision in the light of the above. If they are not able to accept Proposal 11-110, they

should dismiss 11-108 as well. Adoption of the "hard usage" cord specification as a separate requirement will provide no additional safety benefit and cause unnecessary stress to the manufacturing sector.

Clarification on the intent of Proposal 11-109:

Proposal 11-109 proposed to revise 440-65 by placing a device for the protection of room air conditioner circuits where it properly belongs - prior to all flexible cordage used by the room air conditioner. This proposal was submitted with Proposals 11-108 and 11-110, and was offered as the only effective way to address the real rather than perceived hazards in the use of flexible cordage with room air conditioners. While the code making panel's decision to ignore the substantiation for adoption of this proposal was unfortunate, it was not an explicit requirement of the proponent that it be adopted along with Proposals 11-108 and 11-110. The mutual adoption of Proposals 11-108 and 11-110 was the intent of the submitter, as was made clear in the proposal and expressed personally before the committee at their 2005 NEC Report on Proposals deliberations in January, 2003. Finally, it should be noted that the adoption of Proposal 11-109 would not have required the adoption of Proposal 11-108.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-70 Log #3029 NEC-P11 **Final Action: Accept**
(440.64)

Submitter: Wayne Morris Fairfax, VA

Comment on Proposal No: 11-108

Recommendation: This proposal, submitted by the proponent representing AHAM, should be rejected and revert to the text of the 2003 National Electric Code by revising the proposed text as follows:

Where a flexible cord is used to supply a room air conditioner the following conditions should be met:

A. **Length of Cord:** The length of such cord shall not exceed 3.0 (10 ft) for a nominal, 120 volt rating or 1.8 m (6 ft) for a nominal, 208-240 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: By accepting this proposal in isolation, and not in combination with Proposal 11-109 and 11-110, the Code Making Panel has failed to take into account of the intent of the proponent. In the last paragraph of the substantiation, the proponent stated: "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 440.65, which has been submitted by the same submitter." That proposal became Proposal 11-110.

Substantiation: The original intent of Proposal 11-108, -109 and -110 was to provide an alternative set of provisions to that introduced in 440.65 of the 2002 Edition of the Code. There remains genuine concern among the manufacturers of room air conditioners concerning the reliability and effectiveness of in-cord protective devices. Although they have never accepted that an inherent problem exists with power supply cord safety, the manufacturers made an offer to adopt alternative additional protective methods based on proven technologies. As such, all three proposals should have been accepted or rejected concurrently. Proposals 11-108 and 11-110, when both adopted would have resulted in an air conditioner cordset that would exceed the current cordset requirements for safety AND reliability. Without adopting both proposals, the panel is creating unnecessary difficulties not only for the appliance manufacturers but also for suppliers of LCDI cord sets. Only three years after having to amend their designs, listings, purchasing specifications and packaging arrangements to accommodate 440.65, the appliances makers will be obliged to repeat the whole exercise a second time to adopt the use of listed "hard usage" cord.

When the use of in-cord LCDI or AFCI devices was mandatory in the 2002 Code, there was no discussion of any need to further improve the mechanical protection of the cord itself. It was assumed that the addition of interrupter devices would achieve the level of protection perceived to be necessary. To presume that the proponent of Proposal 11-108 had intended to apply an additional and unnecessary level of protection above and beyond the implied protection provided by an in-cord LCDI or AFCI device is an unwarranted assumption on the part of the Code Making Panel.

As for LCDI cord sets, it should be remembered that the cord is a unique type that forms an integral part of the protection. It is constructed in a manner that does not align with any of the regular cord types. For listing purposes, UL has been obliged to examine and test the cord in order to be able to "recognize" it as being mechanically equivalent to SPT-3, during which process a number of specification changes were needed. If the cord is to meet "hard usage" specification, the whole process will need to be repeated.

We respectfully suggest that the Code Making Panel reconsider their decision in the light of the above. If they are not able to accept Proposal 11-110, they should dismiss 11-108 as well. Adoption of the "hard usage" cord specification as a separate requirement will provide no additional safety benefit and cause unnecessary stress to the manufacturing sector.

Clarification on the intent of Proposal 11-109:

Proposal 11-109 proposed to revise 440.65 by placing a device for the protection of room air conditioner circuits where it properly belongs - prior to all flexible cordage used by the room air conditioner. This proposal was submitted with proposals 11-108 and 11-110, and was offered as the only effective way

to address the real rather than perceived hazards in the use of flexible cordage with room air conditioners. While the Code Making Panel's decision to ignore the substantiation for adoption of this proposal was unfortunate, it was not an explicit requirement of the proponent that it be adopted along with Proposals 11-108 and 11-110. The mutual adoption of Proposal 11-108 and 11-110 was the intent of the submitter, as was made clear in the proposal and expressed personally before the committee at their 2005 NEC Report on Proposals deliberations in January, 2003. Finally, it should be noted that the adoption of Proposal 11-109 would NOT have required the adoption of Proposal 11-108.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-71 Log #3097 NEC-P11 **Final Action: Accept**
(440.64)

Submitter: Wayne M. Myrick, Sharp Electronics Corp

Comment on Proposal No: 11-108

Recommendation: I am submitting this comment to urge the panel to reject this proposal. The original proposal (11-108) was intended to be considered in combination with proposals 11-109 and 11-110. If the panel accepts this proposal by itself, the requirement would be disruptive and expensive for the supplier and air conditioner industries with no increase in the level of safety. **Substantiation:** The original set of proposals (11-108, 11-109, and 11-110) taken together, would have provided an alternative to the requirement for an AFCI or LCDI in Paragraph 440-65 in the 2002 Edition of the Code. Since proposals 11-109 and 11-110 have been rejected and are no longer being considered, proposal 11-108 should likewise be rejected.

When the use of LCDI or AFCI devices was made mandatory in the 2002 Code, there was no discussion of upgrading the cord itself. Room air conditioner manufacturers submitted proposal 11-108, along with 11-109 and 11-110, as an alternative based on available, proven technology.

The current requirement for AFCI/LCDI devices in the cord of room air conditioners will necessitate substantial investments of time and money by the air conditioner manufacturers. If proposal 11-108 is accepted, a new hard usage cord with shielded conductors would have to be developed for use with the LCDI devices. The newly developed cords would have to go through the safety certification process. Then the LCDI devices would have to be resubmitted for approval with the new cords and finally, all air conditioners would have to be evaluated for use with the new devices and cords. This would give considerable time and result in tremendous costs for the cord manufacturers, the LCDI device manufacturers and air conditioner manufacturers. Adoption of the "hard Usage" cord specification as a separate requirement will provide no additional safety benefit and will impose an undue burden on the manufacturing sector.

I respectfully request that Code Making Panel 11 reconsider their decision in the light of the above. If Proposals 11-109 and 11-110 are not acceptable, then proposal 11-108 should be rejected as well.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-72 Log #3431 NEC-P11 **Final Action: Accept**
(440.64)

Submitter: Kevin Gurley, Fedders Appliances

Comment on Proposal No: 11-108

Recommendation: Please do not accept proposal 11-108.

Substantiation: By accepting proposal 11-108 in isolation of proposals 11-109 and 11-110, the Code Making Panel fails to take into account the intent of the original proposals. The original intent of proposals 11-108, 11-109 and 11-110 was to provide an alternative set of provisions that was introduced in 440.65 in the 2002 Edition of the Code.

I see no justification for accepting Proposal 11-108 which would add the requirement for a hard usage power cord to an already robust cord set, that is also protected by an LCDI or AFCI device.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-73 Log #3476 NEC-P11 **Final Action: Reject**
(440.64)

Submitter: J.B. Hoyt, Whirlpool Corporation

Comment on Proposal No: 11-108

Recommendation: No recommendation given.

Substantiation: Whirlpool Corporation fully supports the position taken by Mr. William Kezer on behalf of the Association of Home Appliance Manufacturers also submitted on October 30, 2003.

Panel Meeting Action: Reject

Panel Statement: The submitter has not provided a specific recommended action as is required by Section 4-5.5 of the NFPA Regulations Governing Committee Projects.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-74 Log #3481 NEC-P11 **Final Action: Accept**
(440.64)**Submitter:** Peter Byun, Lg Electronics Inc.**Comment on Proposal No:** 11-108**Recommendation:** This proposal, submitted by the proponent representing AHAM, should be rejected and revert to the text of the 2003 National Electrical Code by revising the proposed text as follows:

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:

By accepting this proposal in isolation, and not in combination with Proposals 11-109 and 11-110, the Code Making Panel has failed to take into account of the intent of the proponent. In the last paragraph of the substantiation, the proponent stated: "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." That proposal became Proposal 11-110.

Substantiation:

The original intent of Proposals 11-108, -109, -110 was to provide an alternative set of provisions to that introduced in Paragraph 440-65 of the 2002 Edition of the Code. There remains genuine concern among the manufacturers of room air conditioners concerning the reliability and effectiveness of in-cord protective devices. Although they have never accepted that an inherent problem exists with power supply cord safety, the manufacturers made an offer to adopt alternative additional protective methods based on proven technologies. As such, all three proposals should have been accepted or rejected concurrently. Proposal 11-108, and 11-110, when both adopted would have resulted in an air conditioner cord set that would exceed the current cord set requirements for safety AND reliability. Without adopting both proposals, the Panel is creating unnecessary difficulties not only for the appliance manufacturers but also for suppliers of LCDI cord sets. Only three years after having to amend their designs, listings, purchasing specifications and packaging arrangements to accommodate Paragraph 440.65, the appliance makers will be obliged to repeat the whole exercise a second time to adopt the use of listed "hard usage" cord.

When the use of in-cord LCDI or AFCI devices was made mandatory in the 2002 Code, there was no discussion of any need to further improve the mechanical protection of the cord itself. It was assumed that the addition of interrupter devices would achieve the level of protection perceived to be necessary. To presume that the proponent of Proposal 11-108 had intended to apply an additional and unnecessary level of protection above and beyond the implied protection provided by an in-cord LCDI or AFCI device is an unwarranted assumption on the part of the Code Making Panel.

As for LCDI cord sets, it should be remembered that the cord is a unique type that forms an integral part of the protection. It is constructed in a manner that does not align with any of the regular cord types. For listing purposes, UL has been obliged to examine and test the cord in order to be able to "recognize" it as being mechanically equivalent to SPT-3, during which process a number of specification changes were needed. If the cord is to meet "hard usage" specification, the whole process will need to be repeated.

We respectfully suggest that the Code Making Panel reconsider their decision in the light of the above. If they are not able to accept Proposal 11-110, they should dismiss 11-108 as well. Adoption of the "hard usage" cord specification as a separate requirement will provide no additional safety benefit and cause unnecessary stress to the manufacturing sector.

Clarification on the intent of Proposal 11-109:

Proposal 11-109 proposed to revise 440-65 by placing a device for the protection of room air conditioner circuits where it properly belongs - prior to all flexible cordage used by the room air conditioner. This proposal was submitted with Proposal 11-108 and 11-110, and was offered as the only effective way to address the real rather than perceived hazards in the use of flexible cordage with room air conditioners. While the Code Making Panel's decision to ignore the substantiation for adoption of this proposal was unfortunate, it was not an explicit requirement of the proponent that it be adopted along with Proposal 11-108 and 11-110. The mutual adoption of Proposals 11-108 and 11-110 WAS the intent of the submitter, as was made clear in the proposal and expressed personally before the Committee at their 2005 NEC Report on Proposals deliberations in January, 2003. Finally, it should be noted that the adoption of Proposal 11-109 would NOT have required the adoption of Proposal 11-108.

Panel Meeting Action: Accept**Number Eligible to Vote:** 14**Ballot Results:** Affirmative: 1411-75 Log #3487 NEC-P11
(440.64)**Final Action: Accept****Submitter:** Kevin Gurley, Fedders Appliances**Comment on Proposal No:** 11-108**Recommendation:** Please do not accept Proposal 11-108.**Substantiation:** By accepting Proposal 11-108 in isolation of Proposals 11-109 and d 11-110, the code making panel fails to take into account the intent of the original proposals. The original intent of Proposals 11-108, 11-109 and 11-110 was to provide an alternative set of provisions to that introduced in paragraph 440.65 in the 2002 edition of the code.

I see no justification for accepting Proposal 11-108 which would add the requirement for a hard usage power cord to an already robust cord set, that is also protected by an LCDI or AFCI device.

Panel Meeting Action: Accept**Number Eligible to Vote:** 14**Ballot Results:** Affirmative: 1411-76 Log #889 NEC-P11
(440.65)**Final Action: Accept****Submitter:** William H. King, Jr., U.S. Consumer Product Safety Commission**Comment on Proposal No:** 11-110**Recommendation:** I support the panel action that rejected Proposal 11-110.

Proposal 11-110 recommended deleting 440.65.

Substantiation: The substantiation for Proposal 11-110 included information regarding reports of "spliced cords." This needs further explanation. Upon checking into a number of investigative reports compiled by the US Consumer Product Safety Commission (CPSC) where spliced cords are reported, the term "spliced cord" was meant only to indicate the presence of a wrapping of tape over the cord insulation and not necessarily the existence of an electrical splice. The tape could have been an attempt to repair mechanical damage to the cord insulation. The current requirement at 440.65 addresses the risk of fire from damaged cord insulation.**Panel Meeting Action: Accept****Number Eligible to Vote:** 14**Ballot Results:** Affirmative: 11 Negative: 3**Explanation of Negative:**

BUNCH: I vote negative on this panel action. Inadequate technical information has been used to get the requirement for LCDI or AFCI protection into 440.65. The panel did not address the data presented by Heiden Associates that refuted most of the claims regarding fires caused by faulty room air conditioner cords. If such a need is technically proven to be needed, it is best handled through product standards which can address any other product issues correctly at the same time. Panel continues to set improper scope bounds in product design areas by accepting this.

COX: See my explanation of negative vote on Comment 11-57.

HAAS: See my explanation of negative vote on Comment 11-78.

11-77 Log #1097 NEC-P11
(440.65)**Final Action: Accept****Submitter:** Neil F. LaBrake, Jr., Niagara Mohawk, a National Grid Company / Rep. Edison Electric Institute**Comment on Proposal No:** 11-110**Recommendation:** Reject the Proposal.**Substantiation:** This proposal should have been rejected. This should be part of a product standard and is not part of the premise wiring system.

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 NEC, the product safety standard process would be weakened resulting in the entire process being weakened.

Edison Electric Institute's position is that the requirements for listed end-use electrical devices that are not installed as part of the permanent premises wiring system are best covered by the appropriate product standard. It is not the NEC's intent or scope to set requirements to be provided as part of a listed end-use electrical device 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 and maintenance, electric supply system characteristics, and the 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.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 11 Negative: 3

Explanation of Negative:

BUNCH: See my explanation of negative vote on Comment 11-76.
 COX: See my explanation of negative vote on Comment 11-57.
 HAAS: See my explanation of negative vote on Comment 11-78.

11-78 Log #1565 NEC-P11 **Final Action: Reject**
 (440.65)

Submitter: William Keezer, WJ Keezer Associates

Comment on Proposal No: 11-110

Recommendation: The proponent of Proposal 11-110 respectfully suggests that Code Making Panel 11 reconsiders and reverses its decision to reject Proposal 11-110 and accept the proposed changes in their original form.

Substantiation: Problem: By rejecting this proposal without consideration for the fact that the NEC's proper role should be in the regulation of installation practices, not in the design and construction of Listed appliances, we believe the Code is overstepping its proper role as well as making technical decisions on appliance design that are beyond their area of expertise.

Substantiation: The substantiation for the original proposal stands on its own merits and highlights in detail the Safety Standards implications of the Code Panel's decision to adopt 440.65 in the first place. AHAM agrees with the dissenting panel members' opinions on this decision and believe their input should have been given full and proper consideration. Their comments should be considered part of this substantiation.

Panel Meeting Action: Reject

Panel Statement: The panel is charged with identifying the specific requirements needed to protect persons and property from the electrical hazards that may result from the use of equipment that falls under the scope of Article 440. The panel reviewed data submitted during the 2002 NEC ROP cycle. The incident data indicated that people were put at risk due fires caused by cord or equipment failures. The panel reaffirms that the protective techniques required by 440.65 will function to mitigate this type of hazard.

Number Eligible to Vote: 14

Ballot Results: Affirmative: 11 Negative: 3

Explanation of Negative:

BUNCH: I vote negative on this panel action. Inadequate technical information has been used to get the requirement for LCDI or AFCI protection into 440.65. The panel did not address the data presented by Heiden Associates that refuted most of the claims regarding fires caused by faulty room air conditioner cords. If such a need is technically proven to be needed, it is best handled through product standards which can address many of product issues correctly at the same time. Panel continues to set improper scope bounds in product design areas by accepting this.

Also, the data cites as being reviewed by the panel during the 2002 NEC ROP has been refuted in a technical report and presented to the panel. The panel has remained silent in challenging this report and yet continues to accept the first information presented. The cause and effect and statistical information is being ignored by the panel action.

COX: See my explanation of negative vote on Comment 11-57.

HAAS: The proposal should have been accepted. This panel has noted the lack of action in respect to the perceived safety issues to AC cords and responded with a code change in the 2002 NEC cycle. Product safety and product standards are the responsibility of other groups. The Code should keep its focus on permises wiring and stop at the wall socket. Any product that plugs into the wall should be governed by product standards and product safety requirements. The effect should have been noted by appropriate product standards and safety areas and prompted an affirmation or rejection with cause, to enlighten this panel as to the lack of need for action. The section should be removed from the Code and left to the product standards and safety groups to address and respond appropriately.

11-79 Log #1567 NEC-P11 **Final Action: Reject**
 (440.65)

Submitter: William Keezer, WJ Keezer Associates

Comment on Proposal No: 11-109

Recommendation: The proponent of Proposal 11-109 respectfully suggests that Code Making Panel 11 reconsider and reverse its decision to reject Proposal 11-109 and accept the proposed changes in their original form. That proposal stated:

“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: By rejecting this proposal, the Code Making Panel is sidestepping its proper role in insuring that proven methods of protecting branch circuits of questionable safety are required. By attempting to design products and write product safety standard requirements of questionable value as an alternative is to evade addressing the real problem - the frequent alteration and damage of both power cords and extension cords as well as failures of branch circuit outlets. There are documented occurrences of these conditions that far exceed the verifiable number of room air conditioner cord-initiated fires.

Substantiation: The substantiation for the original proposal stands on its own merits and highlights in detail the Safety Standards implications of the Code Panel's decision to adopt 440.65 in the first place. AHAM agrees with the dissenting panel members' opinions on this decision and believe their input should have been given full and proper consideration. Their opinions are to be considered part of this substantiation. The supporting comment of Mr. Haas (“Branch Circuit protection should have been referred to CMPs 2 and 10 for consideration.”) has merit except that in the unique situation of branch circuit protection for room air conditioners, Article 440 has already set the precedent for addressing branch circuit requirements unique to room air conditioners in 440.62. Had proposal 11-109 been adopted, it was certainly within the power of the committee to make the proposal a component of 440.62 without altering the intent of the original proposal.

Panel Meeting Action: Reject

Panel Statement: The proposed text is unenforceable. Authorities having jurisdiction have no prior knowledge of which general purpose outlets will be used to supply the AC unit. The proposed text does not make the requirement retroactive, which would be necessary in order to enforce the requirement in an existing building. The panel reaffirms its action on Proposal 11-109 and supported its action with this 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 AHD 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: 14

11-80 Log #2838 NEC-P11 **Final Action: Accept**
 (440.65)

Submitter: Edward A. Schiff, Technology Research Corp.

Comment on Proposal No: 11-110

Recommendation: The CMP should continue to reject this proposal.

Substantiation: The commentor wishes to express his appreciation to the members of CMP 11 for their time, consideration, and stance on safety. This requirement was addressed during the past two code cycles and adopted for the 2002 NEC. Although this requirement has been incorporated into the UL standard, removal from the code might indicate that this protection is no longer needed, a scenario which happened on pressure washers in 1993. As is the case with immersion protection on hair dryers, ground fault protection on pools and spas, and ground fault protection on high pressure sprayer washers, this safety requirement needs to remain in the code.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 11 Negative: 3

Explanation of Negative:

BUNCH: See my explanation of negative vote on Comment 11-78.

COX: See my explanation of negative vote on Comment 11-57.

HAAS: See my explanation of negative vote on Comment 11-78.

11-81 Log #2840 NEC-P11 **Final Action: Accept**
 (440.65)

Submitter: Edward A. Schiff, Technology Research Corp.

Comment on Proposal No: 11-109

Recommendation: The CMP should continue to reject this proposal.

Substantiation: The commentor wishes to express his appreciation to the members of CMP 11 for their time, consideration, and stance on safety and would also like to acknowledge the submitter's introductory statement that “AHAM supports the legitimate concern for the safety of the circuits and cordage used for room air conditioners.”

However, the requirement for branch circuit protection would be a retroactive requirement. In addition it is unenforceable since the purchaser of the room air conditioner is not going to have an inspection by the Authority Having Jurisdiction when the appliance is purchased and installed.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-82 Log #3563 NEC-P11 **Final Action: Accept**
(440.65)

Submitter: Aaron B. Chase, Leviton Mfg. Co. Inc.

Comment on Proposal No: 11-110

Recommendation: Accept the Panel Action. The Panel should continue to reject this Proposal.

Substantiation: I support the Panel statement.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 11 Negative: 3

Explanation of Negative:

BUNCH: See my explanation of negative vote on Comment 11-78.

COX: See my explanation of negative vote on Comment 11-57.

HAAS: See my explanation of negative vote on Comment 11-78.

11-83 Log #3565 NEC-P11 **Final Action: Accept**
(440.65)

Submitter: Aaron B. Chase, Leviton Mfg. Co. Inc.

Comment on Proposal No: 11-109

Recommendation: Accept the Panel Action. The Panel should continue to reject this Proposal.

Substantiation: Most homes do not have AFCI protection. AFCIs are not required on all branch circuits. I fully concur with Mr. Saunders' statement. Additionally, commercially available AFCIs are listed for protection of the branch circuit and not the wiring extending beyond the outlet.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 14

11-84 Log #3639 NEC-P11 **Final Action: Accept**
(440.65)

Submitter: William H. King, Jr., U.S. Consumer Product Safety Commission

Comment on Proposal No: 11-110

Recommendation: I support the panel action that rejected Proposal 11-110. Proposal 11-110 recommended deleting 440.65.

Substantiation: The substantiation for Proposal 11-110 included information regarding reports of "spliced cords". This needs further explanation. Upon checking into a number of investigative reports compiled by the U.S. Consumer Product Safety Commission (CPSC) where spliced cords are reported, the term "spliced cord" was meant only to indicate the presence of a wrapping of tape over the cord insulation and not necessarily the existence of an electrical splice. The tape could have been an attempt to repair mechanical damage to the cord insulation. The current requirements at 440.65 addresses the risk of fire from damaged cord insulation.

Panel Meeting Action: Accept

Number Eligible to Vote: 14

Ballot Results: Affirmative: 11 Negative: 3

Explanation of Negative:

BUNCH: See my explanation of negative vote on Comment 11-78.

COX: See my explanation of negative vote on Comment 11-57.

HAAS: See my explanation of negative vote on Comment 11-78.

ARTICLE 445 — GENERATORS

13-5 Log #1943 NEC-P13 **Final Action: Reject**
(445.18)

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

Comment on Proposal No: 13-7

Recommendation: Accept the proposal in principle. Insert the phrase " , which shall be grouped if more than one," after the word "disconnect(s)" and before "by means".

Substantiation: A fundamental concept in the code is that when multiple disconnects are used for a common purpose they must normally be grouped. See, for example 225.34(A). There was no technical substantiation presented in support of the proposition that such disconnects need not be grouped.

Panel Meeting Action: Reject

Panel Statement: The proposed changes to the wording would require grouping of all disconnecting means including those for Article 695 and Article 700 systems. The panel disagrees that these disconnects should be grouped and points out that these systems are required to have separation. The submitter's substantiation indicates that the disconnects are for a "common purpose," which is not the case in many generator applications.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

HORNBERGER: Panel should have "accepted in principle", requiring the disconnects to be grouped at one location, within site of the generator, or require posting of a plaque or directory showing the locations of all the disconnects at each disconnect and at the generator. The purpose of the single

disconnect, presently required at the generator, is to isolate the generator and its controls from all possible sources during maintenance. Without proper signage, or documentation of the multiple disconnect locations, isolation of a possible back-feed source may be missed, causing injury or death to maintenance personnel.

13-6 Log #3109 NEC-P13 **Final Action: Accept**
(445.18)

Note: The Technical Correlating Committee has been advised by the Chairs of NFPA 99 and NFPA 110 that those committees agree with the panel action, but do not agree with the substantiation submitted. The Technical Correlating Committee agrees with those positions.

The Technical Correlating Committee notes that CMP 15 stated the following in the 1996 NEC ROP on the same issue: "The feeders from the emergency generators to the first overcurrent device of any load, even nonessential ones, must be considered as part of the emergency system to protect system integrity."

The Technical Correlating Committee is directing that a Task Group consisting of members from CMP 13, NFPA 110 and NFPA 99 be formed to further discuss this issue for the 2008 NEC cycle.

Submitter: Kenneth E. Vannice, Leviton/NSI-Colortran / Rep. United States Institute for Theatre Technology

Comment on Proposal No: 13-7

Recommendation: Continue to leave the wording as shown in the panel action.

Substantiation: This comment is to address Mr. Hornberger's negative vote. Article 700, Emergency Wiring, must continue exclusively clear back to the generator terminals. If Article 701 or 702 wiring is connected to the same generator, it must also be wired to the generator terminals to comply with Article 700. Several code cycles ago, the old Panel 15 made the terminal enclosure on a generator larger for that reason. If both of these loads are to be connected to the generator terminals, more than one disconnect means is necessary.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

HORNBERGER: Panel should have rejected this comment. The disconnects should be grouped at one location, within site of the generator, or require posting of a plaque or directory showing the locations of all the disconnects at each disconnect and at the generator. The purpose of the single disconnect, presently required at the generator, is to isolate the generator and its controls from all possible sources during maintenance. Without proper signage, or documentation of the multiple disconnect locations, isolation of a possible back-feed source may be missed, causing injury or death to maintenance personnel.

WHITTALL: Although the author of the comments is agreeing with the panel's action, his substantiation is incorrect. Nowhere in the NFPA codes does it specify that the "Emergency wiring must continue exclusively clear back to the generator terminals". Nor did "Panel 15 several cycles ago increase the size of the terminal enclosure on a generator for that reason". According to the substantiation, a generator set used for both Emergency Standby and any other purpose would need two set of lead wires back to the generator terminals.

The terminal enclosure was increased to hold and be able to bend wires that would carry 115% of the generator rated load, not two sets of wires, which would carry even 100% of the load. Also, if there is more than one generator set in the installation and they are operated in parallel, the sets are connected to a common buss bar and the loads that are taken off the protection devices are connected to that buss bar. Under the substantiation given, this would not be possible. And the sets would not be able to be paralleled.

Comment on Affirmative:

WOOD: I agree with the panel's action on this comment. However, I disagree with the submitter's substantiation. It was not the panel's intent that emergency wiring originate at the generator terminals.

13-7 Log #783 NEC-P13 **Final Action: Reject**
(445.19)

Submitter: Michael J. Johnston Plano, TX

Comment on Proposal No: 13-8

Recommendation: This proposal should be accepted in principle and in part at a minimum. The panel should reconsider its action on proposal 13-8 and revise the proposed text as follows:

445.19 (A) General. Exposed non-current-carrying metal parts of permanently installed generators, including fences, guards, and so forth, shall be grounded in accordance with the applicable provisions of Article 250.

Substantiation: There are currently no grounding requirements in Article 445. There are also no specific grounding requirements for generators contained within Sections 250.34, 250.110, or 250.112 for permanently installed generators. This proposed section closes this hole in the code. It is understood that portable generator frames are not required to be grounded, however, vehicular mounted and permanently installed generator metal frames do require grounding for safety. The proposed language in (B) in the original proposal is already included in the FPN to 250.20(D) and is more appropriate in a rule rather than information but will have to be addressed in Article 250. Adding the general requirement for grounding of generators is appropriate and consistent with grounding rules that presently exist in other Articles in Chapter for covering "Equipment for General Use." See 404.9(B), 406.9, 406.10, 408.20, 410.18, 424.85, 430.141 and 430.142, 440.61, 450.5, 450.10, 460.10, 490.36, and 490.37 to name a few. No grounding requirements in Article 445. This pro-

posed section is needed to close a hole and allow application of the rules in 250 for the grounding of permanently installed generator non-current-carrying metal parts. Separately derived systems produced by generators are currently addressed in Section 250.30.

Panel Meeting Action: Reject

Panel Statement: Except as modified by Article 445, Article 250 now applies to generators. There is no need to repeat this requirement in Article 445. Article 250 applies to generators just the same as Articles 110, 240, etc. apply to generators. The panel does not want to start the practice of repeating general article requirements that already apply in Article 445. The NEC Style Manual does not permit references to entire articles.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

ARTICLE 450 — TRANSFORMERS AND TRANSFORMER VAULTS

9-133 Log #1595 NEC-P09 **Final Action: Accept in Principle**
(450.5)

Submitter: Alan Manche, Schneider Electric/Square D Co.

Comment on Proposal No: 9-132

Recommendation: The panel should reconsider and accept proposal 9-132 in principle. Revise NEC 450.5 with the additions (underlined) and deletions (strike through) as shown. The entire first sentence of 450.5 is shown for clarity, but only those changes shown underlined or strike through are part of this comment.

450.5 Grounding Autotransformers. Grounding autotransformers covered in this section are zigzag or T-connected transformers. They shall be permitted only for connection 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.

Substantiation: The panel should reconsider and accept this proposal in principle. The panel statement only shares a concern of clarity and did not discount the merit or the technical need to address the transformer protection issue presently missing from article 450. The revised text above establish a more defined permitted use of zig-zag and T-connected transformers without creating a concern for confusion if a “uses not permitted” list were established. This should address the panels concern of confusion noted in the panel’s statement for proposal 9-132.

Panel Meeting Action: Accept in Principle

Add the following sentence at the end of 450.5 in the existing NEC: “Zig-zag connected transformers shall not be installed on the load side of any system grounding connection, including those made in accordance with 250.24(B), 250.30(A)(1), or 250.32(B)(2).”

Panel Statement: This wording achieves the goal in the original proposal of avoiding placing zig-zag connections where they would be compromised by other line-to-ground fault current sources on the premises. The sections cited in this panel action correlate with actions taken by CMP 5 to restructure 250.28 and 250.30.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

HARTWELL: The Technical Correlating Committee should review these section references in Article 250 because Code-Making Panel 5 may have shifted them during the comment period.

ARTICLE 490 — EQUIPMENT, OVER 600 VOLTS, NOMINAL

9-134 Log #2394 NEC-P09 **Final Action: Reject**
(490.2)

Submitter: James M. Daly, General Cable

Comment on Proposal No: 9-139

Recommendation: The Proposal should be Accepted in Principle and, in addition, change the section title from “High Voltage” to “Medium Voltage”.

Substantiation: Medium voltage is already widely accepted in the Code. 328.2 defines medium voltage cable as “a single or multiconductor solid dielectric insulated cable rated 2001 volts or higher.”

328.100 defines the construction specifications for medium voltage cables and references Tables 310.61, 310.63, and 310.64.

Table 310.61 defines the Application Provisions for Medium Voltage Solid Dielectric cables for “dry or wet locations rated 2001 volts or higher.”

Table 310.63 defines the conductor insulation and jacket thicknesses for 2001 – 5000 volts.

Table 310.64 defines the conductor insulation thickness for 5001 – 35,000 volts.

Tables 310.16 through 310.20 provide ampacities for conductors or cables rated 0 through 2000 volts.

Tables 310.67 through 310.86 provide ampacities for conductors and cables rated 2001 – 5000 volts as well as higher medium voltages.

No other ANSI standard limits low voltage to 600 volts.

High voltage normally starts at either 35,000 or 69,000 volts depending on the ANSI standard.

Panel Meeting Action: Reject

Panel Statement: The references cited are for particular types of cables. This section is specific to Article 490 and is used to clarify that this article applies to equipment rated above 600 volts and does not conflict with other parts of the Code or cause confusion. There are many other ANSI approved standards that limit low voltage to 600 volts.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

9-135 Log #1092 NEC-P09
(490.46 (New))

Final Action: Reject

Submitter: Neil F. LaBrake, Jr., Niagara Mohawk, a National Grid Company / Rep. Edison Electric Institute

Comment on Proposal No: 9-141

Recommendation: Accept this Proposal.

Substantiation: Article 490 does not currently contain minimum performance based requirements for service equipment operating above 600 volts. The proposal addresses specific safety concerns: (1) separation between service and feeder/branch circuit wiring and equipment and (2) access to service terminations for testing, isolation, and safety grounding for maintenance.

The intent with this proposal is to provide a minimum requirement for “Medium Voltage Service Equipment”, that could satisfy the electric delivery service requirements; provide a “service equipment” standard for manufacturers, and an installation that is safe for the user. These minimum requirements are essential to provide such separation and isolation for safe operation. These also limit the ancillary devices permitted within the compartment to those associated with the line side service cable and equipment. Some electric delivery companies expect users of medium voltage service equipment to provide qualified personnel to operate the service disconnect, change fuses, rack out breakers and VT drawers, and maintain any feeder cable or bus connected to the service. These qualified personnel should be able to perform these tasks without exposure to energized parts of the service, up to the open service disconnect.

The minimum requirements should be incorporated into the Code now and they can be improved or modified at a later time to conform to the future recommendations of the CMP-9 task group.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 9-136.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

CROUSHORE: See my Explanation of Affirmative Vote on Comment 9-136. In view of the panel action on Comment 9-136, the “Reject” action should have been at least “Accept in Principle” for consistency.

9-136 Log #1278 NEC-P09 **Final Action: Accept in Principle in Part**
(490.46 (New))

Submitter: Timothy M. Croushore, Allegheny Power

Comment on Proposal No: 9-141

Recommendation: The proposal should be accepted in principle. Replace the proposed text in the proposal with the following text for new 490.46:

A. General. Metal enclosed and metal clad switchgear installed as high voltage service equipment shall include the following provisions:

1. Service conductor termination compartment
2. Service overcurrent protective device(s)
3. Ground bus
4. Service Conductor Termination Compartment. The service cable shall terminate in a separate compartment. The compartment shall comply with 490.46(B)(1) through (B)(5):
 1. Door. The compartment shall include a hinged door with provision for applying a separate lock on the exterior of the door.
 2. Marking. The compartment shall be equipped with a label identifying it as the Service Conductor Termination Compartment.
 3. Conductors and Bus Bars. Compartments containing exposed conductors or bus bars shall be marked on the outside of the compartment with the nominal voltage(s) present.
 4. Work Space and Guarding. Work space and guarding shall comply with 110.34.
 5. Safety Grounds. Provisions for installing safety grounds shall be included.
 6. Cable Isolation. Provisions to disconnect and isolate the service cable connectors from the service equipment shall be included.
5. Utility Metering Equipment. Provision for installing metering transformers and the following associated equipment shall be permitted in the service cable termination compartment or in an adjacent compartment:
 1. Current Transformers
 2. Voltage Transformers
 3. Meter Socket
 4. Surge Arrestors
 5. Associated Wiring for Protective Relaying

D. Service Overcurrent Protective Devices(s). High voltage service overcurrent device(s) 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.

E. Ground Bus. A ground bus shall be extended into the service cable terminating compartment for connection of the service cable shields and to facilitate the attachment of a safety grounds for personnel protection.

Substantiation: Article 490 does not currently contain minimum performance based requirements for service equipment operating above 600 volts. The proposal addresses specific safety concerns:

- (1) Separation between service and feeder/branch circuit wiring and equipment, and
- (2) Access to service terminations for testing, isolation, and safety grounding for maintenance.

The intent with this new section is to establish a minimum set of criteria that can be adopted universally across the US. This section provides a minimum requirement for "Medium Voltage Service Equipment", that could satisfy the electric delivery service requirements; provide a "service equipment" standard for manufacturers, and an installation that is safe for the user. These minimum requirements are essential to provide such separation and isolation for safe operation. These also limit the ancillary devices permitted within the service conductor termination compartment to those associated with the line side service cable and equipment.

It should be noted that each serving utility or equipment user might have their own criteria in addition to these minimum requirements. These additional requirements will have to be communicated and called out in individual specifications for particular installations. However, this section contains the minimum requirements for safety to comply with OSHA 1910.269 and other ASTM and ANSI standards.

Panel Meeting Action: Accept in Principle in Part

Revise the submitter's comment to read as follows: 490.46 Metal Enclosed and Metal Clad Service Equipment.

Metal enclosed and metal clad switchgear installed as high-voltage service equipment shall include a ground bus for the connection of service cable shields and to facilitate the attachment of safety grounds for personnel protection. This bus shall be extended into the compartment where the service conductors are terminated.

Panel Statement: CMP 9 accepts the concept of providing a means for grounding service conductors in the compartment where they are terminated. CMP 9 rejects the remainder of the comment because the acceptance of the remainder of the comment would unnecessarily prohibit the use of many types of metal enclosed switchgear that are currently applied in a safe manner.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

Comment on Affirmative:

CROUSHORE: We certainly applaud the panel movement in accepting a portion of the original Proposal 9-141. We are submitting the affirmative comment to help focus attention on the need for addressing more of the original proposed requirements in the NEC. For example, the ROC panel action did not address issues such as separation of service and load conductors, hinged covers, access for testing, isolation and ancillary equipment locations.

HARTWELL: By its action on the comment, Code-Making Panel 9 has shown it is willing to address the concerns in the underlying proposal in a comprehensive way. NEMA and the utilities should make every effort to arrive at a consensus on the technical issues prior to the first Friday in November of 2005.

9-137 Log #1351 NEC-P09 **Final Action: Accept in Principle**
(490.46 (New))

Submitter: Jim Carroll, Schneider Electric

Comment on Proposal No: 9-141

Recommendation: The proposal should continue to be rejected.

Substantiation: The proposals general intent is to bring standardization to a portion of a switchgear line-up typically utilized by the serving utility. Harmonization of utility practices and standardization of equipment utilized in the interface between utilities and premises wiring systems is highly desirable. Standardization can have the effect of reducing costs to customers as common pieces of equipment are utilized plus more importantly can offer a common training safety program for employees (either utility or private) that need to access this type of equipment. The impact of true standardization is much larger than any of the panel members has imagined.

Unfortunately, this proposal does not accomplish the proper standardization. The Task Group appointed by Mr. Croushore on this issue should work diligently to establish a set of criteria that can be adopted universally across the US. The issue is much deeper than just a set of requirements in the NEC in that each utility may have their own criteria for the interface and without proper involvement and communication will continue to insist on their individual requirements regardless of the NEC language. This is the harmonization that must take place and must be accepted/utilized by all utilities. It begs the question of whether the NEC is the proper place to drive this common platform or should there be another standard created specifically to address utility/premises wiring interface issues.

Proposal 9-141 and even the rewrite attempted in Mr. Hartwell's positive comment will outlaw the use of many forms of equipment currently being employed as Medium Voltage Service Equipment in today's marketplace and that are being safely deployed. To indiscriminately eliminate product designs and require additional features into equipment that are not currently specified will increase the ultimate cost of the equipment to the consumer and any supposed gain in safety would be in question since the existing equipment is now safely utilized. One might ask why not standardize on a different set of criteria utilized by a different utility group.

This proposal should continue to be rejected. At the same time, a harmonization effort for the interface requirement should be started. Schneider Electric/Square D is supportive of this effort and will eagerly participate in the development of a standardized interface.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 9-136.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

CROUSHORE: See my Explanation of Affirmative Vote on Comment 9-136.

9-138 Log #2564 NEC-P09 **Final Action: Accept in Principle**
(490.46 (New))

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

Comment on Proposal No: 9-141

Recommendation: The proposal should continue to be rejected.

Substantiation: The proposal contains new design requirements where the utility conductors enter and terminate in medium-voltage switchgear applied as service equipment which will cause tremendous conflict with existing utility practices. When the equipment is owned by the power user, it is typical for serving utilities around the country to impose their own design requirements on this part of the equipment. They even place their locks on that part of the equipment to keep the owner out. Proposal 9-141 does not recognize this practice. It would mandate that utilities abandon their individual practices and standardize on the proposed design requirements. Proposal 9-141 also does not recognize that electrical inspectors typically do not inspect portions of the equipment that are under the utility's control.

We also feel that this proposal conflicts with Article 90 which states that the NEC is not intended as a design specification. We realize that the NEC contains some design requirements to increase safety for the users. An example is the interlock required for stored energy type operating mechanisms. Acceptance of Proposal 9-141 would start a new trend that is not in keeping with the purpose of the NEC. Harmonization of utility practices would be welcome but there is some question as to whether an installation document such as the NEC is the proper place for the requirements.

The design requirements contained in Proposal 9-141 are based on the requirements of one utility and to be imposed on all utilities by the NEC and would restrict the types of switchgear utilized for service entrance.

It is strongly recommend that this proposal be rejected.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 9-136.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 10 Negative: 1

Explanation of Negative:

CROUSHORE: See my Explanation of Affirmative Vote on Comment 9-136.

**ARTICLE 500 — HAZARDOUS (CLASSIFIED)
LOCATIONS, CLASS I, II, AND III,
DIVISIONS 1 AND 2**

14-2b Log #CC1400 NEC-P14 **Final Action: Accept**
(500.1, FPN (New))

Note: 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

Comment on Proposal No: 14-108a

Recommendation: Add a new Fine Print Note No. 4 to 500.1 that reads:

FPN No. 4: For the requirements for electrical and electronic equipment and wiring for all voltages in Zone 20, Zone 21, and Zone 22 hazardous (classified) locations where fire or explosion hazards may exist due to combustible dusts, or ignitable fibers or flyings, refer to Article 506.

Substantiation: The added fine print note provides the proper cross-reference to new Article 506.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

COOK: See my explanation of negative vote on Comment 14-95.

14-3 Log #24 NEC-P14
(500.1, FPN 2)

Final Action: Hold

Note: The Technical Correlating Committee directs that the Panel Action on Comment 14-3 be reported as “Hold “ consistent with Section 4-4.6.2.2 of the NFPA Regulations Governing Committee Projects. See Technical Correlating Committee Note on Comment 14-5.

Submitter: David Wechsler, The Dow Chemical Company

Comment on Proposal No: 14-5

Recommendation: Within Article 500, where the context of the single term used, such as “flammable gas” or “flammable vapor” or “flammable liquid” and the meaning is more universal to include both flammable and combustible materials that can form ignitable mixtures in air and burn, replace these terms with “gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode...”.

Specific texts to be changed include the following:

500.1 Scope - Article 500 through 504.

Articles 500 through 504 cover the requirements for electrical and electronic equipment and wiring for all voltages in Class I, Divisions 1 and 2; Class II Divisions 1 and 2; and Class III, Divisions 1 and 2 locations where fire or explosion hazards may exist due to flammable gases or vapors, flammable liquids, flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode, combustible dust, or ignitable fibers or flyings.

505.5 Classifications of Locations.

(A) Classifications of Locations. Locations shall be classified depending on the properties of the flammable vapors, liquids, or gases flammable gas, flammable liquid-produced vapor mixed with air that may burn or explode, or combustible dusts or fibers that may be present, and the likelihood that a flammable or combustible concentration or quantity is present.

(B) Class I Locations. Class I locations are those in which flammable gases or vapors flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

(1) Class I, Division 1. A Class I, Division 1 location is a location

(1) In which ignitable concentrations of flammable gases or vapors flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode can exist under normal operating conditions, or

(2) In which ignitable concentrations of such gases or vapors flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode may exist frequently because of repair or maintenance operations or because of leakage, or

(3) In which breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air may burn or explode and might also cause simultaneous failure of electrical equipment in such a way as to directly cause the electrical equipment to become a source of ignition.

(2) Class I, Division 2. A Class I, Division 2 location is a location

(1) In which volatile flammable liquids or flammable gases flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode are handled, processed, or used, but in which the liquids, vapors, or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems or in case of abnormal operation of equipment, or

(2) In which ignitable concentrations of gases or vapors gases flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air are normally prevented by positive mechanical ventilation, and which might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.

(3) That is adjacent to a Class I, Division 1 location, and to which ignitable concentrations of gases or vapors gases flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.

500.8(A)(6) Where flammable gases flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode, or combustible dusts are or may be present at the same time, the simultaneous presence of both shall be considered when determining the safe operating temperature of the electrical equipment.

Substantiation: The actions taken by the panel on this proposal, while valid in this writer’s opinion, have inadvertently raised a more fundamental and serious problem. When the NEC is used in conjunction with other references, such as NFPA 497 and NFPA 30, and only the NEC term “flammable” is used, there is an opinion being raised that there is indeed no requirement to classify areas containing “combustible liquids”. Restating this concern, it appears that only those areas or locations addressed within the NEC, such as in Class I locations in which materials having flash points below 100 F, must be classified at all. One might even be under the misimpression that only Class I, Division

1 locations contain flammable gases or vapors. Neither of these I believe are positions that are supported by CMP-14, but if allowed to go unchecked could result in loss of life, serious property damage, or an unsafe electrical installation within an intended hazardous (classified) location.

The recommended corrective action is for the text to be consistent when addressing Class I materials so as to agree with the Class I defined Groups. This would require the modification where “flammable vapor” is used, the following replacement text: “...flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode...”.

In the quest for having the words in the various standards/codes agree with the Committee’s intents, it would seem that there is yet another interesting paradox to consider. This issue seems critical as to what “Flammable” means and upon this understanding rests the entire basis for the need to classify a Class I location. For instance, refer to 500.5(B)(1) FPN No. 1 and examine the listing - only “flammable” conditions are presented.

Classification, or the need to do it, stems from NEC Article 500, 500.5 A.

“Locations shall be classified depending on the properties of the flammable vapors, liquids, or gases, or combustible dusts or fibers that may be present, and the likelihood that a flammable or combustible concentration or quantity is present.”

Reference is made to NFPA 497 and the material table which contain groups. These groups contain flammable gases, flammable liquids (NFPA Class I’s), and combustible gases, liquids and vapors (NFPA Class II, III’s).

Further, within NFPA 497, the “generic” term “Combustible Material” is used, in addition to the extracted definitions for the terms “flammable liquid” and “combustible liquid”. This “combustible material” term includes the flammable gas, flammable liquid, etc. [literal definition from NFPA 497 - Combustible Material.* A generic term used to describe a flammable gas, flammable liquid produced vapor, or combustible liquid produced vapor mixed with air that may burn or explode] but aside from using this term within some of the 497 text, it does not enter into the NEC Classification aspects, as does the term “flammable”. The Group definitions however, also use the terms “flammable gas”, “flammable liquid”, and “combustible liquid”. Table 2-1 in NFPA 497 containing the Grouped materials, list only “Selected” and not “ALL” chemicals. Referring to NEC 500.5(A), the text does not contain specific language requiring the classification of only those location(s) that contain one or more of the chemicals found in the NFPA 497 list, but rather based upon 500-5(A) “Locations shall be classified depending on the properties of the flammable vapors, liquids, or gases, or combustible dusts...”.

“Flammable” is defined within the NEC only as “Volatile Flammable Liquid. A flammable liquid having a flash point below 38°C (100°F), or a flammable liquid whose temperature is above its flash point, or a Class II combustible liquid that has a vapor pressure not exceeding 276 kPa (40 psia) at 38°C (100°F) and whose temperature is above its flash point.”

The NEC also uses the term “flammable” in other areas. One such example is “450.24 Nonflammable Fluid-Insulated Transformers. For the purposes of this section a nonflammable dielectric fluid is one that does not have a flash point or fire point and is not flammable in air.”

In conclusion, applying the text of the NEC, there is an opinion being raised due to the actions taken on this proposal that there is indeed no requirement to classify areas containing “combustible liquids”, or rather put another way, only those areas or locations addressed in the NEC definition above, such as in locations in which materials having flash points below 100 F, must be classified.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 14-5.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

COOK: See my explanation of negative vote on Comment 14-5.

14-4 Log #114 NEC-P14
(500.1, FPN 2)

Final Action: Reject

Submitter: Robert T. Ford, Safety Management Services, Inc.

Comment on Proposal No: 14-5

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: Reject

Panel Statement: The panel rejected the term “propellants” during the ROP phase, and the submitter has not provided any additional technical substantiation to change the panel’s ROP action.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-5 Log #1322 NEC-P14
(500.1, FPN 2)**Final Action: Hold**

Note: The Technical Correlating Committee directs that the Panel Action on Comment 14-5 be reported as “Hold “ consistent with Section 4-4.6.2.2 of the NFPA Regulations Governing Committee Projects. The comment introduces a new concept that has not had public review. In addition, the Technical Correlating Committee notes that the language in the FPN is inappropriate in that it contains an implied requirement.

Submitter: David Wechsler, The Dow Chemical Company

Comment on Proposal No: 14-5

Recommendation: Revise text to read as follows:

Within Article 500, where the context of the single term used, such as “flammable gas” or “flammable vapor” or “flammable liquid” and the meaning is more universal to include both flammable and combustible materials that can form ignitable mixtures in air and burn, replace these terms with “flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode...”.

Specific texts to be changed include the following:

500.1 Scope - Articles 500 through 504.

Articles 500 through 504 cover the requirements for electrical and electronic equipment and wiring for all voltages in Class I, Division 1 and 2; Class II, Divisions 1 and 2; and Class III, Divisions 1 and 2 locations where fire or explosion hazards may exist due to flammable gases or vapors, flammable liquids, flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode, combustible dust, or ignitable fibers or flyings.

500.5 Classifications of Locations.

(A) Classifications of Locations. Locations shall be classified depending on the properties of the flammable vapors, liquids, or gases flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode, or combustible dusts or fibers that may be present, and the likelihood that a flammable or combustible concentration or quantity is present.

(B) Class I Locations. Class I locations are those in which flammable gases or vapors flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

(1) Class I, Division 1. A Class I, Division 1 location is a location

(1) In which ignitable concentrations of flammable gases or vapors flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode can exist under normal operating conditions, or

(2) In which ignitable concentrations of such gases or vapors flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode may exist frequently because of repair or maintenance operations or because of leakage, or

(3) In which breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode and might also cause simultaneous failure of electrical equipment in such a way as to directly cause the electrical equipment to become a source of ignition.

(2) Class I, Division 2. A Class I, Division 2 location is a location

(1) In which volatile flammable liquids or flammable gases flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode are handled, processed, or used, but in which the liquids, vapors, or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown of such containers or systems or in case of abnormal operation of equipment, or

(2) In which ignitable concentration of gases or vapors flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air are normally prevented by positive mechanical ventilation, and which might become hazardous through failure or abnormal operation of the ventilating equipment, or

(3) That is adjacent to a Class I, Division 1 location, and to which ignitable concentrations of gases or vapors flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.

500.8(A)(6) Where flammable gases flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode, or combustible dusts are or may be present at the same time, the simultaneous presence of both shall be considered when determining the safe operating temperature of the electrical equipment.

Substantiation: The actions taken by the Committee on this proposal, while valid in this writer’s opinion, have inadvertently raised a more fundamental and serious problem. When the NEC is used in conjunction with other references, such as NFPA 497 and NFPA 30, and only the NEC term “flammable” is used, there is an opinion being raised that there is indeed no requirement to classify areas containing “combustible liquids”. Restating this concern, it appears that only those areas or locations addressed within the NEC, such as in Class I locations in which materials having flash points below 100F, must be classified at all. One might even be under the misimpression that only Class I, Division 1

locations contain flammable gases or vapors. Neither of these, I believe, are positions that are supported by CMP-14, but if allowed to go unchecked could result in loss of life, serious property damage, or an unsafe installation within an intended hazardous (classified) location.

The recommended corrective action is for the text to be consistent when addressing Class I materials so as to agree with the Class I defined Groups. This would require the modification where “flammable vapor” is used, the following replacement text: “...flammable gas, flammable liquid-produced vapor, or combustible liquid-produced vapor mixed with air that may burn or explode...”.

In the quest for having the words in the various standards/codes agree with the Committee’s intents, it would seem that there is yet another interesting paradox to consider. This issue seems critical as to what “Flammable” means and upon this understanding rests the entire basis for the need to classify a Class I location. For instance, refer to 500.5(B)(1) FPN No. 1 and examine the listing - only “flammable” conditions are presented.

Classification, or the need to do it, stems from NEC Article 500, 500.5(A).

“Locations shall be classified depending on the properties of the flammable vapors, liquids, or gases, or combustible dusts or fibers that may be present, and the likelihood that a flammable or combustible concentration or quantity is present.”

Reference is made to NFPA 497 and the material table which contain groups. These groups contain flammable gases, flammable liquids (NFPA Class I’s), and combustible gases, liquids and vapors (NFPA Class II, III’s).

Further within NFPA 497, the “generic” term “Combustible Material” is used, in addition to the extracted definitions for the terms “flammable liquid” and “combustible liquid”. This “combustible material” term includes the flammable gas, flammable liquid, etc. [literal definition from NFPA 497 - Combustible Material.* A generic term used to describe a flammable gas, flammable liquid produced vapor, or combustible liquid produced vapor mixed with air that may burn or explode] but aside from using this term within some of the 497 text, it does not enter into the NEC classification aspects, as does the term “flammable”. The Group definitions however, also use the terms “flammable gas”, “flammable liquid”, and “combustible liquid”. Table 2-1 in NFPA 497 containing the Grouped materials, list only “Selected” and not “ALL” chemicals. Referring to the NEC 500.5A, the text does not contain specific language requiring the classification of only those location(s) that contain one or more of the chemicals found in the NFPA 497 list, but rather based upon 500-5A “Locations shall be classified depending on the properties of the flammable vapors, liquids, or gases, or combustible dusts...”.

“Flammable” is defined within the NEC only as “Volatile Flammable Liquid. A flammable liquid having a flash point below 38 degree C (100 degree F), or a flammable liquid whose temperature is above its flash point, or a Class II combustible liquid that has a vapor pressure not exceeding 276 kPa (40 psia) at 38 degree C (100 degree F) and whose temperature is above its flash point.”

The NEC also uses the term “flammable” in other areas. One such example is “450.24 Nonflammable Fluid-Insulated Transformers. For the purposes of this section, a nonflammable dielectric fluid is one that does not have a flash point or fire point and is not flammable in air.”

In conclusion, applying the text of the NEC, there is an opinion being raised due to the actions taken on this proposal that there is indeed no requirement to classify areas containing “combustible liquids”, or rather put another way, only those areas or locations addressed in the NEC definition above, such as in locations in which materials having flash points below 100F, must be classified.

Panel Meeting Action: Accept in Principle

Add a new FPN No.3 to read:When a combustible liquid is stored, handled or processed above its flashpoint, the combustible liquid-produced vapor is considered to be a flammable vapor. See 500.6 for the definitions of the Class I material groups.

Panel Statement: The panel agrees with the concerns expressed in the substantiation, and adding a new FPN No. 3 alerts users of the NEC to the hazards associated with combustible liquids that are stored, handled, or processed above their flashpoints.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

COOK: I agree with the technical action of the committee on Comment 14-5, however, I believe this comment and action introduces a new concept that has not had public review. Section 4.4.6.2.2(a) of the Regulations Governing Committee Projects requires comments that have not had public review to be held.

14-6 Log #650 NEC-P14
(500.2)**Final Action: Accept in Part**

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-8

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept in Part

Panel Statement: The panel accepts the TCC's direction to reconsider this proposal relative to making the proper attribution for extracted text. The concepts are extracted, but the definitions are used for the basis of a term that is unique to the NEC therefore it is not a direct extract from NFPA 496.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-7 Log #2881 NEC-P14
(500.2)

Final Action: Reject

Submitter: Joseph A. Ross, Ross Seminars

Comment on Proposal No: 14-7

Recommendation: Reconsider Proposal 14-7.

Substantiation: The submitter agrees that the proposal was not worded that clearly. The proposal is editorial only. It intends to alphabetically group the definitions for "nonincendive" by changing "associated nonincendive field wiring apparatus" that appears on page 339 of the 2002 NEC to "Nonincendive Field Wiring Apparatus, Associated" and relocating it to follow "Nonincendive Field Wiring Apparatus" that appears on page 340.

Panel Meeting Action: Reject

Panel Statement: The definition used in the NEC is derived from ANSI/ISA 12.12.01, and acceptance of the comment has the potential for causing confusion. The wording used throughout the NEC would also have to be changed if this comment were accepted.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-8 Log #651 NEC-P14
(500.5(C)(2)(1).)

Final Action: Accept in Principle

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 14-11

Recommendation: 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.

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

Revise the text accepted in Proposal 14-11 to read:(1) In which combustible dust due to abnormal operations may be present in the air in quantities sufficient to produce explosive or ignitable mixtures; or

(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.

Panel Statement: The panel action clarifies that items (1) and (2) are separate conditions.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-9 Log #949 NEC-P14
(500.8(A)(4))

Final Action: Accept in Part

Submitter: Dorothy Kellogg, American Chemistry Council

Comment on Proposal No: 14-16

Recommendation: Replace 500.8(A)(4) and 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."

Substantiation: While it seems most apparent that some sort of error was made in the processing of either the original proposal or the panel actions that resulted from a consideration of this proposal; the actions as expressed in the voting comments by Mr. Engler, Mr. Lawrence and Mr. Wechsler (less the crossed out text) agree with the recommendation, are valid and should be accepted by the committee. However, not for the reason of the printed substantiation but again as indicated in the comments of the voting committee members.

Panel Meeting Action: Accept in Part

Panel Statement: The panel accepts the proposed text other than the phrase "regardless of the classification of the location in which it is installed". This phrase is redundant. The panel prefers the text proposed in Comment 14-14. See the panel action on Comment 14-14.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-10 Log #652 NEC-P14
(500.8(A)(2))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 14-15

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See panel action and statement on Comment 14-11.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-11 Log #950 NEC-P14
(500.8(A)(2))

Final Action: Accept in Principle

Submitter: Dorothy Kellogg, American Chemistry Council

Comment on Proposal No: 14-15

Recommendation: Return to the original wording format for (2), but only with the added "temperature" component as follows:

"(2) Equipment that has been identified for a Division 1 location shall be permitted in a Division 2 location of the same class, group, and temperature class."

Make the intrinsic safe issue a new numbered item (3), with the following text and renumber (3)(4)(5) and (6) accordingly:

(3) Intrinsically safe apparatus having a control drawing requiring the installation of associate apparatus for a Division 1 installation shall be permitted to be installed in a Division 2 location if the same associate apparatus is also installed in the Division 2 location."

Substantiation: We agree with part of the panel action to include the third consideration of the temperature class that should be considered for the installation of Division 1 apparatus within a Division 2 location. However, we do not agree with combining the Division 1 apparatus with the more complex issues of intrinsic safety. These should be separately addressed considerations so that each can be better understood by users. As stated in Mr. Neagle's statement, the wording for intrinsic safety seems unduly complex and raises issues that need not be raised. For example, the aspects of listing vs. an evaluation. We believe that the focus on the intrinsic safe issue rests with the control drawing and its requirements for associated apparatus that need to be part of that completed installation. Since the control drawing will specify this interrelationship between the intrinsic safe and its associated apparatus, the user needs only to be cautioned to be aware that if the intrinsic safe apparatus is moved into a Division 2 location, so does the associated apparatus it cannot be left out.

Panel Meeting Action: Accept in Principle

Revise 500.8(A)(2) to read:(2) Equipment that has been identified for a Division 1 location shall be permitted in a Division 2 location of the same class, group, and temperature class and in addition shall comply with (a) or (b) as applicable.

(a) Intrinsically safe apparatus having a control drawing requiring the installation of associated apparatus for a Division 1 installation shall be permitted to be installed in a Division 2 location if the same associated apparatus is used for the Division 2 installation.

(b) Equipment that is required to be explosionproof shall incorporate seals in accordance with 501.15(A) or 501.15(D) when the wiring methods of 501.10(B) are employed.

Panel Statement: The panel accepts the addition of "temperature class" to 500.8(A)(2). The revision to the proposed text for item (3) corrects "associate" to "associated" and clarifies the "use" rather than the "location" of the associated apparatus. Since the proposed text for item (3) relates to Class I, Division 2 installations, it has been incorporated as subparagraph (a). The text proposed in Comment 14-13 as modified by the panel action on that comment will be incorporated as subparagraph (b). Section 500.8(A)(2) has been revised to incorporate and reference these new subdivisions.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-12 Log #1922 NEC-P14
(500.8(A)(2))

Final Action: Reject

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

Comment on Proposal No: 14-15

Recommendation: Accept the panel action text in principle; move "only" ahead of "evaluated."

Substantiation: The panel wording is essentially correct. If the term “listed” were introduced in place of “evaluated” it would imply that the listing only permitted the use in Div. 1 to the exclusion of less hazardous locations. That is unlikely. The panel wording correctly identifies the likely process, where a manufacturer may get something listed for Class I Division 1 after UL (or equal) does the requisite evaluation. If the same equipment is proposed in a Division 2 location, then the associated apparatus must be the same unless reevaluated for Division 2. The AHJ will never be making this evaluation because 504.4 applies to all IS equipment, whether in Div. 1 or 2. It will always be listed, and the AHJ need only review adherence to the drawings. For similar reasons, the wording order in the panel text is correct. If the word “only” were located after “evaluated for use” it would change the meaning, and imply that the Div. 1 equipment was prohibited from Div. 2 (but then allowed in the next clause). To further reinforce this point, the wording in this comment groups the words “evaluated for use” after the word “only” to stress that the evaluation and not the listing is what is in question.

Panel Meeting Action: Reject

Panel Statement: The proposed changes are no longer necessary as a result of the panel action on Comment 14-11.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-13 Log #3456 NEC-P14 **Final Action: Accept in Principle**
(500.8(A)(2))

Note: The Technical Correlating Committee understands that the action on Comment 14-11 contains the final text for this section.

Submitter: William G. Lawrence, Jr. S. Yarmouth, MA

Comment on Proposal No: 14-15

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. 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. Equipment employing the protection technique explosion proof apparatus shall incorporate seals per 501.5(A) or 501.5(D) when the wiring methods of 501.4(B) are employed.

Substantiation: Now that specific guidance is provided for an IS installation, the inference is that there are no special concerns for an explosionproof installation in Division 2. That is misleading and will continue to result in incorrect and unsafe installations.

Explosionproof apparatus is permitted in Class I Division I or Division 2 by 500.7(A). “Protection Techniques”. 500.8(A)(2) is providing guidance on how to do so in a Division 2 location.

The panel statement says proposed FPN No. 1 is a duplicate of 501.5(B)(1). I do not believe this is totally true. 501.5(B)(1) only requires seals on “enclosures required to be “explosionproof”. I cannot locate specific text in the NEC that requires enclosures to be “explosionproof”. I think I know what it means, but it is poorly worded and potentially misleading when applied to this situation. It could be concluded that equipment installed in Division 2 that is not normally sparking is not “required to be explosionproof”, therefore no seals are required. However, when relying on protection technique “explosionproof apparatus” in Division 2, it is necessary to follow all the requirements for that protection technique or it is not “explosionproof apparatus” and is not suitable for installation in Division 2 as such.

Wiring methods are also a concern hidden under the sealing issue. It is not safe to use some of the Division 2 wiring methods to connect explosionproof apparatus in Division 2 unless the explosionproof apparatus enclosure has been “completed” by using a conduit or cable seal. After doing so, it is safe to use Division 2 wiring methods. The Division 1 wiring methods are really an extension of the explosionproof apparatus and are also “explosionproof apparatus”. This is not true for Division 2 wiring methods like liquidtight flexible metal conduit. If explosionproof apparatus in Division 2 is wired with liquidtight flexible metal conduit, the “enclosure” is not complete and does not meet the definition for “explosionproof apparatus”. An explosion would blow a hole in the liquidtight.

Panel Meeting Action: Accept in Principle

Renumber and revise the proposed new text as follows:500.8(A)(2)(b) Equipment that is required to be explosionproof shall incorporate seals in accordance with 501.15(A) or 501.15(D) when the wiring methods of 501.10(B) are employed.

Panel Statement: The revision to the proposed text clarifies that not all equipment installed in Division 2 locations is required to be explosionproof.

The panel action to reidentify the proposed new text as (b) correlates with their action to subdivide 500.8(A)(2) taken in Comment 14-11. The panel has also revised the references in the proposed text to correlate with the reorganization of Article 501.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-14 Log #3457 NEC-P14 **Final Action: Accept**
(500.8(A)(4))

Note: The Technical Correlating Committee directs that the FPN be revised to read: “FPN: Equipment used for flow measurement is an example of equipment having a single compression seal, diaphragm, or tube.”

This rewording avoids the implied permissive statement contained in the proposed recommendation.

Submitter: William G. Lawrence, Jr. S. Yarmouth, MA

Comment on Proposal No: 14-16

Recommendation: Panel should review the purported Panel proposal and consider the revised wording shown in the three comments on the Panel action as follows:

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.

Substantiation: The proposed text would remove the ambiguities from the existing text and allow a uniform enforcement of the requirement.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-15 Log #653 NEC-P14 **Final Action: Accept**
(500.8(B))

Note: The Technical Correlating Committee disagrees with the panel statement and notes that the language used by the panel creates an inconsistency with 90.3 and the direction taken by other code making panels. The Technical Correlating Committee has sent this issue to the Usability Task Group with the direction to provide CMP-14 with specific proposals to eliminate the redundancy in the next code cycle. This direction also includes similar text in Articles 502, 503 and 505.

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-17a

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See the panel action and statement on Comment 14-16.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-16 Log #1926 NEC-P14 **Final Action: Accept in Principle**
(500.8(B))

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

Comment on Proposal No: 14-17a

Recommendation: Accept the proposal in principle. Revise as follows:

(B) Marking. Equipment shall be marked to show the environment for which it has been evaluated. Unless otherwise specified or allowed in (6) the marking shall include the information specified in (1) through (5).

(1) Class. The marking shall specify the class(es) for which the equipment is suitable.

(2) Division. The marking shall specify the division if the equipment is suitable for Division 2 only. Equipment suitable for Division 1 shall be permitted to omit the division marking.

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) Material Classification Group. The marking shall specify the applicable material classification group(s) 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 indicate the group.

(4) Equipment Temperature. The marking shall specify the temperature class or operating temperature at a 40°C ambient temperature, or at the higher ambient temperature if the equipment is rated and marked for an ambient temperature of greater than 40°C. 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.

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

Exception No. 2: Simple apparatus, as defined in 504.2, shall not be required to have a marked operating temperature or temperature class.

FPN: More than one marked temperature class or operating temperature, for gases and vapors, dusts, and different ambient temperatures, may appear.

(5) Ambient Temperature Range. For equipment rated for a temperature range other than -25°C to +40°C, the marking shall specify the special range of ambient temperatures. The marking shall include either the symbol “Ta” or “Tamb”.

FPN: As an example, such a marking might be “-30°C ≤ Ta ≤ +40°C”.

(6) Special allowances.

(a) General Purpose Equipment. 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.

(b) Dusttight Equipment. 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.

(c) Associated Apparatus. Associated intrinsically safe apparatus and associated nonincendive field wiring apparatus that 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.

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

Relocate the FPN on ignition temperature as 500.8 FPN No. 2, renumbering the existing FPN No. 2 on cold temperatures as FPN No. 3:

FPN No. 2: Since there is no consistent relationship between explosion properties and ignition temperature, the two are independent requirements.

Substantiation: This rewrite of the panel action meets the TCC objections, removes a number of additional exceptions, meets the Style Manual objection in Proposal 14-17 (which the panel action actually failed to correct), corrects a technical error, and addresses numerous other Style Manual problems, as follows:

The opening now has suitable parent language. The generic exceptions to the main wording have been converted into positive text [as paragraph (6)]. The numbered paragraphs (1) through (5) have been converted from a list format into a rule format, in order to allow for parallel language usage.

Item (3) has been changed from gas classifications to material classifications. That is the title of 500.6 and reflects the fact that the classifications here involve dust groups as well as gas and vapor groups.

Item (4) has the former mandatory exception folded into the rule, making Proposal 14-17 academic. The equipment temperature rules are now in a single paragraph, followed by two permissive exceptions. The simple apparatus exception is now expressed as a complete sentence, as required by the Style Manual.

Item (5) [undocumented in the ROP but presumably taken from 505.9(D)(1)] has been modified to incorporate the exception into the rule.

The FPN on explosion properties has been relocated to 500.8 as the second note, to follow the first on exercise of care and before the one on cold temperatures. This note has had many different homes in this article over the years. It is important information that goes far beyond ignition temperature ratings; locating it to follow the general equipment heading seemed to make the most sense.

Panel Meeting Action: Accept in Principle

Revise proposed text as follows: (B) Marking. Equipment shall be marked to show the environment for which it has been evaluated. Unless otherwise specified or allowed in (6), the marking shall include the information specified in (1) through (5).

(1) Class. The marking shall specify the class(es) for which the equipment is suitable.

(2) Division. The marking shall specify the division if the equipment is suitable for Division 2 only. Equipment suitable for Division 1 shall be permitted to omit the division marking.

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) Material Classification Group. The marking shall specify the applicable material classification group(s) 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 indicate the group.

(4) Equipment Temperature. The marking shall specify the temperature class or operating temperature at a 40°C ambient temperature, or at the higher ambient temperature if the equipment is rated and marked for an ambient temperature of greater than 40°C. 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.

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: Simple apparatus, as defined in 504.2, shall not be required to have a marked operating temperature or temperature class.

FPN: More than one marked temperature class or operating temperature, for gases and vapors, dusts, and different ambient temperatures, may appear.

(5) Ambient Temperature Range. For equipment rated for a temperature range other than -25°C to +40°C, the marking shall specify the special range of ambient temperatures. The marking shall include either the symbol "Ta" or "Tamb".

FPN: As an example, such a marking might be "-30°C ≤ Ta ≤ +40°C."

(6) Special allowances.

(a) General Purpose Equipment. 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, or ambient temperature range.

(b) Dusttight Equipment. 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, or ambient temperature range.

(c) Associated Apparatus. Associated intrinsically safe apparatus and associated nonincendive field wiring apparatus that are not protected by an alternative type of protection shall not be marked with the class, division, group, or temperature class. Associated intrinsically safe apparatus and associated nonincendive field wiring apparatus shall be marked with the class, division and group of the apparatus to which it is to be connected.

(d) Simple Apparatus. "Simple Apparatus," as defined in Article 504, shall not be required to be marked with the class, division, group, temperature class, or ambient temperature range.

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

Panel Statement: The revisions to the proposed text were made for the following reasons:

The reference to 500.6(A) was changed to 500.6 to include dust in the marking requirement. The revision to 500.8(B)(4) Exception No.1 was for clarification and to complete the sentence. The Fahrenheit temperature was removed, as it was the only Fahrenheit temperature used in this section. Due to the relocation of 500.8(B)(4) Exception No. 2 to 500.8(B)(6)(d), Exception No. 1 was reidentified as 500.8(B)(4) Exception. Section 500.8(B)(4) Exception No. 2 was relocated so that it applies to all of the marking requirements. The revision to 500.8(B)(6)(a) and (b) was due to general-purpose equipment that may be used in Division 2 not having the specified ambient temperature range. The revision to 500.8(B)(6)(c) was made to enhance clarity.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-17 Log #481 NEC-P14 **Final Action: Accept in Principle**
(500.8(D))

Submitter: Vic Gournas, ISA-The Instrumentation, Systems and Automation Society

Comment on Proposal No: 14-24

Recommendation: 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 foot). Such conduit shall be made wrenchtight to prevent sparking when fault current flows through the conduit system and to ensure the explosionproof 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 full engaged for entries into explosionproof equipment. Threaded joints with factory

threaded NPT entries shall be made up with at least 4 1/2 threads fully engaged for entries into explosionproof equipment. Threaded joints with metric entries shall be made up with at least five threads fully engaged for entries into explosionproof equipment.

Substantiation: ISA disagrees with the Code-Making Panel 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 proposed. 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.

Justification for changes to NEC 500.8(D), 501.4(A) and 505.9(E):

Reducing the 5 thread engagement requirement specified within the NEC text for factory cut female NPT threads to 4 1/2 thread engagement, allows a more manufacturable product for worldwide use, and better alignment with the IEC product standard gauging practices for NPT threaded joints. This change allows manufacturers to gauge female NPT entries to a gauging practice of (0 to +1 turns of L1) for international use that than the currently restrictive gauging practice (+1/2 to + 1 turns of L1). This proposal will not affect field cut NPT threads, male or female.

Panel Meeting Action: Accept in Principle

Revise the proposed text to read:500.8(D) Threading. All NPT threaded conduit and fittings referred to herein shall be threaded with a National (American) Standard Pipe Taper (NPT) thread that provides a taper of 1 in 16 (3/4-in. taper per foot). Conduit and fittings shall be made wrenchtight to prevent sparking when fault current flows through the conduit system, and to ensure the explosionproof 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 entries into explosionproof equipment shall be made up with at least five threads fully engaged.

Exception: For listed explosionproof equipment, factory threaded NPT entries shall be made up with at least 4 1/2 threads fully engaged.

Panel Statement: The panel agrees with the submitter's substantiation but has limited its application to listed equipment with NPT threads only. The panel is concerned that there is less control over field installed-threads and thus has not extended the 4 1/2 thread provision to those installations. In addition, metric entries have not been included in this exception, as they are not tapered threads. These changes do not modify the requirement that threaded joints be made up wrenchtight.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

BRIESCH: The panel action should be to reject this comment and retain the requirement for 5 full thread engagement. This proposal is in direct conflict with ANSI requirements for both threading and gauging of NPT threads for not only hazardous locations electrical fittings, but general purpose electrical fittings, boxes and enclosures.

NPT electrical conduit and fitting threading and gauging practice is harmonized in ANSI/NEMA FB-1, ANSI/UL 1203, ANSI/UL 514A, ANSI/UL 50, ANSI/UL 6 and CSA C22.2 No. 0.5. A correctly formed NPT male thread will end a distance of L4 from the end of the conduit or fitting plus or minus the 1 turn gauging tolerance allowed by the standard. Obtaining 5 thread engagement of the female and male tapered NPT threads depends upon the correct thickness of the female wall for the thread pitch involved, the length of the threaded male fitting and forming the threads correctly to achieve the desired engagement. North American electrical fitting NPT thread forms are required by the above standards to be formed in a manner such that not less than 5 full threads can be achieved upon wrench-tight engagement. In the worst case, the female entry gauged at +1/2 and a male part gauged at -1 and made wrench-tight will engage 5 threads. It should be noted that there are requirements for general purpose boxes and enclosures that require 5 threads in the female entry in UL 514A, UL 50 and NEMA FB-1.

It should also be noted that installation documents are currently globally harmonized at 5 full threads engagement for explosionproof and flameproof tapered entry threads.

COOK: Based on the substantiation provided in Comment 14-23, it appears that this action would allow a product to be installed in a hazardous (classified) location that would not meet the product standards for ordinary locations.

WIRFS: Mr. Briesch and Mr. Cook have pointed out compelling substantiation to maintain the full five-thread engagement requirements and consistency with a large base of manufacturing standards. Until there is further substantiation to modify this requirement in a manner consistent with those standards, it should not be changed in the NEC.

ARTICLE 501 — CLASS I LOCATIONS

14-18 Log #654 NEC-P14 **Final Action: Accept**
(501)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-19a
Recommendation: The Technical Correlating Committee notes to the reader of the Report on Proposals that this proposal rennumbers 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The corrections have been made via the panel action on Comment 14-47. It is noted that the change directed for 501.15(F)(3)(b) is not necessary since that section has been eliminated via the panel action on 14-47.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-19 Log #655 NEC-P14 **Final Action: Accept**
(501.1)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-21

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel maintains that its action on Proposal 14-21 includes important information for this section. This text has been in previous editions of the NEC.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-20 Log #948 NEC-P14 **Final Action: Reject**
(501.3(B)(1) Exception (New))

Submitter: Dorothy Kellogg, American Chemistry Council
Comment on Proposal No: 14-22

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] General-purpose enclosures shall be permitted if current-interrupting contacts are

- (a) Immersed in oil, or
- (b) Enclosed within a chamber that is hermetically sealed against the entrance of gases or vapors, or
- (c) In nonincendive circuit, or
- (d) Part of a listed nonincendive component.

Substantiation: Since the current exception deals only with use of "general-purpose" enclosures for contacts, and not listed division 2 enclosures, the action of creating a replacement (d) under this "general-purpose condition, does not really address the installation outlined by the original proposal. The base paragraph (B)(1) deals with a Division 2 location, and the problem is the installation of a switch in an enclosure now requires that the enclosure to be identified for Division 1. Since Division 2 enclosures now exist, the current text of (B)(1) would not permit the switch to be mounted in that Division 2 enclosure, which is the desired installation. The action taken by the panel action would permit a general-purpose enclosure if the current-interrupting contacts were listed for Division 2, which seems also acceptable. However, the suggested change does not seem to address the intended installation (in a Division 2 location, mount a switch in a Division 2 enclosure) which should be acceptable.

Panel Meeting Action: Reject

Panel Statement: The evaluation for Class I, Division 2 locations is based on the enclosure plus the contained equipment.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-21 Log #1935 NEC-P14 **Final Action: Accept**
(501.3(C)(3))

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

Comment on Proposal No: 14-37

Recommendation: Accept the proposal in principle. Revise as follows:

“Except for listed cable sealing fittings, the thickness of the sealing compound in a completed seal shall not be less than the metric designator (trade size) of the sealing fitting expressed in the units of measurement employed, and in no case less than 16 mm (5/8 in.)”

Substantiation: This comment is technically correct and in accord with the Style Manual and 90.9. The fact that metric designators (trade sizes) are pure numbers without dimensions is a problem from time to time as the NEC works through the metrication process. The wording here is based on the CMP 9 solution to the same issue in 314.28(A).

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-22 Log #480 NEC-P14 **Final Action: Accept**
(501.4(A))

Note: The Technical Correlating Committee notes that the proper panel action is “Accept in Part” based on the action on Comment 14-17.

Submitter: Vic Gourmas, ISA-The Instrumentation, Systems and Automation Society

Comment on Proposal No: 14-24

Recommendation: 501.4(A) Class 1, Division 1.

(1) General. In Class 1, 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 least five threads fully engaged.

Substantiation: ISA disagrees with the Code-Making Panel 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 proposed. 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.

Justification for changes to NEC 500.8(D), 501.4(A) and 505.9(E):

Reducing the 5 thread engagement requirement specified within the NEC text for factory cut female NPT threads to 4 1/2 thread engagement, allows a more manufacturable product for worldwide use, and better alignment with IEC product standard gauging practices for NPT threaded joints. This change allows manufacturers to gauge female NPT entries to a gauging practice of (0 to +1 turns of L1) for international use rather than the currently restrictive gauging practice (+ 1/2 to +1 turns of L1). This proposal will not affect field cut NPT threads, male or female.

Panel Meeting Action: Accept

Panel Statement: The panel action on Comment 14-17 has placed the thread engagement requirement into 500.8(D).

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

BRIESCH: The panel action should be to reject this comment. See explanation of negative vote on Comment 14-17.**Comment on Affirmative:**

COOK: See my explanation of negative vote on Comment 14-17. I am not opposed to providing the treading requirements in 500.8(D); however, I do not agree with the change made to the requirement in Comment 14-17.

14-23 Log #3284 NEC-P14 **Final Action: Accept in Principle**
(501-4(A)(1)(a))

Submitter: Donald Ankele, Underwriters Laboratories Inc.

Comment on Proposal No: 14-24

Recommendation: Support the Panel Action to reject this proposal.

Substantiation: The substantiation provided by the submitter is incorrect.

Substantiation for Comment - This proposal is an attempt to address a commercial manufacturing issue in the installation code instead of complying with the product standard. This proposal is in direct conflict with ANSI requirements for both threading and gauging of NPT threads for not only hazardous locations electrical fittings, but general purpose electrical fittings, boxes and enclosures, and seeks to allow male NPT thread constructions that do not conform to ANSI/ASME B1.20.1.

The submitter correctly describes the current North American practice for the NPT entry thread form and modified gauging. However, the submitter also states that shouldered fittings having a male NPT threaded length to the shoulder of less than the L4 dimension given in ANSI/ASME B1.20.1 may not correctly engage the modified female thread form in some instances. A fitting or conduit not threaded to the L4 length does not comply with the thread form requirements in ANSI/ASME B1.20.1.

The submitter is incorrect in the statement that there are currently no standards that address this condition. NPT electrical conduit and fitting threading and gauging practice is harmonized in ANSI/NEMA FB-1, ANSI/UL1203, ANSI/UL514A, ANSI/UL 50, ANSI/UL 6 and CSA C22.2 No. 0.5. A correctly formed NPT male thread will end a distance of L4 from the end of the conduit or fitting plus or minus the 1 turn gauging tolerance allowed by the standard.

Obtaining 5 thread engagement of the female and male tapered NPT threads depends upon the correct thickness of the female wall for the thread pitch involved, the length of the threaded male fitting and forming the threads correctly to achieve the desired engagement. North American electrical fitting NPT thread forms are required by the above standards to be formed in a manner such that not less than 5 full threads can be achieved upon wrench-tight engagement. It should be noted that there are requirements for general purpose boxes and enclosures that require 5 threads in the female entry in UL 514A, UL 50 and NEMA FB-1.

It must be noted that installation documents are currently globally harmonized at 5 full threads engagement for explosionproof and flameproof tapered entry threads.

The submitter has not provided substantiation for the suitability of 3-1/2 threads for all trade sizes to support utilization equipment such as luminaires, the affects of corrosion on unengaged unprotected threads on steel conduit, nor substantiation that the proposed thread engagement will not pose a thermal or arcing source of ignition under ground fault conditions in a Division 1 location.

Panel Meeting Action: Accept in Principle

Panel Statement: The panel agrees with the submitter that the thread engagement requirement should not be reduced to 3 1/2 threads. However, the substantiation provided in Comment 14-17 has convinced the panel that changing the thread engagement requirement to 4 1/2 threads for limited applications is appropriate. See panel action and statement on Comment 14-17.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

BRIESCH: The panel action should be to accept this comment and retain the requirement for 5 thread engagement. See explanation of negative vote on Comment 14-17.

COOK: I agree with the recommendation and substantiation provided. This comment should be accepted. The action taken in Comment 14-17 would allow a product to be installed in a hazardous (classified) location that would not meet the product standards for ordinary locations.

14-24 Log #1250 NEC-P14 **Final Action: Reject**
(501-4(A)(1)(d))

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

Comment on Proposal No: 14-25

Recommendation: This proposal should be Accepted in Principle. Do not delete (A)(1)(d) as the proposal suggests, but rather add a second and third paragraph to read:

The name(s) of the qualified person(s) shall be kept in a permanent record at the office of the establishment in charge of the completed installation and at the office of the Authority Having Jurisdiction. Notification of any changes in the employment of the designated qualified person(s) shall be made to the office of the Authority Having Jurisdiction.

A person designated as a qualified person shall possess the skills and knowledge related to the construction and operation of the electrical equipment and installation and shall have received documented safety training on the hazards involved. Documentation of their qualifications shall be on file with the office of the Authority Having Jurisdiction and the office of the establishment in charge of the completed installation.

Substantiation: It was not necessarily my desire to have the wording in (A)(1)(d) deleted, if the wording could be changed to include prescriptive requirements that could ensure that qualified persons are actually performing the maintenance and supervision as required by (A)(1)(d). The National Electrical Code is a prescriptive code and it is the technical committees' responsibility to ensure that prescriptive requirements are present for the Authority Having Jurisdiction to use. The Panel Statement is correct in that all of the listed company policies and procedures COULD ensure that qualified persons service the installation. While I applaud your faith in human nature, I question your judgment in relaxing safety requirements based on good faith. Give the Authority Having Jurisdiction code requirements that can be enforced.

It is difficult to understand how it is possible to relax requirements for safety in a Code that tells us in 90.1(B), “this Code contains provisions that are considered NECESSARY for safety.” This section further states that “Compliance therewith and proper maintenance will result in an installation that is ESSENTIALLY free from hazard but NOT NECESSARILY efficient, convenient, or ADEQUATE for good service or future expansion of electrical use.” It appears to me that this tells us that these requirements are the MINIMUM requirements for safety and anything less will result in an installation that is NOT FREE FROM HAZARD.

Proponents of this travesty, knowing the truth in this, attempt to circumvent the obvious degradation of safety by using phraseology such as “the installation is under engineering supervision” or “a qualified person will monitor the system.” What is monitoring the installation? What does engineering supervision mean?

I have submitted several proposals to delete these exceptions to requirements for safety but they were all rejected. Perhaps in the comment stage, enough persons will comment in favor of accepting these proposals or at least accepting them in a manner where some prescriptive requirements will be added to accurately describe what "engineering supervision" entails. What does "monitoring" the installation mean, what type of record keeping is necessary to assure compliance, what is a "monitor" or what is a "qualified person?" How is documentation of the qualifications and presence of a "qualified person" accomplished by the Authority Having Jurisdiction?

Without these prescriptive requirements, these exceptions to the requirements for safety appear to be "just another subterfuge to avoid compliance with the safety requirements of the National Electrical Code without regard to putting persons and equipment at risk."

Panel Meeting Action: Reject

Panel Statement: The enforcement of this requirement is the responsibility of the authority having jurisdiction. How the AHJ monitors this requirement is outside the scope of the NEC. The concepts that the submitter has introduced in this comment have not had public review during the ROP phase.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-25 Log #656 NEC-P14
(501.4(B)(1))

Final Action: Reject

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-27

Recommendation: 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.

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: Reject

Panel Statement: The panel action on Comment 14-31 has removed the proposed new text on rigid nonmetallic conduit.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-26 Log #1235 NEC-P14
(501.4(B)(1))

Final Action: Accept

Submitter: Donald A. Ganiere Ottawa, IL

Comment on Proposal No: 14-27

Recommendation: Panel should reject this proposal.

Substantiation: There was no technical substantiation provided to show that the use of rigid nonmetallic conduit is safe in Class I, Division 1 locations.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-27 Log #1370 NEC-P14
(501.4(B)(1))

Final Action: Accept

Submitter: James W. Carpenter, International Association of Electrical Inspectors

Comment on Proposal No: 14-27

Recommendation: Panel should reject proposal 14-27.

Substantiation: The proposal does not provide adequate substantiation for the proposed change. No fact-finding report was provided to substantiate the change.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-28 Log #2874 NEC-P14
(501.4(B)(1))

Final Action: Accept

Submitter: William A. Wolfe, Steel Tube Institute of North America

Comment on Proposal No: 14-27

Recommendation: Reject this proposal.

Substantiation: The submitter has provided no technical substantiation as to why the requirement for concrete encasement of rigid nonmetallic conduit should be deleted in Class I, Division 2 hazardous locations. He merely states that his proposal provides the option of using a conduit system that is

corrosion resistant and "safe". There have obviously been good reasons for requiring concrete encasement and 24 inches of cover for this wiring method and the submitter has provided no information as why it is now "safe" to use RNC without these safeguards. The metal wiring methods currently allowed are also corrosion resistant and can be made even more so with supplementary corrosion protection. These raceways can be PVC coated, wrapped or painted. Rigid nonmetallic wiring methods have corrosion issues in certain chemical environments.

This proposal allows the use of any rigid nonmetallic conduit. Article 352 covers Schedule 40 and Schedule 80 PVC conduit, Fiberglass Conduit, HDPE conduit, etc. Are the characteristics of all of these types of RNC suitable for use in a hazardous locations without concrete encasement? Will a glued connection provide the strength required in all of these types of hazardous locations? Are the temperature limitations of RNC products a factor in hazardous locations? The submitter has not addressed these types of issues which do not represent the same concerns when a product is concrete-encased and buried under 24 inches of cover.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-29 Log #2917 NEC-P14
(501.4(B)(1))

Final Action: Reject

Submitter: David H. Kendall, Carlon

Comment on Proposal No: 14-27

Recommendation: Continue to Accept in Principle this proposal with the following revision to the Panels proposed text:

(3) Corrosive Atmospheres: Schedule 80 Rigid Nonmetallic Conduit with an equipment grounding conductor is permitted in corrosive atmospheres when under conditions of maintenance and supervision that ensure only qualified persons monitor and supervise the system.

Substantiation: Corrosion is a serious safety problem on off shore drilling rigs and in chemical plants. Metal conduit will corrode away even when it has been galvanized or coated with PVC. When metal conduit corrodes it will no longer maintain its physical ability to protect the conductors or cables nor be able to act as an equipment grounding conductor.

Schedule 80 Rigid Nonmetallic Conduit is a heavy duty conduit that has been evaluated and listed for areas of physical damage. Schedule 80 RNC when installed in accordance with Article 352 will not bend and provide the physical strength and integrity in areas prone to damage. The proposed language adopts text found in 314.50 Exception that limits the use to those areas that are monitor by qualified persons. Also a title and text was added to indicate that Schedule 80 RNC is only permitted in corrosive atmospheres.

The Fine Print Note was deleted per the TCC recommendation.

Panel Meeting Action: Reject

Panel Statement: The panel believes that there are several problems with acceptance of RNC as a wiring method in Division 2 locations even as limited by this comment. They include: Insufficient substantiation as to physical strength and integrity of the proposed conduit type; lack of limitations; suitability of "solvent wipe" conduit connections, fire and smoke considerations, the unaddressed issues of the required changes to other existing Code sections such as modifications to sealing and the bonding of metallic boundary seals in a RNC system.

While it is acknowledged that certain installations, particularly in corrosive environments, may benefit from a non-metallic conduit alternative, to ensure that the wiring methods employed in a classified location provide the level of integrity and safety necessary, the concerns indicated above must be addressed and resolved before this type of addition to acceptable wiring methods should be made.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-30 Log #3278 NEC-P14
(501.4(B)(1))

Final Action: Accept

Submitter: Christopher R. Pharo Marlton, NJ

Comment on Proposal No: 14-27

Recommendation: I urge that the panel reject this proposal.

Substantiation: RNC has a place in the code when it comes to underground installations, there is probably no other product better suited to handle moisture and certain environmental conditions. However, Class 1 Division 2 locations are not the place for RNC to be installed.

1. RNC becomes brittle in cold temperatures - 352.10 FPN. "RNC shall not be used where subject to physical damage" - 352.12(C). Why should we allow a raceway to be installed in areas that are subject to physical damage when the raceway cannot handle the abuse? We cannot. A tradesman dropping a wrench or purposely standing on RNC will undoubtedly damage the raceway. Rigid steel conduit or Intermediate metallic conduit has been proven to handle this daily abuse.

2. RNC sags in high temperatures. Why should we install a raceway that under high temperatures due to sunlight exposure in the summer will belly or sag between supports? We cannot. RSC and IMC can handle the summer heat with no adverse effects.

3. RNC expands and contracts due to temperature changes - 352.44. Is there a listed expansion joint for RNC to be used in Class 1, Div. 2 locations? There is not. RSC and IMC experience only slight expansion and contraction and no joints are necessary.

4. How do we install a conduit seal in RNC? If a metallic conduit seal is used, then it must be bonded. How do we bond metal in a run of plastic? We would have to ty wrap the bonding cable to the outside of the conduit and create a way of bonding these metallic fittings. Is this bonding conductor suitably protected now? These are all questions that should be addressed before this proposal goes any further. By the way, conduit seals installed in RSC or IMC are an integral part of the raceway system.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-31 Log #3281 NEC-P14
(501.4(B)(1))

Final Action: Accept

Submitter: David Soffrin, American Petroleum Institute

Comment on Proposal No: 14-27

Recommendation: Delete the proposed wording, "rigid nonmetallic conduit with an equipment grounding conductor" from permitted wiring methods in Class I, Division 2.

Substantiation: The blanket addition of Rigid Nonmetallic Conduit as an acceptable wiring method in all Division 2 locations is too broad, wide reaching, and all inclusive. Areas of concern include, the variety and differences in materials that qualify as RNC, integrity of RNC conduit connections, limitations of RNC physical strength and properties, particularly in hot and cold locations, radio interference and cross talk between power & instrumentation, the effect of this change to numerous other Code sections that were not addressed in the proposal, and the lack of any limitations on its use. This comment is in support of the negative votes to the panel action contained in the ROP.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-32 Log #3304 NEC-P14
(501.4(B)(1))

Final Action: Accept

Submitter: J. Joseph Dodds, Robroy Industries

Comment on Proposal No: 14-27

Recommendation: Recommend that the proposal be rejected.

Substantiation: The primary purpose of a conduit system is to provide physical protection and security for the enclosed wiring and cable. Compromising this purpose in any way results in a concern for human safety. The proposal accentuates the high degree of corrosion protection provided by nonmetallic conduit, but ignores the other extremely important aspects of wire and cable protection. Before adding nonmetallic conduit to Class I, Division 2 wiring methods, the other aspects of wire and cable protection must be carefully considered.

The following items are recommended for consideration:

1. Conduit is installed as a wire/cable protection system, not individual sections of conduit that must withstand corrosion in unique applications. The connections must withstand the rigors of the application; a connection failure can result in a catastrophic failure. The connections used with metal conduit systems have a long and successful application history in numerous corrosive environments. Long-term data to confirm the performance of the nonmetallic conduit system connections are not presented to substantiate the recommendation.

2. Installation of a metal conduit system can be confirmed by an electrical continuity test. If a connection is not properly assembled, the measured resistance will be high. Since a nonmetallic conduit connection is not conductive, a method to confirm the connection integrity should be presented to substantiate the safety of a nonmetallic conduit system. In addition, the electrical conductivity of a metal conduit system can be used as a long-term test to evaluate connection integrity or to confirm the integrity of a re-made connection.

3. Nonmetallic conduit does not provide EMI/RFI shielding for the enclosed wires and cable; metal conduit provides the shielding that can be an important safety consideration, especially in our current social environment where terrorism is a threat. Interference and false signaling with the wiring or cable enclosed within the conduit could be catastrophic.

4. The thermal conductivity of nonmetallic conduit is much lower than steel conduit. This will affect the ampacity and heat dissipation for the wire and cable that is enclosed. This performance aspect is not addressed in the proposal.

5. The failure modes of nonmetallic conduit are different from metal conduit. If a high impact load is applied to metal conduit, the conduit will be deformed, but still functional. If a high impact load is applied to nonmetallic conduit, the conduit may fracture and the physical protection and security of the conduit system is compromised. The difference in failure mode is not evaluated in the proposal.

6. In addition to superior corrosion resistance, coated steel conduit systems provide all the performance advantages mentioned in Items 1-5. This proposal

is made as if there is no metal conduit system currently available that provides adequate corrosion protection. Coated steel conduit systems have a successful history in all of the environments mentioned in the substantiation for nonmetallic conduit.

Before adopting this recommendation to add nonmetallic conduit to Class I, Division 2 wiring methods, we strongly recommend that technical responses be generated to address the issues presented above. Without confirmation data, the safety risks in this application are an unknown.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-33 Log #941 NEC-P14
(501-4(B)(1)(3) (New))

Final Action: Reject

Submitter: Dorothy Kellogg, American Chemistry Council

Comment on Proposal No: 14-27

Recommendation: Under (1) General, add new (3) as follows and renumber the existing items beginning with the current (3) accordingly:

(3) Rigid nonmetallic conduit listed for use in a Class I, Division 2 or Unclassified Location as being sunlight resistant, resistant to the spread of fire, and designed to protect the cable from physical damage, and run with an appropriately sized equipment grounding conductor.

Substantiation: The suggested modifications to require the use of a listed rigid nonmetallic conduit that is designed to protect the cable from physical damage will result in the establishment of an appropriate product standard that will address the issues raised by the individual committee members votes. Thus, for example, while it is true that there are many types of rigid nonmetallic conduit available, under the modified wording only that product meeting the listing requirement would be permitted to be used in this application. We would anticipate that this listing would also require some type of marking to better enable this distinction to be made. Since this is a Division 2 application, there is no reason that a solvent made connection would be less secure than a threaded connection. Clearly, within a Division I condition, where threaded connections is required, the solvent connection would not be acceptable. Further, while it is common and good practice to use threaded conduit even in Division 2 locations, there is not an NEC requirement that this be done. Additionally, since a separate equipment ground is required with this rigid nonmetallic conduit, the issues associate with continuity afforded by the conduit system would not be an issue. So again, the nonmetallic connection only needs to be secure, and tight for integrity reasons. The aspects of affording physical protection to the cable are clearly an important aspect regarding the use of such a product in a Division 2 location. With the modified wording, the product standard that will need to be developed to address this NEC application will have to develop the testing criteria for this condition. The panel should not rule out the use of this listed rigid nonmetallic conduit application on the basis that it has not been tested or that such a variety could not be manufactured. As an example, Type "Schedule 80" pvc rigid nonmetallic already is considered by its product standard as being suitable for use in areas where subject to physical damage. There is no certainty that metallic conduit will not be bent, damaged, corroded, or be otherwise compromised to question its ability to perform as it was originally intended. However, with the listing, both metallic and nonmetallic will be placed at the same starting point. Sealing aspects could also be addressed by the same condition as metallic since the NEC does not require those seals to be explosionproof, unless the listing requirement stated otherwise. While it may be true that nonmetallic may be more effected by elevated temperatures than might metallic, only the user knows what the operating environment conditions may be and in the same way the user selects an appropriate wiring or cabling method, so too, does a similar need exist for metallic or nonmetallic. Clearly, users with intrinsic safe, nonincendive systems, or areas containing corrosive atmospheres would welcome an opportunity to use a listed rigid nonmetallic conduit that could safely be used in a Division 2 location. Often times, if the opportunity door is shut for an application, there is little chance that a product will be developed for that application. In this case, action to support this modified text will enable the development of both the product and the testing standard to proceed, as there definitely is a need for this product.

Panel Meeting Action: Reject

Panel Statement: The submitter's proposed text does not address all of the panel's concerns related to installing RNC in Class I, Division 2 locations and being able to comply with all of the installation requirements. One of the concerns is the integration of boundary seals into runs of RNC. Also, the proper grounding and bonding of isolated metal fittings and isolated metal conduit is a potential problem that the submitter's comment has not addressed. Where expansion and contraction occur, Article 352 requires the use of expansion fittings, and there is no evidence that the expansion fittings currently available are suitable for use in Class I hazardous (classified) locations.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

WECHSLER: We are voting against the Panel action and feel that the Panel should have accepted this comment in principle with the following additional wording (shown underlined):

Under (1) General, add new (3) as follows and renumber the existing items beginning with the current (3) accordingly:

(3) In industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons service the installation, rigid nonmetallic conduit with appropriate fittings and seals, all listed for use in a Class I, Division 2 or Unclassified Location as being sunlight resistant, resistant to the spread of fire, and designed to protect the cable from physical damage, and run with an appropriately sized equipment grounding conductor.

While the initial proposal was vague, the current comment addresses all Panel concerns. For example, the suggested modifications to require the use of a listed rigid nonmetallic conduit that is designed to protect the cable from physical damage will result in the establishment of an appropriate product standard that will address the issues raised by the individual committee members votes. Thus, for example, while it is true that there are many types of rigid nonmetallic conduit available, under the modified wording only that product meeting the listing requirement would be permitted to be used in this application. We would anticipate that this listing would also require some type of marking to better enable this distinction to be made. Since this is a Division 2 application, there is no reason that a solvent made connection would be less secure than a threaded connection. Clearly, within a Division 1 condition, where threaded connections are required, the solvent connection would not be acceptable. Further, while it is common and good practice to use threaded conduit even in Division 2 locations, there is not a NEC requirement that this be done.

Additionally, since a separate equipment ground is required with this rigid nonmetallic conduit, the issues associate with continuity afforded by the conduit system would not be an issue. So again, the nonmetallic connection only needs to be secure, and tight for integrity reasons. The aspects of affording physical protection to the cable are clearly an important aspect regarding the use of such a product in a Division 2 location. With the modified wording, the product standard that will need to be developed to address this NEC application will have to develop the testing criteria for this condition. The panel should not rule out the use of this listed rigid nonmetallic conduit application on the basis that it has not been tested or that such a variety could not be manufactured. As an example Type "Schedule 80" pvc rigid nonmetallic already is considered by its product standard as being suitable for use in areas where subject to physical damage. There is no certainty that metallic conduit will not be bent, damaged, corroded, or be otherwise compromised to question its ability to perform as it was originally intended. However, with the listing, both metallic and nonmetallic will be placed at the same starting point. Sealing aspects could also be addressed by the same condition as metallic since the NEC does not require those seals to be explosionproof, unless the listing requirement stated otherwise. While it may be true that nonmetallic may be more effected by elevated temperatures than might metallic, only the user knows what the operating environment conditions may be and in the same way the user selects an appropriate wiring or cabling method, so too, does a similar need exist for metallic or nonmetallic. Clearly, users with intrinsic safe, nonincendive systems, or areas containing corrosive atmospheres would welcome an opportunity to use a listed rigid nonmetallic conduit that could safely be used in a Division 2 location. Often times, if the opportunity door is shut for an application there is little chance that a product will be developed for that application. In this case, action to support this modified text will enable the development of both the product and the testing standard to proceed, as there definitely is a need for this product.

14-34 Log #657 NEC-P14
(501-4(B)(1)(5))

Final Action: Accept in Part

Note: It was the action of the Technical Correlating Committee that 727.4(3) be revised to read as follows:

"In hazardous locations where permitted by 501.10, 502.10, 503.10, 504.20, 504.30, 504.80 and 505.15 and where installed within the parameters of the uses permitted in 727.4."

The Technical Correlating Committee has revised the text to remove the circular references. The panel is incorrect in their statement in that 501.10 simply states that you can use ITC in accordance with 727.4, however 727.4(3) is specific to hazardous locations and simply says you use the cable as permitted in 501.10. This circular reference does not make it clear that the balance of the uses permitted in 727.4 must be followed.

The Technical Correlating Committee revision corrects that oversight.
Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-29

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept in Part

Panel Statement: The panel has reconsidered the issue brought forth in the TCC comment but does not see that the cross-references in Articles 501 and 727 create a circular reference. Article 501 provides the enabling text for Type

ITC cable to be installed in Class I locations.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-35 Log #939 NEC-P14
(501-4(B)(1)(5))

Final Action: Accept

Note: See Technical Correlating Committee Note on Comment 14-34.

Submitter: Dorothy Kellogg, American Chemistry Council

Comment on Proposal No: 14-29

Recommendation: Continue to support the replacement of the term "open wiring" with the text modifications contained within the actions as taken during the ROP stages by the Committee on this proposal.

With respect to the comments of the Technical Correlating Committee and a voting Committee member regarding the suggested circular reference, it would appear that under the current NEC Style Manual, the committee overseeing Article 727 has the ability to permit the use of ITC within other articles of the NEC. If those committees overseeing these other articles also agree. Both articles must provide the permission under the current style. In the current 501-4(B)(1) General - it states "In Class I, Division 2 locations, the following wire methods shall be permitted." Item (5) of this section states "Type ITC cable in cable trays, in raceways etc." In 727-4 Uses permitted include a listing consisting of cable tray, in raceways, in hazardous (classified) locations as permitted in 501-4, 502-4, etc." both articles contain the same permissive wording. The current and past editions of the NEC which were reviewed for consideration of this comment, in addressing type PLTC which was the basis for type ITC, stated in 501-4(B)(1)(4) "type PLTC cable in accordance with the provisions of Article 725, or in cable trays...". In Article 725, 725-61(D)(1) states "Type PLTC. Cable installed in hazardous (classified) locations shall be Type PLTC. Where the use of Type PLTC cable is permitted by 501.4(B)...the cable shall be permitted in cable trays, in raceways...". However, unlike the format of Article 725 which deals with many types of cables, Article 727 addresses only a single cable type and further this article does not have a section dealing with hazardous (classified) locations. The appropriate sections in Chapter 5, Article 501, 502, etc. and those in Article 727 agree with this basic "permissive" format for PLTC which has existed for some time without a problem or suggestion of circular references. Additionally, as expressed by the comment in the committee member vote, the committee action does better address the use of Type ITC cable in hazardous locations that the former text did. This was an objective of the original proposal offered for consideration.

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 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 articles 300.16(A); 312.5(B); 314.17(B), and 314.17(C).

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-36 Log #658 NEC-P14
(501.4(B)(2))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-30

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Revise proposed text for 501.4(B)(2) to read: (2) Flexible Connections. Where provision must be made for limited flexibility, one or more of the following wiring methods shall also 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: The panel has added the word "also" to indicate that methods (1) through (5) are in addition to the wiring methods described in 501.4(B)(1). The panel has also removed the words "wiring method" since not all of the items described in (1) through (5) are wiring methods.

Number Eligible to Vote: 15**Ballot Results:** Affirmative: 1514-37 Log #3687 NEC-P14
(501.4(B)(2))**Final Action: Reject****Submitter:** George W. Flach, National Armored Cable Manufacturers Assn.
Comment on Proposal No: 14-30**Recommendation:** Accept the inclusion of AC cable as originally proposed so that the text of 501.4(B)(2) as revised by the panel will 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) Type AC cable containing an insulated equipment grounding conductor with listed fittings

(6) 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

Substantiation: Responding to the panel's request for technical substantiation in the form of a construction comparison to currently permitted wiring methods. The construction of AC cable is equal to or exceeds that of Flexible Metal Conduit and MC cable which are currently permitted. The UL required thickness of the armor on AC is 0.025 to 0.034 inch. The thickness for the equivalent sized Flexible Metal Conduit is 0.025 to 0.030 inch, and the thickness of MC, which is not specified by UL, is 0.017 inch and lower. Type AC is as substantial in construction as currently permitted wiring methods and should be included.**Panel Meeting Action: Reject****Panel Statement:** The performance requirements for Type MC cable in UL 1569 exceed the performance requirements for Type AC cable in UL 4.**Number Eligible to Vote:** 15**Ballot Results:** Affirmative: 1514-38 Log #2966 NEC-P14
(501.5(A)(4) Exception No. 2 (New))**Final Action: Reject****Submitter:** Craig M. Wellman, Newark, DE**Comment on Proposal No:** 14-32**Recommendation:** The CMP should accept Proposal 14-32, revised to read as follows:

Exception No. 2: A conduit system terminating in an unclassified or Division 2 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 into the Division 2 location or into the Unclassified location. The Unclassified or Division 2 location where the wiring method transition is made shall be outdoors or if the conduit system is all in one room, it shall be permitted to be indoors. Conduit seals shall be installed where required by other parts of this section.

Substantiation: The panel statement expresses concern about gases passing down secondary wiring to an area where a source of ignition might be present. As shown on Figure 1, there is no reason to believe the gases will pass up the conduit from the Division 1 location, through the Division 2 location to the Unclassified location at the cable tray. There is no driving force to push or pull the gases. Similarly, there is no reason to believe that gases will enter the cable end in the pushbutton station termination compartment and pass through the cable.

The revision to the proposed text recognizes that the situation is the same if the cable tray is in a Division 2 location and the conduit runs from a Division 1 location to a Division 2 location. This case is illustrated in Figure 2. It also recognizes that this exception should be applicable where factory sealed explosion proof enclosures are provided.

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

Panel Meeting Action: Reject**Panel Statement:** The conduit system within a Class I, Division 1 location is essentially an extension of the explosionproof enclosure which is completed by the boundary seal. The lack of a boundary seal compromises the integrity of the explosionproof conduit system.

Under the conditions specified in 501.5(B)(2) Exception No. 2, the boundary seal can be omitted where a transition is made from a Division 2 to an unclassified location.

Number Eligible to Vote: 15**Ballot Results:** Affirmative: 1514-39 Log #940 NEC-P14
(501.5(B) Exception No. 2)**Final Action: Accept****Submitter:** Dorothy Kellogg, American Chemistry Council**Comment on Proposal No:** 14-33**Recommendation:** Continue to support the actions as taken during the ROP stages by the committee on this proposal.**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 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:** 15**Ballot Results:** Affirmative: 1514-40 Log #947 NEC-P14
(501.5(B)(2))**Final Action: Accept in Principle****Submitter:** Dorothy Kellogg, American Chemistry Council**Comment on Proposal No:** 14-34**Recommendation:** Continue to support the text changes as suggested by the actions as taken during the ROP stages by the panel on this proposal.**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 the same type of 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 with the Division 2 portion of the conduit from being communicated to the conduit beyond the seal". However, it is now common practice to require explosionproof seals. Explosionproof seals are expensive and make it difficult to modify wiring once installed. This proposal will make it clear that explosionproof seals are not required as boundary seals between Division 2 and unclassified locations.**Panel Meeting Action: Accept in Principle****Panel Statement:** See panel action and statement on Comment 14-43.**Number Eligible to Vote:** 15**Ballot Results:** Affirmative: 1514-41 Log #1236 NEC-P14
(501.5(B)(2))**Final Action: Reject****Submitter:** Donald A. Ganiere Ottawa, IL**Comment on Proposal No:** 14-34**Recommendation:** Panel should reject this proposal.**Substantiation:** The comments of Mr. Cook need to be addressed before this change is accepted. We need guidance in the field as to the acceptable methods that can be used to "minimize the passage of gasses or vapors." Anything that is placed in the raceway will reduce or "minimize" the passage of gasses or vapors. What level of minimization is required for a safe installation?**Panel Meeting Action: Reject****Panel Statement:** The panel action on Comment 14-43 addresses the concerns expressed in the substantiation.**Number Eligible to Vote:** 15**Ballot Results:** Affirmative: 15

14-42 Log #1369 NEC-P14 **Final Action: Reject**
(501.5(B)(2))

Submitter: James W. Carpenter, International Association of Electrical Inspectors

Comment on Proposal No: 14-34

Recommendation: Reject proposal as submitted.

Substantiation: Although the necessity for the boundary seal to be explosion-proof might not be required, IAIE does not agree with the proposed text, which provides no guidance as to what is an acceptable seal. The standard for sealing fittings (UL 886) includes a pressure test of .007 cubic ft of air per hour at a pressure of 6 inches of water to insure that passage of gas is minimized. All seals that have been evaluated to that standard are also explosionproof. If other seals are acceptable, but no specific requirements are provided, the AHJ would have no basis for approval.

Panel Meeting Action: Reject

Panel Statement: The panel action on Comment 14-43 addresses the concerns expressed in the substantiation.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

COOK: The panel action for this comment, based on the panel discussion and action on Comment 14-43, should be accept in principle. The panel action in Comment 14-43 to allow a seal that was not explosionproof is subject to the seal being identified for the purpose. That purpose is to minimize the passage of gas. It has already been determined in the standard for sealing fittings (UL 886), what must be done to assure that is accomplished. The requirement for identified seals allows the AHJ to require seals that are listed to accomplish that purpose, or if the AHJ is comfortable with one of the other options related to identified equipment to choose that option. The original proposal, 14-34, was to allow a nonexplosionproof seal and provide no guidance for what was required. That concept has not been accepted in Comment 14-43. The recommendation to reject Proposal 14-34 as submitted, has been done, therefore, this comment should at least be accepted in principle, or possibly just accepted.

14-43 Log #1932 NEC-P14 **Final Action: Accept in Principle in Part**
(501.5(B)(2))

Note: It was the action of the Technical Correlating Committee that the panel action be revised to read as follows:

“Such seals shall not be required to be explosionproof, but shall be identified for the purpose of minimizing passage of gases under normal operating conditions and shall be accessible.”

This revision is consistent with Mr. Cook's affirmative comment on vote and is consistent with the direction given by the Technical Correlating Committee to all panels that required that the use of the term “for the purpose” must include what purpose is being identified.

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

Comment on Proposal No: 14-34

Recommendation: Accept the proposal in principle. Restate the rule as :”Such seals shall be approved, but they shall not be required to be explosionproof.” In addition to the proposed text, add the following fine print note:

“FPN: Electrical sealing putty is a method of sealing.”

Substantiation: This comment is in response to comments in the voting. There is a long history of the use of compounds to prevent the passage of vapor, as is required in 300.7(A) when there is a temperature/moisture differential. The proposed fine print note occurs in 502.5. I am unaware of any significant field problem with bubble gum or paper towels being used for this purpose. This comment, however, allows the AHJ to review the sealing method.

Panel Meeting Action: Accept in Principle in Part

Revise the text proposed in the comment to read:Such seals shall not be required to be explosionproof but shall be approved identified for the purpose and shall be accessible.

“FPN: Electrical sealing putty is a method of sealing.”

Panel Statement: In order to ensure that performance requirements for the seal are quantified, the panel has amended the proposed text to use “identified” instead of “approved”. The panel rejected the proposed FPN because there is no assurance that this method will achieve the necessary performance for the seal. The panel has also included an accessibility requirement for these seals because this was necessary based on the action taken on Comment 14-44.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

COOK: I agree with the panel action, but believe the text should read as follows:

“Such seals shall not be required to be explosionproof but shall be identified for the purpose of minimizing the passage of gases and shall be accessible. The added text provides clarification for the purpose of the identification.

14-44 Log #983 NEC-P14 **Final Action: Accept in Principle**
(501.5(C))

Submitter: Dorothy Kellogg, American Chemistry Council

Comment on Proposal No: 14-36

Recommendation: Revise to read:

(C) Class I Divisions 1 and 2. Where explosionproof sealing fittings are

required, in Class I, Division 1 and 2 locations, the fittings seals in Class I, Division 1 and 2 locations shall comply with 501.5(C)(1) through (C)(6).
Substantiation: The Code already recognizes that a need for sealing but not that all sealing must be accomplished with an explosionproof seal. The proposed action on Proposal 14-34 makes this condition quite clear. (Revised statement - “Conduits shall be sealed to minimize passage of gases or vapors within the Division 2 portion of the conduit from being communicated in the conduit beyond the seal. Such seals shall not be required to be explosionproof.”) Additional examples may be found in 504.70. Yet the requirements for seals in Class 1, Division 1 and Division 2 locations are contained within 501.5(C) and these are in fact the characteristics of an explosionproof seal. So while in several places the Code indicates that an explosionproof seal is not needed, what is now required is applying 501.5(C), a listed explosionproof seal. The intent of this proposal is to clarify that only explosionproof seals are required to meet 501.5(C). Further, no technical requirements for explosionproof seals are deleted by this proposal, as suggested in the panel comment.

Panel Meeting Action: Accept in Principle

Revise text proposed in the comment to read: (C) Class I, Divisions 1 and 2. Seals installed in Class I, Division 1 and Division 2 locations shall comply with 501.5(C)(1) through (C)(6).

Exception: Seals not required to be explosionproof in accordance with 501.5(B)(2) or 504.70.

Panel Statement: The term “explosionproof seal” is not defined in the NEC, and the panel has removed it from the proposed text. The panel action clarifies that seals in Class I, Division 1 and 2 locations comply with all of the requirements in 501.5(C) unless there is a specific provision that exempts the seal from these requirements.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-45 Log #1933 NEC-P14 **Final Action: Accept in Principle**
(501.5(C))

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

Comment on Proposal No: 14-36

Recommendation: Accept the proposal in principle. In addition to the proposed text, add the following sentence:

“Non-explosionproof sealing provisions shall be accessible.”

Substantiation: The panel action on Proposal 14-34 makes this proposal essential. The added sentence has the effect of retaining the only requirement in (1) through (6) that needs to be retained for a non-explosionproof seal.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 14-43.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-46 Log #659 NEC-P14 **Final Action: Accept**
(501.5(F)(3))

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-40

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

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See panel action and statement on Comment 14-47.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-47 Log #672 NEC-P14 **Final Action: Accept in Principle**
(501.5(F)(3))

Submitter: Ted H. Schnaare, Emerson Process Management - Rosemount Division

Comment on Proposal No: 14-40

Recommendation: Instead of the panel proposal developed during the ROP meeting, use the following text which is a revision of the current NEC.

Add new material to the end of the existing 501.5(F)(3):

Process connected equipment that is used as and marked “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: The panel action on this proposal goes too far too fast. While the ISA 12.27.01 standard is presumably better than the almost complete lack of equipment requirements for process sealing that existed prior to its introduction, it is a new and untested standard. The above modified wording introduces the concept of “Dual Seal” rated equipment without eliminating or changing the existing text. This will allow installers to continue to follow their current practices with regard to this issue until process connected equipment can be

examined and listed in accordance with the new standard. It will also provide the opportunity for the standard to be used and improved before it is viewed as mandatory by the code. As it stands, the panel action could make it very difficult to install certain types of measurement equipment that may have difficulty meeting the Dual Seal requirements of ISA 12.27.01 but provides a critical safety monitoring function. If this is the case, the new requirements could actually lead to a much more hazardous situation than if the panel would have taken no action at all.

The above comment is very similar to the original ISA proposal with the exception of the following:

- It does not refer to “Single Seal” devices
- It requires “listing”

Removing the “Single Seal” allowance and adding the “listing” requirement improves the original ISA proposal in the two areas that were of most concern to the panel members during the ROP meeting.

Panel Meeting Action: Accept in Principle

Revise text proposed in the comment to read: Process-connected equipment that is ~~used as~~ listed and marked “Dual Seal” shall 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.

Panel Statement: The panel has changed the word “used” to “listed” based on the wording in the submitter’s original comment. There appears to have been a transcription error in the copy provided to the panel. Modifications to the original proposal removed the reference to “single seal process-connected equipment”.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-48 Log #3439 NEC-P14
(501.9(B)(1)Through (5))

Final Action: Accept

Note: The Technical Correlating Committee notes that the references in the Recommendation are to 501.130 (not 501.9) of Proposal 14-19a.

The Technical Correlating Committee directs that new item (1) be revised to read as follows:

“(1) Luminaires (Lighting Fixtures). Where lamps are of a size...”

This change is necessary because the text accepted by the panel does not create a complete sentence.

Submitter: David Wechsler, The Dow Chemical Company

Comment on Proposal No: 14-20

Recommendation: Insert “or” following the end of the first sentence of the listing, and change the first line number from (1) to (2) as indicated below:

Revise the numbering order for 501.9(B)(1) thru (5) to better agree with 501.9(A) as follows:

(1)(2) Fixed luminaires (Lighting Fixtures). Luminaires (lighting fixtures) for fixed lighting shall be protected from physical damage by suitable guards or by location. Where there is danger that falling sparks or hot metal from lamps or fixtures might ignite localized concentrations of flammable vapors or gases, suitable enclosures or other effective protective means shall be provided. Where lamps are of a size or type that may, under normal operating conditions, reach surface temperatures exceeding 80 percent of the ignition temperature in degrees Celsius of the gas or vapor involved, fixtures shall comply with 501.9(A)(1) or shall be of a type that has been tested in order to determine the marked operating temperature or temperature class (T Code).

(2)(3) Pendant Luminaires (Fixtures). Pendant luminaires (lighting fixtures) shall be suspended by threaded rigid metal conduit stems, threaded steel intermediate metal conduit stems, or other approved means. For rigid stems longer than 300 mm (12 in.), permanent and effective bracing against lateral displacement shall be provided at a level not more than 300 mm (12 in.) above the lower end of the stem, or flexibility in the form of an identified fitting or flexible connector shall be provided not more than 300 mm (12 in.) from the point of attachment to the supporting box or fitting.

(3)(4) Portable Lighting Equipment. Portable lighting equipment shall comply with 501.9(A)(1).

Exception: Where portable lighting equipment is mounted on movable stands and is connected by flexible cords, as covered in 501.11, it shall be permitted, where mounted in any position, if it conforms to 501.9(B)(2).

(4)(5) Switches. Switches that are a part of an assembled fixture or of an individual lampholder shall comply with 501.6(B)(1).

(5)(6) Starting Equipment. Starting and control equipment for electric-discharge lamps shall comply with 501.7(B).

Exception: A thermal protector potted into a thermally protected fluorescent lamp ballast if the luminaire (lighting fixture) is identified for the location.

Next change the title of the following from “Fixed Luminaires” to “Luminaires” to agree with 501.9(A)(1) as follows:

(1) (2) Fixed Luminaires (Lighting Fixtures).

Remove the sentence indicated from the strikeout portion of item (1) [former (2)] below and make it into a new (2) section titled “Physical Damage”, renumber the remaining items, and keep the remainder of the (1) as follows:

(1)(2) Luminaires (Lighting Fixtures). Luminaires (lighting fixtures) for fixed lighting shall be protected from physical damage by suitable guards or by location. Where there is danger that falling sparks or hot metal from lamps or fixtures might ignite localized concentrations of flammable vapors or gases, suitable enclosures or other effective protective means shall be provided.

Where lamps are of a size or type that may, under normal operating conditions, reach surface temperatures exceeding 80 percent of the ignition temperature in degrees Celsius of the gas or vapor involved, fixtures shall comply with 501.9(A)(1) or shall be of a type that has been tested in order to determine the marked operating temperature or temperature class (T Code).

(2) Physical Damage. Luminaires (lighting fixtures) for fixed lighting shall be protected from physical damage by suitable guards or by location. Where there is danger that falling sparks or hot metal from lamps or fixtures might ignite localized concentrations of flammable vapors or gases, suitable enclosures or other effective protective means shall be provided.

- (3) Pendant Luminaires
- (4) Portable Lighting Equipment
- (5) Switches
- (6) Starting Equipment

Substantiation: The changes are being made to better agree with 510.9(A) format.

Panel Meeting Action: Accept

Panel Statement: Correct the spelling of “luminaire” throughout the proposed text.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-49 Log #2969 NEC-P14
(501.10(B)(3))

Final Action: Accept

Submitter: Richard E. Loyd Sun Lakes, AZ

Comment on Proposal No: 14-27

Recommendation: Reconsider Proposal 14-27 and reject the proposal.

Substantiation: There was no substantiation submitted for adding rigid non-metallic conduit as a new permitted wiring method in Class 1 Division 2 locations.

There is no evidence that adding RNC will insure equal safety or improved safety. There are many known factors that safety will be compromised. RNC will not withstand an explosion. It is not suitable for applications subject to physical damage. Static build-up is common on PVC products. This is another ignition source added to classified areas.

Please reconsider this change and reject it.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-50 Log #660 NEC-P14
(501.11)

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 14-45

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Revise the proposed wording of 501.11(A)(1) to read: (A) Permitted Uses. 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) For that portion of the circuit where the fixed wiring methods of 501.10(A) cannot provide the necessary degree of movement for fixed and mobile electrical utilization equipment, and the flexible cord is protected by location or by a suitable guard from damage and only in an industrial establishment where conditions of maintenance and engineering supervision ensure that only qualified persons install and service the installation.

(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.

Panel Statement: This section will be renumbered as 501.140(A) in the 2005 NEC. The reference in item (2) of this section has also been revised to reflect the renumbering.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-51 Log #2636 NEC-P14
(501.15, 502-15, 503-15 and 505-19)

Final Action: Accept in Principle

Note: The Technical Correlating Committee understands that the Panel Action refers to 501.25, 502.25, 503.25, and 505.19 in accordance with Proposal 14-47a.

Submitter: Paul Dobrowsky Holley, NY

Comment on Proposal No: 14-47a

Recommendation: For each of the four sections revise the proposal to read as follows:

XXX.XX Live Parts, Class I, Divisions 1 and 2. There shall be no exposed live parts.

Exception. Exposed live parts that are protected by a protection technique according to 500.7(E), 500.7(F), or 500.7(G) that is suitable for the location shall be permitted.

Substantiation: Using the term “live parts” as provided and defined in Article 100 is better.

The phrase “shall not present a risk of electrical shock” does not help the user determine appropriate voltage levels or specify what equipment is permitted. Acceptable voltage levels, related to a shock hazard, depend on conditions (wet, dry, etc.) In hazardous locations the issue of igniting combustible and flammable materials is present in addition to the shock hazard concern. The majority of “live parts” in a hazardous location are typically in enclosures so the exception concept complies with the NEC style manual. As the submitter of the proposal to change the definition of live parts, I can assure you that it was not the intent to prohibit “appropriate” exposed live parts in Chapter 5. The objective was to provide a definition that could be used, with specific details, in all Articles. Using the definitions in Article 100 is beneficial to provide a consistent use throughout the NEC.

Panel Meeting Action: Accept in Principle

Revise 501.15, 502.15, 503.19 and 505.15 as follows:

501.15 Uninsulated Exposed Parts, Class I, Divisions 1 & 2. There shall be no uninsulated exposed parts, such as electric conductors, buses, terminals, or components, that operate at more than 30 volts (15 volts in wet locations). These parts 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.

502.15 Uninsulated Exposed Parts, Class II, Divisions 1 & 2. There shall be no uninsulated exposed parts, such as electric conductors, buses, terminals, or components, that operate at more than 30 volts (15 volts in wet locations). These parts 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.

503.15 Uninsulated Exposed Parts, Class III, Divisions 1 & 2. There shall be no uninsulated exposed parts, such as electric conductors, buses, terminals, or components, that operate at more than 30 volts (15 volts in wet locations). These parts 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.

505.19 Uninsulated Exposed Parts. Uninsulated exposed parts, such as electric conductors, buses, terminals, or components that operate at more than 30 volts (15 volts in wet locations). These parts shall additionally be protected by type of protection ia, ib, or nA that is suitable for the location.

Panel Statement: The panel action has quantified the voltage level that presents a shock hazard for Class I, Class II, and Class III locations. The section numbers will have to be revised to reflect the new numbering for the 2005 NEC in Articles 501, 502, and 503.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-52 Log #3440 NEC-P14 **Final Action: Accept in Principle**
(501.15, 502-15, 503-15 and 505-19)

Submitter: David Wechsler, The Dow Chemical Company

Comment on Proposal No: 14-47a

Recommendation: Revise the following sections as indicated to read:

501.15 Uninsulated Exposed Parts, Class I, Divisions 1 & 2. Except as permitted by the protection technique that is suitable for the location, there shall be no uninsulated exposed parts, such as electric conductors, buses, terminals, or components.

FPN: See Sections 500.7(E), or 500.7(F) or 500.7(G) for additional guidance.

502.15 Uninsulated Exposed Parts, Class II, Divisions 1 & 2. Except as permitted by the protection technique that is suitable for the location, there shall be no uninsulated exposed parts, such as electric conductors, buses, terminals, or components.

FPN: See Sections 500.7(E), or 500.7(F) or 500.7(G) for additional guidance.

503.15 Uninsulated Exposed Parts, Class III, Divisions 1 & 2. Except as permitted by the protection technique that is suitable for the location, there shall be no uninsulated exposed parts, such as conductors, buses, terminals, or components.

FPN: See Sections 500.7(E), or 500.7(F) or 500.7(G) for additional guidance.

Exception: As provided in 503.13.

505.19 Uninsulated Exposed Parts. Except as permitted by the protection technique ia, ib, or nA, that is suitable for the location, there shall be no uninsulated exposed parts, such as electric conductors, buses, terminals, or components.

Substantiation: The issue that these hazardous (classified) location sections need to address is not “shock” hazards, but ignition source potentials. Shock hazards are a general electrical problem and are addressed within other sections of the NEC. The action taken by the panel while moving in the appropriate direction due to the change in the definition of “live parts”, fails to resolve the issue and in fact makes it even more difficult to comply with. The NEC does not define what a shock hazard is. As indicated in my voting ballot, which due to my error was attached to Log CP1403 rather than this proposal, a shock

hazard may be seen to exist for intrinsic safe as well as nonincendive devices. The proposed wording is convoluted by first stating that exposed uninsulated parts should not be shock hazards and then requiring these parts to comply with protection techniques that have nothing to do with shock hazards. So if, 500.7(E) or (F) or (G) permits there to be an uninsulated part, and it could be exposed, this new wording would not permit this installation even when permitted by the referenced section. Uninsulated parts which are permitted by 500.7(E) or (F) or (G) should be permitted, especially when the issues within this section deal with potential arcing or sparking contracts that may become ignition sources. The suggested wording provides the additional degree of protection needed for these articles. It retains shock hazard as a general NEC issue that is addressed in other sections of the NEC.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 14-51.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-53 Log #2968 NEC-P14 **Final Action: Reject**
(501.15(B)(2))

Submitter: Richard E. Loyd Sun Lakes, AZ

Comment on Proposal No: 14-34

Recommendation: Reconsider and reject this comment.

Substantiation: The submitter has not provided any substantiation for this change. To compare seals in intrinsically safe systems with power circuit seals is inappropriate and offers no insurance of safety.

I investigated an explosion in a chemical plant in Pennsylvania where the gas and vapors migrated to a motor control center in an unclassified area where it was ignited by the making and breaking of contacts causing an explosion. A proper explosion seal was not installed. This change would have made that installation legal.

I don't know what type of seal is identified and tested for sealing in accordance with 504.70. Most contractors still use explosion proof seals for safety even though CMP-14 permits something that may not exist.

Panel Meeting Action: Reject

Panel Statement: The panel action on Comment 14-43 addresses the concerns expressed in the substantiation.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

COOK: The panel action for this comment, based on the panel discussion and action on Comment 14-43, should be accept in principle with the panel statement as shown. It appears that the submitter's concerns have been addressed. The substantiation indicates that seals need to be identified for their purpose and the panel action on Comment 14-43 does that.

14-54 Log #946 NEC-P14 **Final Action: Accept**
(501.16)

Submitter: Dorothy Kellogg, American Chemistry Council

Comment on Proposal No: 14-50

Recommendation: Continue to support the addition of the term “bonding” with the text modifications contained within the actions as taken during the ROP stages by the committee on this proposal.

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 allow affected sections (501.16; 502.16 and 503.16).

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

ARTICLE 502 — CLASS II LOCATIONS

14-55 Log #203 NEC-P14 **Final Action: Reject**
(502.1)

Submitter: Peter J. Schram Delray Beach, FL

Comment on Proposal No: 14-76

Recommendation: Reject the Panel Action to delete the last sentence of the last paragraph of 502.1 of the 2002 edition of the NEC.

Substantiation: This sentence was added in the 1981 edition of the Code via Proposal No. 49, per the NFPA “1980 Annual Meeting Report of the National Electrical Code Committee.” It was recognized at that time that it was a redundant statement. The substantiation for the proposal was: “The information in 500-5(a)(3) is not well understood in the industry. This wording does not change the intent, but helps clarify the information already in the Code.”

I have seen no information in the Panel Statement that the requirement in what is now 500.5(C)(3) of the 2002 NEC is any better understood by the industry. I believe there is still a need for this redundancy.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its action on Proposal 14-76 to eliminate the redundant text.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

COOK: I agree with the submitter's recommendation and substantiation. For NEC users who work in Class II, Group E locations on a very regular basis, the text is redundant. For designers, installers, and inspectors who are not involved with installations in these locations on a regular basis, the deleted text is very useful and easier to understand than the text in 500.5(C)(3).

14-56 Log #1251 NEC-P14
(501-4(A)(1)(c))

Final Action: Reject

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

Comment on Proposal No: 14-53

Recommendation: This proposal should be Accepted in Principle. Do not delete as the proposal suggests, but rather add a second and third paragraph to (A)(1)(c) to read:

The name(s) of the qualified person(s) shall be kept in a permanent record at the office of the establishment in charge of the completed installation and at the office of the Authority Having Jurisdiction. Notification of any changes in the employment of the designated qualified person(s) shall be made to the office of the Authority Having Jurisdiction.

A person designated as a qualified person shall possess the skills and knowledge related to the construction and operation of the electrical equipment and installation and shall have received documented safety training on the hazards involved. Documentation of their qualifications shall be on file with the office of the Authority Having Jurisdiction and the office of the establishment in charge of the completed installation.

Substantiation: It was not necessarily my desire to have the wording in (A)(1)(c) deleted, if the wording could be changed to include prescriptive requirements that could ensure that qualified persons are actually performing the maintenance and supervision as required by (A)(1)(d). The National Electrical Code is a prescriptive code and it is the technical committees' responsibility to ensure that prescriptive requirements are present for the Authority Having Jurisdiction to use. The Panel Statement is correct in that all of the listed company policies and procedures COULD ensure that qualified persons service the installation. While I applaud your faith in human nature, I question your judgment in relaxing safety requirements based on good faith. Give the Authority Having Jurisdiction code requirements that can be enforced.

It is difficult to understand how it is possible to relax requirements for safety in a Code that tells us in 90.1(B), "this Code contains provisions that are considered NECESSARY for safety." This section further states that "Compliance therewith and proper maintenance will result in an installation that is ESSENTIALLY free from hazard but NOT NECESSARILY efficient, convenient, or ADEQUATE for good service or future expansion of electrical use." It appears to me that this tells us that these requirements are the MINIMUM requirements for safety and anything less will result in an installation that is NOT FREE FROM HAZARD.

Proponents of this travesty, knowing the truth in this, attempt to circumvent the obvious degradation of safety by using phraseology such as "the installation is under engineering supervision" or "a qualified person will monitor the system." What is monitoring the installation? What does engineering supervision mean?

I have submitted several proposals to delete these exceptions to requirements for safety but they were all rejected. Perhaps in the comment stage, enough persons will comment in favor of accepting these proposals or at least accepting them in a manner where some prescriptive requirements will be added to accurately describe what "engineering supervision" entails. What does "monitoring" the installation mean, what type of record keeping is necessary to assure compliance, what is a "monitor" or what is a "qualified person?" How is documentation of the qualifications and presence of a "qualified person" accomplished by the Authority Having Jurisdiction?

Without these prescriptive requirements, these exceptions to the requirements for safety appear to be "just another subterfuge to avoid compliance with the safety requirements of the National Electrical Code without regard to putting persons and equipment at risk."

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 14-24.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-57 Log #1325 NEC-P14
(502.4(A)(1)d., FPN 2 (New))

Final Action: Reject

Submitter: Steven J. Blais, EGS Electrical Group

Comment on Proposal No: 14-54

Recommendation: Add new text to read as follows:

FPN No. 2: Boxes and fittings having only threaded or gasketed joints is a

method for minimizing the entrance of dusts.

The Panel Action should be APR

Add FPN: (Also see companion comments for Panel Action 14-56 and 14-62)

Substantiation: This new FPN will give necessary guidance to the AHJ in determining the intent and objectivity of the rule. Boxes and fittings in the 1999 NEC and prior editions had only been required to "minimize" the entrance of dusts where no taps, joints, or terminal connections are made.

The Panel Action on ROP 14-54 eliminated several box and fitting designs from Class II, Division 1 locations for the sake of objectivity for the AHJ. It appears the CMP14 action caused confusion with our end-users in that 500.7(C) does not recognize "dusttight" as a suitable protection technique for Class II, Division 1 hazardous locations.

The original confusion with the Panel Action appears to emanate from the interpretation of "dusttight" in the phrase "dusttight wireways" of 502.4(B)(1)(2). As there are not wireways specifically rated as "dusttight" it appears the terminology is meant to be self evident, in that all the specific wireways identified are obviously dusttight in-and-of themselves (excluding the end openings). The CMP Action on 14-54 caused boxes and fittings to have a "dusttight" rating that now requires specified test conditions to be met. See 500.2 (Dusttight).

Panel Meeting Action: Reject

Panel Statement: Section 502.4(B)(4) requires that all boxes and fittings be dusttight.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-58 Log #661 NEC-P14
(502.4(A)(1)e.)

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-55

Recommendation: 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.

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

Replace proposed 502.4(A)(2) to read: "(2) Flexible Connections. Where necessary to employ flexible connections, one or more of the following wiring methods shall also 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 nNote.

Panel Statement: The panel has added the word "also" to indicate that methods (1) through (5) are in addition to the wiring methods described in 502.4(A)(1). The panel has also removed the words "wiring methods" because not all of the items described in (1) through (5) are wiring methods.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-59 Log #1326 NEC-P14
(502.4(B)(4), FPN 2 (New))

Final Action: Reject

Submitter: Steven J. Blais, EGS Electrical Group

Comment on Proposal No: 14-56

Recommendation: Add new text to read as follows:

FPN No. 2: Boxes and fittings having only threaded or gasketed joints and EMT compression fittings is a method for minimizing the entrance of dusts.

The Panel Action should be APR

Add FPN: (Also see companion comments for Panel Action 14-54 and 14-62)

Substantiation: This new FPN will give necessary guidance to the AHJ in determining the intent and objectivity of the rule. Boxes and fittings in the 1999 NEC and prior editions had only been required to "minimize" the entrance of dusts where no taps, joints, or terminal connections are made.

The Panel Action on ROP 14-56 eliminated several box and fitting designs from Class II, Division 2 locations for the sake of objectivity for the AHJ. It appears the CMP14 action caused confusion with our end-users. 502.4(B)(1)(2) permits EMT in Class II, Division 2 hazardous locations, however EMT fittings do not have "dusttight" ratings to a specified test condition. EMT is currently being terminated in Class II, Division 2 hazardous locations by means of EMT compression fittings.

The original confusion with the Panel Action appears to emanate from the interpretation of "dusttight" in the phrase "dusttight wireways" of 502.4(B)(1)(2). As there are not wireways specifically rated as "dusttight" it appears the terminology is meant to be self evident, in that all the specific wireways identified are obviously dusttight in-and-of themselves (excluding

the end openings). The CMP Action on 14-56 caused boxes and fittings to have a “dusttight” rating that now requires specified test conditions to be met. See 500.2 (Dusttight).

Panel Meeting Action: Reject

Panel Statement: The proposed fine print note conflicts with the requirement for boxes and fittings to be dusttight.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-60 Log #1041 NEC-P14
(502.5(4) (New))

Final Action: Accept

Submitter: Noel Williams, Noel Williams Consulting

Comment on Proposal No: 14-57

Recommendation: The proposal should have been accepted.

Substantiation: While the existing requirements may be clear enough, they are overly restrictive and unreasonable. The example given in the substantiation illustrates this point, but two more examples may help to illustrate the absurdity of the current rule: If a conduit run extends 1 foot horizontally and then 10 feet down, it must have a seal, but a conduit extending 5 feet down and then 1 foot horizontally is considered equivalent to a seal. Similarly, if a conduit extends one foot down and then 20 feet horizontally, it must have a seal, but another conduit extending 10 feet horizontally and then 1 foot down is considered equivalent to a seal. This is what the “clear” language says, even though it makes no sense. The code should make sense wherever possible.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-61 Log #1936 NEC-P14
(502.5(4) (New))

Final Action: Accept in Part

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

Comment on Proposal No: 14-57

Recommendation: Accept the proposal. If the proposal is accepted, place the same provision in the new Article 506 at 506.16(4).

Substantiation: The panel statement is not responsive. The submitted substantiation never argued there was any lack of clarity in the requirement. Indeed, that presumably was why the proposal was offered. The proposal offers a reasonable approach that is plainly equivalent in safety. The AHJ should not have to resort to the written 90.4 process to recognize it.

Panel Meeting Action: Accept in Part

Panel Statement: The panel accepts the recommendation to accept the proposal. The panel rejects the recommendation to include the text proposed in Proposal 14-57 in Article 506. The panel action on Comment 14-97 provides different sealing requirements from those found in Article 502.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

COOK: The panel statement indicates that for Article 506, Comment 14-97 provides different sealing requirements from those found in Article 502. The protection techniques used proposed Article 506 and those used in Article 502 are the same. The wiring methods are the same. The sealing requirement in proposed 506.16 and those in Article 502 are both intended to prevent the entrance of dust into the enclosures. No substantiation provided with Proposal 4-108a or Comment 14-97 indicates that the purpose or function of seals is different. I believe the wording proposed in 506.16 would permit the manner described in Proposal 14-57 as an effective method of sealing.

14-62 Log #2423 NEC-P14
(502.10(A)(2))

Final Action: Accept in Principle

Submitter: J. Philip Simmons, Simmons Electrical Services / Rep. National Armored Cable Manufacturers Association

Comment on Proposal No: 14-55

Recommendation: Revise 502.10(A)(2) of the 2005 NEC ROP Draft as follows:

(2) Where necessary to employ flexible connections, one or more of the following wiring methods shall be used permitted:

- (a) dusttight flexible connectors
- (b) liquidtight flexible metal conduit with listed fittings
- (c) liquidtight flexible nonmetallic conduit with listed fittings.
- (d) interlocked armor Type MC cable having an impervious outer nonmetallic covering with listed fittings
- (e) 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.

Substantiation: In response to the Panel Statement for Proposal 14-55, the Type MC cable mentioned for generally accepted wiring methods in Class II, Division 1 locations is Type MC-HL and is specifically listed for Class II, Division 1 locations. (See 510.10(A)(1)(3) of the 2005 ROP Draft.) The wiring methods included in 502.10(A)(2) of the ROP Draft are other wiring methods deemed suitable for flexible connections but are not specifically listed for Class II, Division 1 areas. This includes liquidtight flexible metal conduit and liquidtight flexible nonmetallic conduit as well as flexible cords.

Interlocked armor Type MC cables by construction are flexible and, with an impervious outer jacket, are suitable for the applications provided in this Section. Since three varieties of Type MC cable are produced and the smooth sheath and corrugated types may not be suitable where flexibility is needed, the interlocked armor type of MC cable is designated.

We have also attempted to respond to the Technical Correlating Committee note on the Proposal.

Panel Meeting Action: Accept in Principle

Revise 502.10(A)(2) as shown in Proposals 14-51a and 14-55 to read:

(2) Where necessary to employ flexible connections, one or more of the following wiring methods shall also be permitted:

- (a) dusttight flexible connectors
- (b) liquidtight flexible metal conduit provided with listed fittings.
- (c) liquidtight flexible nonmetallic conduit with listed fittings.
- (d) interlocked armor Type MC cable having an overall jacket of suitable polymeric material and provided with termination fittings listed for Class II, Division 1 locations.
- (e) 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.

Panel Statement: The panel has modified paragraph (2) to correlate with their action taken on Comment 14-36 for Class I, Division 1 locations. The panel has modified the proposed text describing the outer covering of the Type MC cable to parallel with the requirement for the outer covering required for Type MC-HL and also has modified the proposed text to require termination fitting specifically listed for Class II, Division 1 locations.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

COOK: I agree with the intent of the first sentence of the panel statement, however in Comment 14-36 the words “wiring method” were deleted since all of the items in the list are not wiring methods. I believe it was the panel’s intent to delete “wiring method” here also. I agree with the first action in the second sentence of the panel statement that describes the outer covering of the cable. I do not agree with the second action of the second sentence of the panel statement that requires the termination fittings for this method to be specifically listed for Class II, Division 1 locations. That requirement is not consistent with the termination requirements for the other items in the list and I did not hear any justification for the additional requirement. I do not believe this type MC cable with ordinary location, listed fittings would present any greater risk than the other items with ordinary location listed fittings.

14-63 Log #945 NEC-P14
(502.16)

Final Action: Accept

Submitter: Dorothy Kellogg, American Chemistry Council

Comment on Proposal No: 14-59

Recommendation: Continue to support the addition of the term “bonding” with the text modifications contained within the actions as taken during the ROP stages by the committee on this proposal.

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 allow affected sections (501.16; 502.16 and 503.16).

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

ARTICLE 503 — CLASS III LOCATIONS

14-64 Log #1327 NEC-P14
(503.3(A)(1), FPN 2 (New))

Final Action: Reject

Submitter: Steven J. Blais, EGS Electrical Group

Comment on Proposal No: 14-62

Recommendation: Add new text to read as follows:

FPN No. 2: Boxes and fittings having only threaded or gasketed joints and EMT compression fittings are methods for minimizing the entrance of dusts.

The Panel Action should be APR

Add FPN: (Also see companion comments for Panel Action 14-54 and 14-56)

Substantiation: This new FPN will give necessary guidance to the AHJ in determining the intent and objectivity of the rule. Boxes and fittings installed in Class III Division 1 and 2 hazardous locations need only be required to prevent the entrance of flying and fibers.

The original confusion with the current rule appears to emanate from the interpretation of “dusttight” in the phrase “dusttight wireways” of 502.4(B)(1)(2) and 503.3(A). Since there are not wireways specifically rated as “dusttight” it appears the terminology is meant to be self evident, in that all

the specific wireways identified are obviously dusttight in-and-of themselves (excluding the end openings). The current rule requires boxes and fittings to have a “dusttight” rating that requires specified test conditions to be met. See 500.2 (Dusttight).

Panel Meeting Action: Reject

Panel Statement: The proposed fine print note conflicts with the requirement for boxes and fittings to be dusttight.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-65 Log #944 NEC-P14 **Final Action: Accept**
(503.16)

Submitter: Dorothy Kellogg, American Chemistry Council

Comment on Proposal No: 14-66

Recommendation: Continue to support the addition of the term “bonding” with the text modifications contained within the actions as taken during the ROP stages by the committee on this proposal.

Substantiation: 503.16 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 allow affected sections (501.16; 502.16 and 503.16).

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

ARTICLE 504 — INTRINSICALLY SAFE SYSTEMS

14-66 Log #662 NEC-P14 **Final Action: Accept**
(504.30(B))

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 14-68a

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See panel action on Comment 14-67.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-67 Log #3652 NEC-P14 **Final Action: Accept**
(504.30(B)(3))

Submitter: Nicholas P. Ludlam, FM Approvals

Comment on Proposal No: 14-68a

Recommendation: Revise text to read as follows:

(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 this clearance is permitted to be reduced by the control drawing.

Substantiation: The intrinsic safety standards on which the original proposal was based, ANSI/UL 913, ANSI/ISA 12.02.01, ISA 12.06.01, etc. state that the clearance between two terminals for connection of field wiring of different intrinsically safe circuits shall be at least 6 mm unless no hazard results from connection. The determination of any potential hazard that may arise from an interconnection between two different intrinsically safe circuits would be made during the listing process by the testing agency. The original substantiation provided with the panel proposal is correct but the proposed text did not indicate what was permitted to be reduced.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

ARTICLE 505 — CLASS I, ZONE 0, 1, AND 2 LOCATIONS

14-68 Log #943 NEC-P14 **Final Action: Reject**
(505, 500-1, 500-2 & 501-1)

Submitter: Dorothy Kellogg, American Chemistry Council

Comment on Proposal No: 14-72

Recommendation: Delete “Class 1”, before “zone” throughout Article 505, and as it appears in 500.1 FPN, 500.2 and 501.1 General.

Substantiation: It appears that during the ROP stage, the panel acted to accept development of an Article 506 addressing Zone 20, 21, and 22. Thus, the panel statement that the panel has not acted to accept the “IEC” Zones 20, 21,

and 22 is not entirely true. The submitter has a valid point in that the “Class I” appearing before “Zone 0”, or “zone 1” or “zone 2” is redundant and has little meaning. Zones 0, 1, and 2 can only refer to those same materials that under the Class Division methodology can only be considered as being Class I materials. However, there is another advantage in deleting the “Class I”. This action would help really separate the aspects of these two methodologies, which may be a good thing to do. It would eliminate any possible confusion as to the methodology applied. “Class” would refer only to “divisions” and “zone” would mean “zone”.

Panel Meeting Action: Reject

Panel Statement: The existing wording is utilized in numerous documents, listings, marking, and products, and the panel does not see the need to change the present text.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-69 Log #663 NEC-P14 **Final Action: Accept**
(505.2)

Note: The Technical Correlating Committee understands that the action of this comment will be to delete the reference to the IEC standard.

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 14-73

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-70 Log #3435 NEC-P14 **Final Action: Hold**
(505.2)

Note: The Technical Correlating Committee notes that the panel’s intent is to “Hold” only the comment and not the proposal.

Submitter: Jeremy Neagle, Intertek ETL SEMKO

Comment on Proposal No: 14-73

Recommendation: Revise text as follows:

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 No. 1: See ANSI/ISA 12.23.01-2002, 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 60079-18, Electrical apparatus for explosive gas atmospheres - Part 18: Encapsulation “m”.

FPN No. 2: Type of protection “m” may be further subdivided into ma or mb.

Substantiation: Standards are currently in preparation which include two levels of protection, ‘ma’ and ‘mb’ which are suitable for Zone 0 and Zone 1 locations respectively. IEC 60079-18, 2nd edition is in the final stages of publication, and adoption of this standard as ISA 12.23.01, 2nd edition is currently in process with publication expected in 2005. The necessary measures are not yet in place to allow for use of ‘ma’ in Zone 0 locations. However, it provides a greater level of safety than the current practice, while ‘mb’ provides an equivalent level of safety as the current practice. Adding this FPN clarifies the fact that both levels of protection ‘ma’ and ‘mb’ are both suitable for use in Class I Zone 1 locations. US standards will likely be published, and listed equipment available throughout the life span of this code edition, this FPN clarifies that apparatus marked ‘m’ as required, which is additionally marked to indicate level of protection ‘a’ or ‘b’ is still suitable for use in Class I, Zone 1 locations.

Panel Meeting Action: Hold

Panel Statement: The comment introduces the concept of encapsulation types “ma” and “mb”, which have not had public review during the proposal phase and for which there is not a published standard at this time.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-71 Log #800 NEC-P14
(505.2, FPN)

Final Action: Accept

Note: The Technical Correlating Committee understands that the action of this comment will be to delete the reference to the IEC standard.

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-73a

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-72 Log #664 NEC-P14
(505.4(B), FPN 7)

Final Action: Accept

Note: The Technical Correlating Committee understands that the action of this comment will be to delete the reference to the IEC standard.

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-75

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-73 Log #3650 NEC-P14
(505.5(B))

Final Action: Reject

Submitter: Nicholas P. Ludlam, FM Approvals

Comment on Proposal No: 14-72

Recommendation: Remove "Class I" from all locations within this article.

Substantiation: The panel should have accepted the original proposal in principle. The definitions of Zone 0, 1, and 2 in the Code [505.5(B)] are already defined as Flammable gases or vapors. To say "Class I, Zone 1" is redundant, there is no Class II Zone 0, as it has been proposed that Zone 20 be used. Modifying the designation for flammable gases and vapors to drop the Class I would also then align with the proposal for dusts which only requires Zone 20, 21, or 22 without the Class prefix.

Panel Meeting Action: Reject

Panel Statement: The existing wording is utilized in numerous documents, listings, marking, and products, and the panel does not see the need to change the present text.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-74 Log #937 NEC-P14
(505.7(A))

Final Action: Reject

Note: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

Submitter: Dorothy Kellogg, American Chemistry Council

Comment on Proposal No: 14-78

Recommendation: Delete 505-7(A) and renumber the section as applicable.

Substantiation: After almost three NEC cycles of having this requirement,

which was initially provided only as a "check" to better assure aspects of the Zone methodology were followed, it is time to eliminate this paragraph and let experience and training take the much improved leadership roles. There is no reason now that people who are not professional engineers, cannot be trained to handle zone issues. Further, there is no basis to exclude those that may already have significant understanding and practical experience with the zone concept, such as those people from outside the US that are also not professional engineers. It also seems apparent that some members of Panel 14 are also not professional engineers and this has not stopped them in developing the rules and requirements governing zone installations. Lastly, the NEC is not the document that defines qualifications. The application of the zone methodology should not continue to be singled out within the entire National Electrical Code, as the apparent item that is the most hazardous, most abused, or most whatever of all other issues and aspects addressed that pose risk potentials within the NEC. It is time for this requirement to be removed.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 9 Negative: 6

Explanation of Negative:

BRIESCH: The panel action should be to reject this comment. See explanation of negative vote on Comment 14-75.

COOK: I disagree with the panel action on this comment. The submitter's substantiation indicates that experience and training should replace the requirement for professional engineers to supervise the tasks of area classification, selection of equipment, and wiring on projects using Article 505. The present text in 505.7 requires the individual who supervises this work to meet two requirements. First, they must be "qualified", which experience and training would help to provide. In addition to being qualified, that individual must also be a Registered Professional Engineer. In all of the PE Registration requirements that I am familiar with, that requirement would also add a great deal of accountability to the supervision. I am not aware of any other qualification in the industry that provides that level of accountability. There may be some, but they have never been submitted as substantiation to delete this requirement. It has never been my opinion since the 1996 code cycle, that all PEs were qualified to meet this requirement. It has never been my opinion since the 1996 code cycle that a qualified individual who was not a PE was not permitted to work on these projects. It has been and still is my opinion that the individual supervising this work should be qualified and accountable. The substantiation indicates that all members of CMP 14 are not PEs and yet are involved in developing the rules governing the installations. The requirements of the NEC affect more than the design and supervision of the project and the consensus process includes everyone involved in the installation. Most regulations in a democracy are developed by a cross-section of individuals that are affected by the regulations. Although Article 505 has been part of the NEC for almost three code cycles, CMP 14 has only been made aware of one project that has used Article 505. The responsible engineers that worked on that project have made numerous proposals, comments, and presentations to CMP 14 over the past three cycles. Those proposals, comments, and presentations have provided substantiation to me that a greater degree of accountability is still needed for these applications. The CMP 14 debate over almost every issue related to Article 505 continues to provide substantiation to me that the requirements are not clear enough to eliminate the greater degree of accountability.

KUCZKA: The panel substantiation states that "After almost three NEC cycles...it is time to...let experience and training take the...roles." This is a specious argument because, while the Zone system has been included in three NEC cycles, there has been little experience in its use. In fact, it is generally acknowledged that there has been only one major installation in the U.S. using Zones and that it was very difficult. The time that a rule is in the book doesn't qualify as experience.

In fact, where is it written that this rule was only temporary? Some panel members accepted the Zone system based in part because its use would be under the supervision of a qualified PE.

Many PEs are not qualified to supervise Zone installations and because they are PEs, they will know that and also know that the conditions of their licensure forbid them to work in fields for which they are not qualified. That is the point of this rule.

O'MEARA: I disagree with the panel action. The requirement for a Registered Professional Engineer should continue to be maintained in 505.7(a) for the following reasons:

- The Zone concept is not yet in widespread use.
- Adequate training programs have not been developed to the degree that is necessary in order to facilitate safe installation of equipment in hazardous locations by persons that self-certify themselves as qualified to design and implement this concept.
- Utilizing a Registered Professional Engineer assures that the proper training has been provided prior to the design of the installation.
- Utilizing a Registered Professional Engineer provides a higher degree of accountability and protection for the persons that will be working in and exposed to the risks associated with these installations.

WELDON: This section was adopted by Code-Making Panel 14 when it agreed to expand the code to Zone "0" applications. The primary reasoning was to assure that the new methodology was understood. It is my understanding that less than 10 percent of installations in the U.S. have utilized Zone "0", thereby, affording very little actual experience with the new methodology.

WIRFS: The original proposal (ROP 14-78) only dealt with the addition of members of the WSO not the entire deletion of the requirement. I don't believe that such a substantive change should be made in the comment phase.

The concept to entirely remove the requirement for the PE supervision was never addressed at the ROP stage and this is a fundamental change that would be made without the benefit of adequate public review and comment. To make this sweeping of a change at this stage is inappropriate.

Additional comment:

Technically, there is no reason why anyone (that are not professional engineers) cannot be trained to handle any electrical design methodology. This argument is not unique to determining hazardous zone areas. Yet most states require certification of engineers as professional Engineers to take a legal responsibility for the safe application of engineering principles for all structures and systems that affect the public. The wiring of electrical systems within hazardous areas is the most severe test of these safety principles.

The commentator has stated that some of the panel members are not PEs that are developing the rules. However, they missed the point that there are also several members that are PEs (there always have been in my experience on the panel) and they provide sufficient insight to the panel for the proper application of electrical scientific principles.

The argument that this shouldn't be the only area of the code that is singled out for supervision by professional engineers is a good one. Maybe this should be a requirement for the entire code. Article 310 allows cable ampacities to be calculated under "engineering supervision" without defining the qualifications. Requiring a PE would at least set a standard of care and responsibility that is accepted throughout the US.

Carte blanc acceptance of non-US technical personnel (as is suggested by the commentator) is not acceptable. We still require foreign engineers to meet the same standard of care (included becoming registered Professional Engineers) as any other engineer. We already have created some differences in our Zone requirements from those outside the US and offshore manufactured equipment has not always been able to pass UL testing under our more stringent standards.

We have not been told of any technical justification to delete this oversight requirement and I would be surprised if there are any major facilities that wouldn't have a responsible PE on their staff and if they are using consultants they are required to be PEs by most state laws. The commentator should be aware that the work can be done by other technical staff as long as they are working under the direct supervision of a PE that reviews and seals the work.

14-75 Log #3280 NEC-P14
(505.7(A))

Final Action: Reject

Note: The Technical Correlating Committee directs that this Comment be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

Submitter: David Soffrin, American Petroleum Institute

Comment on Proposal No: 14-77

Recommendation: Delete 505.7(A).

Substantiation: The proposed addition of other alternate qualifications for those who would be authorized to supervise the classification and selection of equipment and wiring methods for Article 505 helps illustrate that the correct action is for the removal of this section in its entirety. While there has never been any justification that a registered professional engineer was more or less qualified to oversee "Zones" than anyone else, it was used to provide an additional requirement for the application a new alternate approach to classification methodology in the NEC. This added requirement was intended to be temporary until greater familiarity with the methods and equipment was established. Three code cycles have met that requirement. The application of Article 505 should be governed by the same requirements as the rest of the NEC and 505.7(A) should now be removed.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 9 Negative: 6

Explanation of Negative:

BRIESCH: The panel action should be to reject this comment. The requirement for a qualified registered professional engineer was included in Article 505 as a necessary provision due to the lack of familiarity with the Zone system. I do not agree with the submitter that 3 codes cycles has provided enough experience in the application of Article 505 to remove this requirement. Although Article 505 has been a part of the NEC since 1996, Panel 14 has only been made aware of one application. At this time, this hardly seems to be the necessary level of experience to remove this requirement.

COOK: See my explanation of negative vote on Comment 14-74.

KUCZKA: See my Explanation of Negative Vote on Comment 14-74.

O'MEARA: See my Explanation of Negative Vote on Comment 14-74.

WELDON: See my Explanation of Negative Vote on Comment 14-74.

WIRFS: The original proposal (ROP 14-77) only dealt with the addition of AHJ delegated or approved individuals not the entire deletion of the requirement. I don't believe that such a substantive change should be made in the comment phase. The concept to entirely remove the requirement for the PE supervision was never addressed at the ROP stage and this is a fundamental change that would be made without the benefit of adequate public review and comment. To make this sweeping of a change at this stage is inappropriate.

Also see the additional commentary included in my comment on 14-74.

14-76 Log #791 NEC-P14
(505.8, FPN)

Final Action: Accept

Note: The Technical Correlating Committee understands that the action of this comment will be to delete the reference to the IEC standard.

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-80

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-77 Log #3434 NEC-P14
(505.8(G))

Final Action: Hold

Note: The Technical Correlating Committee notes that the panel's intent is to "Hold" only the comment and not the proposal.

Submitter: Jeremy Neagle, Intertek ETL SEMKO

Comment on Proposal No: 14-80

Recommendation: Add text as follows:

(G) Encapsulation "m". This protection technique shall be permitted for equipment in Class I, Zone 1 or Zone 2 locations.

FPN: Type of protection "m" may be further subdivided into ma or mb.
Substantiation: Standards are currently in preparation which include two levels of protection, 'ma' and 'mb' which are suitable for Zone 0 and Zone 1 locations respectively. IEC 60079-18, 2nd edition is in the final stages of publication, and adoption of this standard as ISA 12.23.01, 2nd edition is currently in process with publication expected in 2005. The necessary measures are not yet in place to allow for use of 'ma' in Zone 0 locations. However, it provides a greater level of safety than the current practice, while 'mb' provides an equivalent level of safety as the current practice. Adding this FPN clarifies the fact that both levels of protection 'ma' and 'mb' are both suitable for use in Class I Zone 1 locations. US standards will likely be published, and listed equipment available throughout the life span of this code edition, this FPN clarifies that apparatus marked 'm' as required, which is additionally marked to indicate level of protection 'a' or 'b' is still suitable for use in Class I, Zone 1 locations.

Panel Meeting Action: Hold

Panel Statement: The comment introduces the concept of encapsulation types "ma" and "mb", which have not had public review during the proposal phase and for which there is not a published standard at this time.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-78 Log #792 NEC-P14
(505.9(C)(2))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-88a

Recommendation: The Technical Correlating Committee directs the panel to reconsider the proposal 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Add two new fine print notes following the second paragraph of 505.9(C)(2) and reidentify the existing fine print note as FPN No. 1 as follows: FPN No.1: An example of the required marking for intrinsically safe apparatus for installation in Class I, Zone 0 is "Class I, Zone 0, AEx ia IIC T6." An explanation the marking that is required is shown in FPN Figure 505.9(C)(2).

FPN No.2: An example of the required marking for Intrinsically Safe Associated Apparatus mounted in a flameproof enclosure for installation in Class I, Zone 1 is "Class I, Zone 1 AEx d[ia] IIC T4."

FPN No.3: An example of the required marking for intrinsically safe associated apparatus NOT for installation in a hazardous (classified) location is "[AEx ia] IIC".

Panel Statement: The two examples in Exceptions No. 1 and No. 2 shown in Proposal 14-88a will be relocated as new fine print notes following the second paragraph of 505.9(C)(2). CMP14 has determined that the Exception No.1 shown in Proposal 14-88a should also require markings 1, 2, & 6, for associated apparatus suitable for use in a hazardous location thus this exception is not necessary since the main rule applies to this equipment.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-79 Log #3433 NEC-P14
(505.9(C)(2))

Final Action: Hold

Note: The Technical Correlating Committee notes that the panel's intent is to "Hold" only the comment and not the proposal.

Submitter: Jeremy Neagle, Intertek ETL SEMKO

Comment on Proposal No: 14-89

Recommendation: Revise text to read as follows:

FPN No. 1: An example of such a required marking is "Class 1 Zone 0, AEX is IIC T6." An explanation of the marking that is required is shown in FPN Figure 505.9(C)(2).

FPN No. 2: Type of protection "m" may be further subdivided into ma or mb.

Substantiation: Standards are currently in preparation which include two levels of protection, 'ma' and 'mb' which are suitable for Zone 0 and Zone 1 locations respectively. IEC 60079-18, 2nd edition is in the final stages of publication, and adoption of this standard as ISA 12.23.01, 2nd edition is currently in process with publication expected in 2005. The necessary measures are not yet in place to allow for use of 'ma' in Zone 0 locations. However, it provides a greater level of safety than the current practice, while 'mb' provides an equivalent level of safety as the current practice. Adding this FPN clarifies the fact that both levels of protection 'ma' and 'mb' are both suitable for use in Class I Zone 1 locations. US standards will likely be published, and listed equipment available throughout the life span of this code edition, this FPN clarifies that apparatus marked 'm' as required, which is additionally marked to indicate level of protection 'a' or 'b' is still suitable for use in Class I, Zone 1 locations.

Panel Meeting Action: Hold

Panel Statement: The comment introduces the concept of encapsulation types "ma" and "mb", which have not had public review during the proposal phase and for which there is not a published standard at this time.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-80 Log #467 NEC-P14
(505.9(E))

Final Action: Accept in Principle

Submitter: Vic Gourmas, ISA-The Instrumentation, Systems and Automation Society

Comment on Proposal No: 14-24

Recommendation: 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 foot). Such conduit shall be made wrenchtight to prevent sparking when fault current flows through the conduit system, and to ensure the explosionproof 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 explosionproof 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 explosionproof equipment. Threaded joints with metric entries shall be made up with at least five threads fully engaged for entries into explosionproof equipment.

Substantiation: ISA disagrees with the Code-Making Panel 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 proposed. 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.

Justification for changes to NEC 500.8(D), 501.4(A) and 505.9(E):

Reducing the 5 thread engagement requirement specified within the NEC text for factory cut female NPT threads to 4 1/2 thread engagement, allows a more manufacturable product for worldwide use, and better alignment with the IEC product standard gauging practices for NPT threaded joints. This change allows manufacturers to gauge female NPT entries to a gauging practice of (0 to +1 turns of L1) for international use rather than the currently restrictive gauging practices (+1/2 to +1 turns of L1). This proposal will not affect field cut NPT threads, male or female.

Panel Meeting Action: Accept in Principle

Revise the proposed text to read: 505.9(E) Threading. All NPT threaded conduit and fittings referred to herein shall be threaded with a National (American) Standard Pipe Taper (NPT) thread that provides a taper of 1 in 16 (3/4-in. taper per foot). Conduit and fittings shall be made wrenchtight to prevent sparking when fault current flows through the conduit system, and to ensure the explosionproof or flameproof integrity of the conduit system where applicable. Equipment provided with threaded entries for field wiring connections shall be installed in accordance with 505.9(E)(1) or (E)(2). Threaded entries into

explosionproof or flameproof equipment shall be made up with at least five threads fully engaged.

Exception: For listed explosionproof or flameproof equipment, factory threaded NPT entries shall be made up with at least 4 1/2 threads fully engaged.

Panel Statement: See panel action and statement on Comment 14-17.

References within this section have been changed to reference the applicable requirements in Article 505.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 12 Negative: 3

Explanation of Negative:

BRIESCH: The panel action should be to reject this comment. See explanation of negative vote on Comment 14-17.

COOK: Based on the substantiation provided in Comment 14-23, it appears that this action would allow a product to be installed in a hazardous (classified) location that would not meet the product standards for ordinary locations.

WIRFS: See my explanation of negative vote on comment 14-17.

14-81 Log #1938 NEC-P14
(505.9(E))

Final Action: Accept

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

Comment on Proposal No: 14-91

Recommendation: Accept the proposal in principle. Delete the word "below".

Substantiation: The NEC Style Manual prohibits using such prepositions to locate cross-referenced text. The numerical section reference is correct.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-82 Log #704 NEC-P14
(505.15(B)(1))

Final Action: Reject

Submitter: Joe Cox Bluff City, TN

Comment on Proposal No: 14-99

Recommendation: Panel should have accepted Proposal 14-99.

Substantiation: By excluding the expected hazardous atmospheres (inside vessels/piping, open processing, etc. - zone 0) from division 1 locations and making the remainder zone 1, it is reasonable to state in a general way that zone 1 locations have lower risks than division 1 locations. CMP 14 allows MC-HL cable in division 1 locations, which could include zone 0 locations if zone classified. Since TC-HL listed cable meets or exceeds the crush and impact requirements of MC-HL, TC-HL listed cable should be acceptable for use in zone 1 locations which excludes zone 0 locations. These cables have been used in Zone 1 locations in Europe for several years without problems.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 14-87.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-83 Log #938 NEC-P14
(505.15(B)(1))

Final Action: Reject

Submitter: Dorothy Kellogg, American Chemistry Council

Comment on Proposal No: 14-93

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/vapor tight overall jacket of suitable polymeric material, separate dedicated grounding conductor) 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 between a cable tray and the utilization apparatus when secured at intervals not exceeding 1.8 m (6 ft) and supported and protected against physical damage using mechanical protection, such as struts, angles, or channels.

Substantiation: Within hazardous (classified) locations, the NEC currently permits the use of a Type SO cord for limited flexibility for explosionproof to explosionproof enclosures (501.4a(2)). Clearly, Type SO is not as robust a cable as is Type TC-HL. Additionally, an explosionproof enclosure is designed to contain the potential ignition effects of arcing sparking devices. Type "e" equipment does not have arcing or sparking contacts and is not designed for containment of an ignited gas, like explosionproof is. So, if the code currently permits without industry restrictions a lesser grade cable to be used to connect with a greater ignition hazard potential, there should be no basis for denying the use within a restricted controlled industry, the use of a more robust cable, to interconnect a less ignition prone enclosure. The last sentence reflects the deletion of the "open wiring" issue that was addressed by other proposals. The same apparent use of TC-HL was also addressed in Proposals 14-94, 14-97, 14-98 and 14-99.

Additionally, in response to the Committee comment that the committee “does not accept the substantiation that Zone 1 has a lower level of risk than Division 1”, if one compares the NEC definitions of a Class I, Division 2 location with that for a Class I, Zone 2 location, one will conclude that these represent the same hazard potential. If the comparison is made for Class I, Division 1, along with both Class I, Zone 1 and Class I, Zone 0, one will find that these align and that both deal with conditions of material being present to varying degrees but under normal operations. However, one should be able to see that Class I, Zone 1 is a subset of the complete conditional case of a Class I, Division 1 condition; and not vice versa. Further, while there may be some matchup examples, these two conditions are not equal. It is because of this difference that Class I, Zone 0, 1, or 2 listed equipment may only be used in Class I, Division 2 locations for the same gas and temperature class (501.1). Also, because of this difference, Class I, Division 1 listed equipment is permitted to be additionally marked as Class I, Zone 1, or Class I, Zone 2, respectively (505.9(C)(1)(1)).

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 14-87.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

WECHSLER: We are voting against the Panel action and the referenced substantiation as contained in 14-87. The majority of the submitter’s substantiation is addressing the TC-HL as a permissive cable in a Zone 1 location. Metallic cable armor is recognized as an important feature for providing protection against physical damage in Zone 1 locations and TC-HL does not provide this feature of protection.”

Within hazardous (classified) locations, the NEC currently permits the use of a Type SO cord for limited flexibility for explosionproof enclosures (501.4a(2)) within a Class I, Division 1 location. Type SO cord is not an armored cable. Additionally, if one compares the NEC definitions of a Class I, Division 1 along with both Class I, Zone 1 and Class I, Zone 0, one will find that these align and that both deal with conditions of material being present to varying degrees but under normal operations. However, one should be able to see that Class I, Zone 1 is a subset of the complete conditional case of a Class I, Division 1 condition; and not vice versa. So Type SO used in a Class I, Division 1 location might be expected to be more “at risk” than the use of this non armored cable in a Class I, Zone 1 location.

An explosionproof enclosure is designed to contain the potential ignition effects of arcing sparking devices. Type “e” equipment does not have arcing or sparking contacts and is not designed for containment of an ignited gas, like explosionproof is.

So in conclusion, the NEC already permits a less robust, non armored cable, Type SO, to be used with an explosionproof, but the panel action will not permit the better cable Type TC-HL to be used to connect to Type “e” enclosure which has a lower risk hazard than explosionproof enclosure. Thus the Panel substantiation is neither correct nor logical. For the conditions defined within this proposal, this proposal should have been accepted.

14-84 Log #3342 NEC-P14
(505.15(B)(1))

Final Action: Reject

Submitter: Heinz Bockle, R. Stahl Inc.

Comment on Proposal No: 14-96

Recommendation: There is a distinct difference between an area of Class I, Division 1, NEC 2002 article 500.5(B) and an area of Class I, Zone 1, NEC 2002 article 505.5(B)(2). Class I, Division 1 includes Zone 0 and Class I, Zone 1 excludes Zone 0.

There is also a distinct difference between the electrical equipment designed for these areas: Explosion Proof Apparatus is used in Class I, Div 1 and is capable to withstand an internal explosion. “Increased Safety” type “e” apparatus is used in Class I, Zone 1 and does not contain a source of ignition, NEC 2002, article 505.2.

In the wiring requirements, the NEC 505.15, in spite of these fundamental differences in area classification (risk) as well as in design criteria and purpose of “increased Safety” type “e” apparatus, does not make any difference.

Substantiation: The proposed wiring method for Zone 1 would provide for this need and would give the US user the choice to install non-armored cable within the specified limits of the proposal. The proposed TC cable is UL tested to the stringent crush and impact requirements specified in UL 2225 which are the same as for the type MC-HL cable. (UL File 123629).

Panel Meeting Action: Reject

Panel Statement: This comment does not comply with 4-4.5(c) of the Regulations Governing Committee Projects because it does not provide a recommended action.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-85 Log #3343 NEC-P14
(505.15(B)(1))

Final Action: Reject

Submitter: Heinz Bockle, R. Stahl Inc.

Comment on Proposal No: 14-96

Recommendation: Add a new part (C) as follows;

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” within the Class I, Zone 1 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 of equipment in lengths not to exceed 1.8 m (6 ft).FPN No. 1: Type TC-HL cable that is listed for us in Class I, Zone 1 locations meets the same crush and impact requirements as Type MC-HL cable.FPN No. 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 1, Zone 1 has a lower level of risk than class 1, 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 requirement 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 qualified Registered Professional Engineers. This wiring method provides a level of protection consistent with the requirements of Class 1, 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: See panel action and statement on Comment 14-87.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-86 Log #3443 NEC-P14
(505.15(B)(1))

Final Action: Reject

Submitter: Richard J. Buschart, Cable Tray Institute

Comment on Proposal No: 14-94

Recommendation: This proposal should be accepted.

Substantiation: This type of cable, with the requirements indicated in the proposal and limited to locations where qualified persons will service the installation should be acceptable for use in Class I, Zone 1 locations.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 14-87.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-87 Log #3898 NEC-P14
(505.15(B)(1))

Final Action: Reject

Submitter: Robert L. Seitz, Artech Engineering

Comment on Proposal No: 14-98

Recommendation: Proposal 14-98 should be reconsidered for acceptance as modified hereIn industrial establishments with restricted public access, where the conditions of maintenance and supervision ensure that only qualified persons will service the installations, and where the cable is not subject to physical damage, listed TC-HL cable with the crush and impact resistance required of MC-HL cable, with a gas/vapor tight 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 applications shall be permitted within Zone 1 locations, where the enclosure has type of protection “e” or-and where the conditions of (1) through (5) below are met.(1) Type “d” enclosures are factory sealed with type “e” field termination’s (type “de” protection”:

(2) Flameproof (type “d”) and explosion proof enclosures only contain termination’s (termination housing is isolated or factory sealed from arc and heat-producing components)

(3) Seal are provided for each cable entering flameproof (without increased safety type “e” termination’s) or explosion proof enclosures (505(B)(7)

(4)(1) Cables re-installed in cable tray or raceway

(5) (2) Unsupported cable between cable tray or raceway and end device is 1.8 meters or less and installed in a manner to avoid tensile stress at the termination fittings.

Then change the existing (c) to (d), (d) to (e) and (e) to (f).

Substantiation: This will be a lengthy comment as the critical need for non-armored cable to be permitted in Zone 1 locations is a matter of safety and of practicality. My proposal that would allow a non-armored cable to be permitted in a Zone 1 location was rejected, and I am begging for a reconsideration as safety is the primary issue and practicality a secondary issue. The use of non-armored cable, under appropriate restraints and constraints would provide a more safe and a more practical installation, with a resultant greater interest in building new facilities. The conductive armor of the MC-HL cable is the one attribute that provides the safety problem on many occasions. All applications where, during construction (and during operations repairs) that the MC-HL cable must be disconnected to allow removal of pipe spool pieces, motors or other equipment the armor of the MC-HL cable is usually "crimped" as it is difficult to get out of the way of the work activity, so is pushed on until it "stays put", which is when the armor "crimps". Whether or not the integrity of the armor has actually been compromised the inspectors usually see the crimp and require the cable to be replaced. During construction activities of the first Zone project in the US at least one MC-HL cable a day for about 2 months were replaced because of the crimping. Thus my initial experience that led me to seek after permission to install non armored cable in zone 1 areas. While there are some areas of Division 1 areas that have identical risk as of a Zone 1, all those portions of Division 1 that are equivalent to Zone 0 are excluded from a Zone 1 area. Where the continuous and long term emissions of combustible gas are eliminated, where ventilation is incorporated to maintain levels of emission below combustible levels when leaks occur, and where OSHA and EPA requirements dictate low leakage rates and safe work places, the Zone 1 areas have a much lower level of risk than do the "old" Division 1 areas of just 20 years ago. Designs are inherently more safe, equipment's leak less, ventilation is used more prudently and combustible gas detectors are used judiciously, so that the "risk" in a Zone 1 area is intended to be much lower than a Division 1 location might be. I had occasion last year to travel to Germany and see how Zone installations are done there, in two refineries and two chemical plants. Two facilities were older (i.e 30 years) and two were new (less than 5 years). All areas, unclassified, Zone 2 and Zone 1 used non-armored cable and none of the cables seemed at risk being damaged by any work process, even where exposed and unsupported. There were many different cable constructions used, but all were "non armored". Each cable type was appropriate for the application. All cables were run in cable trays throughout the plant. The tray was primarily the "wire basket" type tray that is available in sizes as small as 2" X 2" and run right up to instruments, devices and equipment's. Control stations, Fluorescent fixtures and other lightweight devices were even mounted to the "basket tray" to limit the length of exposed and unsupported cable between tray and device. Conduits were used as "sleeves" to provide protection primarily where cables were "dropped" to instruments and other devices in difficult to get to locations. MC-HL cable connections to instruments (pressure transmitters, temperature transmitters, etc.) and to switches (pressure, temperature, etc.) which would be single pair, triad, quad, single pair and 4 conductor cables (with ground) are among the most difficult and vulnerable connections. These connections are the one's I most strongly want the ability to use non-armored cable. These devices are most subject to frequent removal (either because the spool piece, valve or associated equipment) must be removed for repair or replacement. Even though MC-HL cable of this size is required to be supported within 12" of the termination, it is when the cable is de-terminated or the instrument uninstalled and the cable folded back that the crimp in the armor occurs. The supports for the MC-HL cable must often be removed to allow room to remove the equipment or spool piece as the 12" requirement impinges upon its space. The availability of the "wire basket" tray allows small cable tray to be used from the larger basket tray or ladder tray to close proximity of each device or piece of equipment, so that "exposed" cable is much less likely than installations of just a few years ago. We are not asking for us of non-armored cable in "exposed" application. We are not asking for the use of non-armored cable in "unsupported" application except where necessary for transitions and for connection to devices and equipment's. Where cables must be run "exposed" I would clearly use MC-HL cable. Where cables are subject any physical abuse I require guarding and protection, even for MC-HL cable. Where forklifts and front-end loaders are used within a plant MC-HL cable and even conduit are not immune to damage. Routing is the best way to protect a cable. Non-armored cable without the "basket" tray can more easily be routed in safer areas, as the large bending radius of MC-HL cable prohibits some routing and prohibits its installation in the "smaller" trays. I can therefore actually provide a "safer" installation with the non-armored cable than that for the MC-HL Cable. The sample of Cable that we have found that has been demonstrated to have a crush and impact resistance that exceed the requirement for MC-HL cable is of a very tight construction, has a jacket that is difficult to cut with even a sharp blade, yet is quite flexible. This cable has been tested with a non-metallic cable terminator and "tested" for pull out tension. Various methods of applying tension to the cable with this terminator (connector) that simulate real work place occurrences were tried and the cable and connector held together. I believe that we have found both nonarmored cable and connectors currently manufactured that meet the requirements for safe installation in a Zone 1 environmental and actually allow more practical and safer installations than if only

MC-HL cable is permitted. Once a non-armored cable is "permitted" in Zone 1 areas acceptance criteria would have to be developed and standards for the new "TC-HL" cable developed. This TC-HL cable would cover Power, Control and Instrument cable applications. Conduit installation is not often a desired alternative as the conduit fittings degrade the environmental integrity to about IP54. Where better integrity is required only cable connections should be made. While I feel that it is important that non-armored cable be permitted to be connected to flameproof and explosion proof housings (under the conditions stated in my original proposal) to allow direct connection of these cables to instruments and other control devices that are so housed, I am willing to back off to seek only approval for connection to only Type "e" enclosures. If, however, the panel sees the value of non-armored cable and that the use of non-armored cable can actually enhance the safety of the installation, consideration of my original proposal is encouraged. Thus the new proposal would only allow non-armored cable between type "e" enclosures only. There are no explosions to contain on either end. There are, however, sealable connectors for non-armored cables available that are metallic and use the epoxy sealant used in MC Cable connectors, that would contain the explosion in flameproof (type "d") housings. I don't know about explosion proof (Div 1 housings). Where the termination portion of the device is factory sealed a sealed connection would only be necessary because the termination's are not type "e" Where, however, a factory sealed device with type "e" termination's are used, a non sealed connector would be appropriate, just as if the connection was to a type "e" enclosure. The added aspect of cables run in from unclassified and zone 2 locations to a zone 1 location has not even been addressed in my proposal or any of the others who submitted on this issue. I will, however, discuss it here just to get some more information out there. Cables run from the outside would be allowed to be TC cable within those areas. If non armored cable is permitted in Zone areas, seals at the boundary would not be necessary as the jackets are required to be gas/vaportight already. The connection at the Zone 1 end would be required to be sealed connection, not for explosion containment, but to prevent gas migration as the cable is not certified in any way to prevent the migration of gas down the core of the cable. It is my opinion that non armored cable should not only be permitted within a Zone 1 area, but also between Zone 1 and Zone 2 or unclassified areas. The Risk of damage to any cable is often much greater in the "unclassified" or non hazardous location because of the greater exposure to heavy equipment and greater activity. We do manage to find ways to provide the protection. Where there is a risk of cable damage coincident with the presence of combustible gas, protection of the cable can easily be provided; a tough, resistant to damage cable (TC-HL) cable is available and the presence of 100% combustible atmosphere's extremely rare. Since most facilities now employ combustible gas detectors to detect combustible gas levels at very low levels, initiate increased ventilation of 20% LEL levels and shut down processes at 50% LEL the risk of explosion is minimized. I have been participating in ISA SP 84 committee activities which is involved with Safety Instrumented Systems (including ESD, Fire and Gas and other safety controls). I am newly elected to ISA SP12 which is dealing with the Hazardous location standards and issues. I am also on the IEEE 1584 (Arc Flash) committee and the IEEE 515 (Electric Heat Trace) committee. Each of these have application to make hazardous locations whether Division or Zone safer work places and guidance for design and installation of systems and equipment that are safer than what has existed in times past. Many of the Codes and Standards with which we have worked in the past were very prescriptive and did not allow much "engineering" flexibility or allow for new products or new technologies. There is some trend away from the prescriptive approach and to a guided approach that allows engineers and others to make calculated and informed choices for new installations. The application of non armored cable in Zone 1 areas is one of those areas that should make more allowance. In general, in a Zone 1 application we are not trying to contain explosions. We are generally trying to prevent the explosion. The Armor of an MC-HL cable should not be considered for it's explosion containment capabilities except where connected to a Division 1 explosion proof enclosure. The armor should not be reconsidered at provided protection from all "sharp" objects as sharp objects under sufficient force will penetrate the armor. Protection of the cable to limit such exposure is the best approach. The Risk of "sharp" objects causing damage to the extent that they can penetrate an armored jacket or non-armored jacket is very, very remote. Even conduit cannot fully protect. I've seen heavy loads set on runs of conduit that completely flattened the conduit and the conductors within.

Panel Meeting Action: Reject

Panel Statement: The majority of the submitter's substantiation is addressing the TC-HL as a permissive cable in a Zone 1 location. Metallic cable armor is recognized as an important feature for providing protection against physical damage in Zone 1 locations and TC-HL does not provide this feature of protection.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

COOK: I agree with the panel action and statement. In addition to the metallic cable armor providing physical protection, I believe it should be noted that the armor would also provide some containment of an arc that could occur within the circuit. The proposed nonmetallic jacket would not seem to provide an equal level of protection.

14-88 Log #408 NEC-P14 **Final Action: Reject**
(505.15(B)(1)c.)

Submitter: Robert Huddleston, Jr. Gray, TN
Comment on Proposal No: 14-99
Recommendation: Proposal 14-99 should be accepted.
Substantiation: Type TC-HL cable should be approved for use in Zone 1 locations. It is a proven, safe method of wiring devices and has been safely used in Europe for years. This cable meets the crush and impact requirements of type MC-HL cable, which is currently approved for Zone 1 installations. Cable termination fittings are available for this cable which are capable of meeting the pullout requirements for Zone 1 equipment. It is time for Panel 14 to accept this safe, proven method of installation in Zone 1 locations.
Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 14-87.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

14-89 Log #985 NEC-P14 **Final Action: Accept**
(505-15(C)(1)(c))

Submitter: Dorothy Kellogg, American Chemistry Council
Comment on Proposal No: 14-102
Recommendation: Continue to support the replacement of the term "open wiring" with the text modifications contained within the actions as taken during the ROP stages by the committee on this proposal.
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 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 sections 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 section 398.2 defined term where the text suggests as in 300.16(A); 312.5(B); 314.17(B); 314.17(C).
Panel Meeting Action: Accept
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

14-90 Log #3416 NEC-P14 **Final Action: Accept in Principle**
(505.16(B)(1), and 501-16(B)(1) Exception No. 2)

Submitter: Robert L. Seitz, Artech Engineering
Comment on Proposal No: 14-103
Recommendation: Proposal 14-103 should be accepted as modified here:
Exception No. 2: Conduit and/or conduit fittings shall be allowed permitted to be connected to a type "e", "de" or other enclosure with the "e" terminations enclosure provided only tapered threads (no straight thread couplings) are included in the installation between the enclosure and only cable connector or conduit cable.
FPN: The purpose of a seal at a type "e" enclosure is to assure the ingress protection (environmental integrity) of the installed "e" enclosure to meet or exceed the required IP54 ingress protection rating. Conduit fittings with tapered thread joints are considered to maintain IP54.
Substantiation: This addition to this article is necessary to 1) prevent the unnecessary use of a seal fitting and 2) allow conduit fittings to be installed between cable connectors and a type "e" enclosure. In this application, the seal fitting is not for the containment of an explosion, but only to restrict the entry of moisture or dust that might contaminate the terminations in the type "e" enclosure. By restricting the installation to only fittings with tapered thread joints, conduit couplings which have straight threads are disallowed. MC-HL cables are stiff and have a relatively large bending radius, so that direct entry to an enclosure is not always possible. Allowing unions and 90° fittings to be installed between hubs and the cable connector would permit reasonable installations. If conditions require an ingress protection greater than IP54, the FPN provides guidance on why conduit fittings are not permitted for those installations. This also gives a limit to the use of conduit connections to type "e" enclosures.

Panel Meeting Action: Accept in Principle
Panel Statement: The panel notes that the reference to 501.16(B)(1) is incorrect, and the action on this comment does not impact that section. See the panel action and statement on Comment 14-91.
Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

14-91 Log #108 NEC-P14 **Final Action: Accept in Principle**
(505.16(B)(1) Exception No. 2, FPN)

Note: Based on the affirmative voting comments, the Technical Correlating Committee directs that the main paragraph of 505.16(B)(1) be revised to read:

"(1) Type of Protection "d" or "e" Enclosures. Conduit seals shall be provided within 50 mm (2 in.) for each conduit entering enclosures having type of protection "d" or "e"."

This paragraph will be followed by the panel action text of this comment.

Submitter: Robert L. Seitz, Artech Engineering
Comment on Proposal No: 14-103
Recommendation: Proposal 14-103 should be accepted as modified here:
Exception No. 2: Conduit and/or conduit fittings shall be allowed permitted to be connected to a type "e", "de" or other enclosure with type "e" terminations enclosure, provided only tapered threads (no straight thread couplings) are included in the installation between the enclosure and any cable connector or conduit seal.

FPN: The purpose of a seal at a type "e" enclosure is to assure the ingress protection (environmental integrity) of the installed "e" enclosure to meet or exceed the required IP54 ingress protection rating. Conduit fittings with tapered thread joints are considered to maintain IP54.

Substantiation: This addition to this article is necessary to 1) prevent the unnecessary use of a seal fitting, and to allow conduit fittings to be installed between cable connectors and a type "e" enclosure. In this application, the seal fitting is not for the containment of an explosion, but only to restrict the entry of moisture or dust that might contaminate the terminations in the type "e" enclosure. By restricting the installation to only fittings with tapered thread joints, conduit couplings which have straight threads are disallowed. MC-HL cables are stiff and have a relatively large bending radius, so that direct entry to an enclosure is not always possible. Allowing unions and 90° fittings to be installed between hubs and the cable connector would permit reasonable installations. If conditions require an ingress protection greater than IP 54, the FPN provides guidance on why conduit fittings are not permitted for those installations. This also gives a limit to the use of conduit connections to type "e" enclosures.

Panel Meeting Action: Accept in Principle

Add two new exceptions and a fine print note to 505.16(B)(1) to read:
Exception No. 2 For type of protection "e", conduit and fittings employing only NPT to NPT raceway joints or fittings listed for type of protection "e" shall be permitted between the enclosure and the seal, and the seal shall not be required to be within 50 mm (2 in.) of the entry.
FPN: Examples of fittings employing other than NPT threads include: conduit couplings, capped elbows, unions, and breather drains.
Exception No. 3 For conduit installed between type of protection "e" enclosures employing only NPT to NPT raceway joints or conduit fittings listed for type of protection "e", a seal shall not be required.

Panel Statement: The exceptions added to 505.16(B)(1) address the installation concerns expressed in the submitter's substantiation.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

BRIESCH: My meeting notes indicate that, in addition to the two exceptions and the FPN, the panel action was to also revise the text of 505.16(B)(1). 505.16(B)(1) should read:

Type of Protection "d" or "e" Enclosures. Conduit seals shall be provided within 50 mm (2 in.) for each conduit entering enclosures having type of protection "d" or "e".

Without this revision, Exception No. 2 is an exception to a rule that doesn't exist.

COOK: In the discussion for this comment, I believe the intent was to add a requirement to 505.16(B)(1) for seals to be located within 50 mm (2 in.) of the entry. Currently required, but no location is specified. If that is done, then proposed Exception No. 2 would make sense. If that is not done, then an exception would be provided for a requirement that does not exist.

ENGLER: 505.16(B)(1) should read:

"Type of Protection "d" or "e" Enclosures. Conduit seals shall be provided within 50 mm (2 in.) for each conduit entering enclosures having type of protection "d" or "e"."

Without this change to 505.16(B)(1), Exception No. 2 which was added by the panel action on the comment, does not have a subject rule.

LAWRENCE: Based on my review of the comments on the ballot by Mr. Briesch and Mr. Cook, I agree with them. My notes agree with those of Mr. Briesch.

The panel action, in addition to the revisions shown for the Fine Print Notes, was to revise 505.16(B)(1) to read: "Type of Protection "d" or "e" enclosures. Conduit seals shall be provided within 50 mm (2 in.) for each conduit entering enclosures having type of protection "d" or "e"."

Without this text, Exception No. 2 refers to a rule that does not exist.

14-92 Log #984 NEC-P14 **Final Action: Accept**
(505-16(C)(1)(b) Exception No. 2)

Submitter: Dorothy Kellogg, American Chemistry Council
Comment on Proposal No: 14-105
Recommendation: Continue to support the replacement of the term "open wiring" with the text modifications contained within the actions as taken during

the ROP stages by the committee on this proposal.

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 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 sections 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 section 398.2 defined term where the text suggests as in 300.16(A); 312.5(B); 314.17(B); 314.17(C).

Panel Meeting Action: Accept
Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-93 Log #793 NEC-P14
(505.16(D)(3))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-106

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See the panel action and statement on 14-94.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-94 Log #673 NEC-P14
(505.16(E)(3))

Final Action: Accept in Principle

Submitter: Ted H. Schnaare, Emerson Process Management - Rosemount Division

Comment on Proposal No: 14-106

Recommendation: Instead of the panel proposal developed during the ROP meeting, use the following text which is a revision of the current NEC.

Add new material to the end of the existing 505.16(E)(3):

Process connected equipment that is used as and marked “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: The panel action on this proposal goes too far too fast. While the ISA 12.27.01 standard is presumably better than the almost complete lack of equipment requirements for process sealing that existed prior to its introduction, it is a new and untested standard. The above modified wording introduces the concept of “Dual Seal” rated equipment without eliminating or changing the existing text. This will allow installers to continue to follow their current practices with regard to this issue until process connected equipment can be examined and listed in accordance with the new standard. It will also provide the opportunity for the standard to be used and improved before it is viewed as mandatory by the code. As it stands, the panel action could make it very difficult to install certain types of measurement equipment that may have difficulty meeting the Dual Seal requirements of ISA 12.27.01 but provides a critical safety monitoring function. If this is the case, the new requirements could actually lead to a much more hazardous situation than if the panel would have taken no action at all.

The above comment is very similar to the original ISA proposal with the exception of the following:

- It does not refer to “Single Seal” devices
- It requires “listing”

Removing the “Single Seal” allowance and adding the “listing” requirement improves the original ISA proposal in the two areas that were of most concern to the panel members during the ROP meeting.

Panel Meeting Action: Accept in Principle

Revise text proposed in the comment to read: Process-connected equipment that is used as listed and marked “Dual Seal” shall 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.

Panel Statement: The panel has changed the word “used” to “listed” based on the wording in the submitter’s original comment. There appears to have been a transcription error in the copy provided to the panel. Modifications to the original proposal removed the reference to “single seal process connected equipment”. See panel action and statement on Comment 14-47.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-95 Log #794 NEC-P14
(506 (New))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-108a

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See the panel action on Comment 14-97.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

Comment on Affirmative:

COOK: I agree with the panel action to accept Comment 14-95, but do not agree that all of the questions have been addressed. See my votes and statements on Comments 14-96 and 14-97.

ENGLER: When based on the TCC comment to remove the references to the IEC standards, the panel deleted the “IEC” protection techniques from 506.8 and replaced them with the traditional “Division” techniques, it should also have deleted the marking of 506.9(C)(2) which is specific to those “IEC” protection techniques. The text of (2) requires all “Division” equipment to be additionally marked before it can be used, negating the permission of (1). Without the deletion of (2), Article 506 will likely be unusable.

The suggested text change to correct this correlation problem is as follows:

506.9 Equipment Requirements

(C) Marking. Equipment shall be marked in accordance with 506.(C)(1)(2).

(1) Division Equipment. Equipment identified for Class II, Division 1 or Class II, Division 2 shall, in addition to being marked in accordance with 500.8(B), be permitted to be marked with the following:

(1) Zone 21 or Zone 22 (as applicable), and

(2) Temperature classification in accordance with 506.9(D)(1).

(2) Zone Equipment. Equipment meeting one or more of the protection techniques described in 506.8 shall be marked with the following in the order shown:

1) Symbol “AEx”

2) Protection technique(s)

3) Zone

4) Temperature classification, marked as a temperature value, in degrees C

5) Ambient temperature marking in accordance with 506.9(D).

LAWRENCE: When based on the TCC comment to remove the references to the IEC standards, the panel deleted the “IEC” protection techniques from 506.8 and replaced them with the traditional “Division” techniques, it should also have deleted the marking of 506.9(C)(2) which is specific to those “IEC” protection techniques. The text of (2) requires all “Division” equipment to be additionally marked before it can be used, negating the permission of (1).

Without the deletion of (2), Article 506 will likely be unusable.

The suggested text change to correct this correlation problem is as follows:
506.9 Equipment Requirements

(C) Marking. Equipment shall be marked in accordance with 506.(C)(1)(2).

(1) Division Equipment. Equipment identified for Class II, Division 1 or Class II, Division 2 shall, in addition to being marked in accordance with 500.8(B), be permitted to be marked with the following:

- 1) Zone 21 or Zone 22 (as applicable), and
- 2) Temperature classification in accordance with 506.9(D)(1).
- (2) Zone Equipment. Equipment meeting one or more of the protection techniques described in 506.8 shall be marked with the following in the order shown:
 - 1) Symbol "AEx"
 - 2) Protection technique(s)
 - 3) Zone
 - 4) Temperature classification, marked as a temperature value, in degrees C
 - 5) Ambient temperature marking in accordance with 506.9(D).

14-96 Log #942 NEC-P14
(506)

Final Action: Accept in Part

Submitter: Dorothy Kellogg, American Chemistry Council

Comment on Proposal No: 14-108a

Recommendation: 1) Take action to support as a panel statement the concept of an Article 506 to address zones 20, 21, and 22, but

- 2) Table this proposal and
- 3) Establish a Technical subcommittee with membership from CMP 14 as well as the NFPA EECA Committee to address issues and details addressed in our statement below (and perhaps those comments from others) by expanding the list presented in our statement for this comment.

Substantiation: 1) Resolution of the apparent position taken by NFPA/NEC TCC opinion which suggests that this document cannot reference IEC standards within this primarily, US National Electrical Code, subtitled "International Electrical Code". What does "International" mean if international standards, such as IEC documents, are to be excluded. By further implication it also appears that NFPA is also establishing a position that an IEC addressed installation cannot be installed within the U.S. We take strong issue against this seemingly apparent position.

2) Within the US and based upon numerous technical papers addressing combustible dusts, it has been determined that not all combustible dusts present the same hazards. For example, metallic dusts generally offer a greater range of potential concerns that some chemical, agricultural or carbonaceous dusts. For this reason, combustible dusts have been classified into three groups; with each group having some different characteristics that affect their protection techniques. Article 506 does not address these considerations. It would also tend to "muddy" the installation by the inclusion of ignitable fibers within the same mix. This is an important consideration that needs to be fully addressed.

3) Along with the concern indicated in item 1 above, it also appears that currently few products are available that can be used within the defined Zone 20, 21 and 22 conditions. It would thus appear that it is too soon to issue this as a complete document at this time. We would like to see a proposal that can be utilized when it is implemented as a standard.

4) As has been provided for flammable/combustible gases/vapors, users need the ability to work within either a zone or the traditional Class II, Division 1 and 2 combustible dust conditions. Specifically, what are the hazardous (classified) location extent recommendations for these zones and how do these align with what will become the prescribed installation. Coordination with members of the EECA Committee may be able to aid in developing transitional recommendations/rules. Additionally, the lack of defined combustible dust groups and the inclusion of ignitable fibers, seems to present some significant obstacles to the overall installation rules, as compared with current US installation practices and these aspects need to be better harmonized. Again, participation by members of the EECA Committee may aid in helping to resolve these issues.

5) We do not support the inclusion of the qualified registered professional engineer and feel that by taking the action to table this proposal and have a subcommittee review and edit a new proposal document, as we recommend that the result will be a complete, understandable user-installation package.

Panel Meeting Action: Accept in Part

Panel Statement: The panel action on Comment 14-97 addresses the first recommended action. The panel has made other revisions to the original proposal and is of the opinion that inclusion of Article 506 in the 2005 NEC is necessary. The panel rejects the portion of the recommendation to table the original proposal and establish a technical subcommittee.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 14 Negative: 1

Explanation of Negative:

COOK: Although I do not share all of the concerns expressed in the substantiation for this comment, I do believe the recommended action is appropriate.

Comment on Affirmative:

LAWRENCE: See my comment on affirmative on Comment 14-95.

14-97 Log #1350 NEC-P14 **Final Action: Accept in Principle**
(506)

Note: 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.

In addition, the Technical Correlating Committee directs that the title of the Article be revised to read "Zone 20, 21 and 22 Locations for Combustible Dusts, Fibers, and Flyings".

The Technical Correlating Committee directs that 506.9(C) be revised to read as shown in Mr. Briesch's Comment on Vote.

Submitter: Al Engler, EGS Electrical Group

Comment on Proposal No: 14-108a

Recommendation: Revise to read as follows:

ARTICLE 506

Class II, Zone 20, 21 and 22 Locations

506.1 Scope. This article covers the requirements for the Zone classification system as an alternative to the Class II and Class III, Division 1 and Division 2 classification system covered in Article 500 for electrical and electronic equipment and wiring for all voltages in Zone 20, Zone 21 and Zone 22 hazardous (classified) locations where fire and explosion hazards may exist due to combustible dusts, fibers, or flyings.

FPN 1: For the requirements for electrical and electronic equipment and wiring for all voltages in Class I, Division 1 or Division 2; Class II, Division 1 or Division 2; Class III, Division 1 or Division 2; Class III, Division 1 or Division 2; and Class I, Zone 0 or Zone 1 or Zone 2 hazardous (classified) locations where fire or explosion hazards may exist due to flammable gases or vapors, flammable liquids, or combustible dusts or fibers, refer to Articles 500 through 505.

FPN 2: Zone 20, Zone 21 and Zone 22 area classifications are based on the modified IEC area classification system as defined in ISA 12.10.05, *Electrical Apparatus for Use in Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations - Classification of Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations (IEC61241-10 Mod)*, and IEC 61241-10, *Electrical Apparatus for use in the Presence of Combustible Dust, Part 10: Classification of areas where combustible dusts are or may be present, and does not divide combustible dusts and fibers into Class II for dust, and Class III for fibers and flyings, as defined in 500.5 (C) and (D); but treats dust, fibers and flyings equally.*

506.2 Definitions. For purposes of this article, the following definitions apply.

Protection by enclosures "tD". Type of protection for electrical equipment based on the limitation of the maximum surface temperature of the enclosure and on other surfaces which could be in contact with dust, fibers and flyings, and on the restriction of dust, fiber, or flying ingress into the enclosure.

Protection by pressurization "pD". Type of protection that guards against the ingress of a mixture of combustible dust, fibers, or flyings in air into an enclosure containing electrical equipment by providing and maintaining a protective gas atmosphere inside the enclosure at a pressure above that of the external atmosphere.

FPN: For additional information see IEC 61241-2, *Electrical Apparatus for use in the Presence of Combustible Dust - Part 2: Electrical Apparatus - Protection by Pressurization (pD)*.

Protection by Intrinsic Safety "iD". Type of protection where any spark or thermal effect is incapable of causing ignition of a mixture of combustible dust, fibers, or flyings in air under prescribed test conditions.

Protection by encapsulation "mD". Type of protection where electrical parts that could cause ignition of a mixture of combustible dust, fibers, or flyings in air are protected by enclosing them in a compound in such a way the explosive atmosphere cannot be ignited.

Zone 20 Hazardous (Classified) Location. An area where ignitable dust is present continuously or for long periods of time in quantities sufficient to be hazardous, as classified by 506.5(B)(1).

Zone 21 Hazardous (Classified) Location. An area where ignitable dust is likely to exist occasionally under normal operation in quantities sufficient to be hazardous, as classified by 506.5(B)(2).

Zone 22 Hazardous (Classified) Location. An area where ignitable dust is not likely to occur under normal operation in quantities sufficient to be hazardous, as classified by 506.5(B)(3).

506.3 Other Articles. All other applicable rules contained in this Code shall apply to electrical equipment and wiring installed in hazardous (classified) locations.

Exception: As modified by this article.

506.4 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.
- (B) **Reference Standards.** Important information relating to topics covered in Chapter 5 may be found in other publications.

FPN: It is important that the authority having jurisdiction be familiar with the recorded industrial experience as well as with standards of the National Fire Protection Association (NFPA) and the ISA- International Society for Measurement and Control, 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.

506.5 Classification of Locations

- (A) **Classifications of Locations.** Locations shall be classified depending on the properties of the combustible dust, fibers or flyings that may be present and the likelihood that a combustible or combustible concentration or quantity is present. Where pyrophoric materials are the only materials used or handled, these locations shall not be classified. Each room, section or area shall be considered individually in determining its classification.
- (B) **Zone 20, Zone 21 and Zone 22 Locations.** Zone 20, Zone 21, and Zone 22 locations are those in which combustible dust, fibers or flyings are ~~is~~ or may be present in the air or in layers, in quantities sufficient to produce explosive or ignitable mixtures. Zone 20, Zone 21 and Zone 22 locations shall include those specified in 506.5(B)(1), (B)(2), and (B)(3).

FPN: Through the exercise of ingenuity in the layout of electrical installations for hazardous (classified) locations, it is frequently possible to locate much of the equipment in a reduced level of classification, and, thus, to reduce the amount of special equipment required.

- (1) **Zone 20.** A Zone 20 location is a location in which
- (2) Ignitable concentrations of combustible dust, fibers or flyings are present continuously, or
- (3) Ignitable concentrations of combustible dust, fibers or flyings are present for long periods of time.
- (4) ~~In which~~ Combustible metallic dusts are present continuously or for long periods of time in quantities sufficient to be hazardous.

FPN No. 1: As a guide to classification of Zone 20 locations, refer to in ISA 12.10.05, *Electrical Apparatus for Use In Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations- Classification of of Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations (IEC61241-10 Mod) and IEC 61241-10, Electrical Apparatus for use in the Presence of Combustible Dust, Part 10: Classification of areas where combustible dusts are or may be present.*

FPN No. 2: Zone 20 classification includes locations inside dust containment systems; hoppers, silos, etc, cyclones and filters, dust transport systems, except some parts of belt and chain conveyors, etc; blenders, mills, dryers, bagging equipment, etc.

- (5) **Zone 21.** A Zone 21 location is a location
- (6) In which ignitable concentrations of combustible dust, fibers or flyings are likely to exist occasionally under normal operating conditions; or
- (7) In which ignitable concentrations of combustible dust, fibers or flyings may exist frequently because of repair or maintenance operations or because of leakage; or
- (8) In which equipment is operated or processes are carried on, of such a nature that equipment breakdown or faulty operations could result in the release of ignitable concentrations of combustible dust, fibers or flyings and also cause simultaneous failure of electrical equipment in a mode to cause the electrical equipment to become a source of ignition; or
- (9) That is adjacent to a Zone 20 location from which ignitable concentrations of dust, fibers or flyings could be communicated, unless communication is prevented by adequate positive pressure ventilation from a source

of clean air and effective safeguards against ventilation failure are provided.

FPN No. 1: As a guide to classification of Zone 21 locations, refer to in ISA 12.10.05, *Electrical Apparatus for Use In Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations- Classification of of Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations (IEC61241-10 Mod) and IEC 61241-10, Electrical Apparatus for use in the Presence of Combustible Dust, Part 10: Classification of areas where combustible dusts are or may be present.*

FPN No. 2: This classification usually includes; locations outside dust containment and in the immediate vicinity of access doors subject to frequent removal or opening for operation purposes when internal combustible mixtures are present; locations outside dust containment in the proximity of filling and emptying points, feed belts, sampling points, truck dump stations, belt dump over points, etc. where no measures are employed to prevent the formation of combustible mixtures; locations outside dust containment where dust accumulates and where due to process operations the dust layer is likely to be disturbed and form combustible mixtures; locations inside dust containment where explosive dust clouds are likely to occur (but neither continuously, nor for long periods, nor frequently) as e.g. silos (if filled and/or emptied only occasionally) and the dirty side of filters if large self-cleaning intervals are occurring.

- (10) **Zone 22.** A Zone 22 location is a location
- (11) In which ignitable concentrations of combustible dust, fibers or flyings are not likely to occur in normal operation, and if they do occur, will only persist for a short period; or
- (12) In which combustible dust, fibers, or flyings are ~~is~~ handled, processed or used but in which the dust, fibers, or flyings are ~~is~~ normally confined within closed containers of closed systems from which they can escape only as a result of the abnormal operation of the equipment with which the dust, fibers, or flyings are ~~is~~ handled, processed or used; or
- (13) That is adjacent to a Zone 21 location, from which ignitable concentrations of dust, fibers or flyings could be communicated, unless such communication is prevented by adequate positive pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.

FPN No. 1: As a guide to classification of Zone 22 locations, refer to in ISA 12.10.05, *Electrical Apparatus for Use In Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations- Classification of of Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations (IEC61241-10 Mod) and IEC 61241-10, Electrical Apparatus for use in the Presence of Combustible Dust, Part 10: Classification of areas where combustible dusts are or may be present.*

FPN No. 2: Zone 22 locations usually include; outlets from bag filter vents, because in the event of a malfunction there can be emission of combustible mixtures; locations near equipment that has to be opened at infrequent intervals or equipment that from experience can easily form leaks where, due to pressure above atmospheric, dust will be blow out: pneumatic equipment, flexible connections that can become damaged, etc.; storage locations for bags containing dusty product, since failure of bags can occur during handling, causing dust leakage; and locations where controllable dust layers are formed that are likely to be raised into explosive dust/air mixtures. Only if the layer is removed by cleaning before hazardous dust/air mixtures can be formed, the area is designated non-hazardous.

FPN No. 3: Locations that normally are classified as Zone 21 can fall into Zone 22 when measures are employed to prevent the formation of explosive dust/air mixtures. Such measures include exhaust ventilation. The measures should be used in the vicinity of (bag) filling and emptying points, feed belts, sampling points, truck dump stations, belt dump over points, etc.

506.6 Special Precautions.

Article 506 requires equipment construction and installation that ensures safe performance under conditions of proper use and maintenance.

FPN: It is important that inspection authorities and users exercise more than ordinary care with regard to the installation and maintenance of electrical equipment in hazardous (classified) locations.

- (A) **Supervision of Work.** Classification of areas and selections of equipment and wiring methods shall be under the supervision of a qualified Registered Professional Engineer.
- (B) **Dual Classification.** In instances of areas within the same facility classified separately, Zone 22 locations shall be permitted to abut, but not overlap, Class II, Division 2 locations. Zone 20 or Zone 21 locations shall not abut Class II, Division 1 or Division 2 locations.
- (C) **Reclassification Permitted.** A Class II, Division 1 or Division 2 location shall be permitted to be reclassified as a Zone 20, Zone 21, or Zone 22 location, provided that all of the space that is classified because of a single combustible dust, fiber or flying source is reclassified under the requirements of this article.

506.8 Protection Techniques. Acceptable protection techniques for electrical and electronic equipment in hazardous (classified) locations shall be as described in 506.8 (A) through (D). Equipment using the protection techniques as described in 506.8 (A) through (D) that are intended to be used in locations where combustible metal dust is present, shall be identified as being suitable for use in areas where combustible metal dust may be present.

FPN: For additional information see IEC 61241-0, *Electrical Apparatus for use in the Presence of Combustible Dust—Part 0: General Requirements*.

- (A) **Dust Ignitionproof.** This protection technique shall be permitted for equipment in Class II, Zone 20, Zone 21 and Zone 22 locations for which it is identified. **Protection by enclosures “iD”.** This protection technique shall be permitted for equipment in Zone 20, Zone 21 and Zone 22 locations for which it is identified.

FPN: For additional information see IEC 61241-1, *Electrical Apparatus for use in the Presence of Combustible Dust—Part 1: Electrical Apparatus—Protection by Enclosures “iD”*.

- (B) **Purged and Pressurized.** This protection technique shall be permitted for equipment in Class II, Zone 21 and Zone 22 locations for which it is identified. **Protection by pressurization “pD”.** This protection technique shall be permitted for equipment in Zone 20, Zone 21 and Zone 22 locations for which it is identified.

FPN: For additional information see IEC 61241-2, *Electrical Apparatus for use in the Presence of Combustible Dust—Part 2: Electrical Apparatus—Protection by Pressurization “pD”*.

- (C) **Intrinsic Safety.** This protection technique shall be permitted for equipment in Class II, Zone 20, Zone 21 and Zone 22 locations for which it is identified. Installation of intrinsically safe apparatus and wiring shall be in accordance with the requirements of Article 504. **Protection by intrinsic safety “iD”.** This protection technique shall be permitted for equipment in Zone 20, Zone 21 and Zone 22 locations for which it is listed:

FPN: For additional information see IEC 61241-0, *Electrical Apparatus for use in the Presence of Combustible Dust—Part 1: Electrical Apparatus—Intrinsically Safe Apparatus “iD”*.

- (D) **Dusttight.** This protection technique shall be permitted for equipment in Class II, Zone 22 locations for which it is identified. **Protection by encapsulation “mD”.** This protection technique shall be permitted for equipment in Zone 20, Zone 21 and Zone 22 locations for which it is identified.

FPN: For additional information see IEC 61241-18, *Electrical Apparatus for use in the Presence of Combustible Dust—Part 18: Electrical Apparatus—Protection by Encapsulation “mD”*.

506.9 Equipment Requirements

- (A) **Suitability.** Suitability of identified equipment shall be determined by one of the following:
 - (1) Equipment listing or labeling
 - (2) Evidence of equipment evaluation from a qualified testing laboratory or inspection agency concerned with product evaluation
 - (3) Evidence acceptable to the authority having jurisdiction such as a manufacturer’s self evaluation or an owner’s engineering judgement

(A) **Listing.**

- (1) Equipment that is listed for Zone 20 shall be permitted in a Zone 21 or Zone 22 location of the same dust, fiber, or flying. Equipment that is listed for Zone 21 may be used in a Zone 22 location of the same dust, fiber or flying.
- (2) Equipment shall be permitted to be listed for a specific dust, fiber or flying, or any specific combination of dusts, fibers or flyings.

- (A) **Marking.** Equipment shall be marked in accordance with 506.9(C)(1) or (2).

- (1) **Division Equipment.** Equipment identified for Class II, Division 1 or Class II, Division 2 shall, in addition to being marked in accordance with 500.8(B), be permitted to be marked with the following:

- (1) Class II, Zone 21 or Zone 22 (as applicable), and
- (2) Temperature classification in accordance with 506.9(D)(1).

- (1) **Zone Equipment.** Equipment meeting one or more of the protection techniques described in 506.8 shall be marked with the following in the order shown:

- 1) Symbol “AEx”;
- 2) Protection technique(s) in accordance with Table 506.20(F)(1)
- 3) Class II and Zone

FPN: Details on Method A and Method B testing can be found in IEC 61241-1, *Electrical Apparatus for use in the Presence of Combustible Dust, Part 1: Electrical Apparatus—Protection by Enclosures “iD”*.

- 4) Ingress protection level

FPN: Information on Ingress Protection can be found in IEC 60529: 1989, *Degrees of protection provided by enclosures (IP Code)*.

- 5) Temperature classification, marked as a temperature value, in degrees C
- 6) Where applicable, the maximum surface temperature T_s shall be marked as a temperature value, with the layer depth, L, indicated in mm;
- 7) Ambient temperature marking in accordance with 506.9(D).

- (A) **Temperature Classifications.** Equipment shall be marked to show the operating temperature referenced to a 40°C (104°F) ambient. Electrical equipment designed for use in the ambient temperature range between - 20°C and + 40°C shall require no additional ambient temperature marking. Electrical equipment that is designed for use in a range of ambient temperatures other than - 20°C and + 40°C is considered to be special; and the ambient temperature range shall then be marked on the equipment, including the either the symbol “T_a” or “T_{amb}” together with the special range of ambient temperatures. As an example such a marking might be “-30°C ≤ T_a ≤ + 40°C”. Electrical equipment suitable for ambient temperatures exceeding 40°C (104°F) shall be marked with both the maximum ambient temperature and the operating temperature at that ambient temperature.

Exception No. 1: Equipment of the non-heat producing type, such as conduit fittings, shall not be required to have a marked operating temperature.

Exception No. 2: Equipment identified for Class II, Division 1 or Class II, Division 2 locations as permitted by 506.20(B) and (C) shall be permitted to be marked in accordance with 500.6(D) and Table 500.6(D).

Installations in Chemical Processing Areas, for minimum ignition temperatures of specific dusts.

~~(F) — Types of Protection Allowed.~~

- (B) **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 foot). Such conduit shall be made wrenchtight to prevent sparking when the fault current flows through the conduit system, and to insure the integrity of the conduit system. Equipment provided with threaded entries for field wiring connections shall be installed in accordance with 506.9(E)(1) or (2).
- (1) **Equipment Provided with Threaded Entries for NPT Threaded Conduit or Fittings.** For equipment provided with threaded entries for NPT threaded conduit or fittings, listed conduit fittings, or cable fittings shall be used.
- (2) **Equipment Provided with Threaded Entries for Metric Threaded Conduit or Fittings.** For equipment with metric threaded entries, such entries shall be identified as being metric, or listed adapters to permit connection to conduit or NPT-threaded fittings shall be provided with the equipment. Adapters shall be used for connection to conduit or NPT-threaded fittings. Listed cable fittings that have metric threads shall be permitted to be used.

Substantiation: The intent of this proposal is to address concerns raised in the ballot comments put forward. Only the clauses where changes were made are included in the proposal text.

1. Change references to IEC standards as directed by the Correlating Committee, and not refer to standards that may not yet be published at the time the code takes effect.
2. Reduce the scope of Article 506 so it covers Class II hazardous dust areas only, and does not encompass fibers and flyings.
3. Does not define new methods of protection for Zone 20, 21, and 22 hazardous dust areas, and allows those methods of protection available per Article 502.
4. Address and clarify the special hazard caused by metal dust, since the Zone area classification system for hazardous dusts does not separate dusts into groups as the Class II system does.
5. Require listed equipment for Zone 20, 21, and 22 areas, so as not to have to address all of the special allowances that exist in Article 502.
6. Reword the marking requirements to eliminate the layer temperature marking and the IEC method of protection codes, and require Class II to be marked.

Panel Meeting Action: Accept in Principle

Revise proposed Article 506 to read:

ARTICLE 506

Zone 20, 21, and 22 Locations for Flammable Dusts, Fibers, and Flyings

506.15 Sealing. Where necessary to protect the ingress of dust, ~~fibers, or flyings~~, or to maintain the type of protection, such as ~~for Type of Protection pD; in pressurized enclosures~~, seals shall be provided. ~~The seal shall be identified as capable of preventing the ingress of dust and maintaining the type of protection, but need not be explosionproof or flameproof.~~

506.1 Scope. This article covers the requirements for the Zone classification system as an alternative to the division classification system covered in Article 500, Article 502 and Article 503 for electrical and electronic equipment and wiring for all voltages in Zone 20, Zone 21 and Zone 22 hazardous (classified) locations where fire and explosion hazards may exist due to combustible dusts, or ignitable fibers, or flyings. Combustible metallic dusts are not covered by the requirements of this article.

506.16 Flexible Cords. Flexible cords used in Zone 20, Zone 21, and Zone 22 locations shall comply with all of the following:

- (1) Be of a type listed for extra-hard usage.
- (2) Contain, in addition to the conductors of the circuit, a grounding conductor in complying with 400.23
- (3) Be connected to terminals or to supply conductors in a approved manner
- (4) Be supported by clamps or by other suitable means in such a manner that there will be no tension on the terminal connections
- (5) Be provided with suitable seals to prevent the entrance of dust, ~~fibers, or flyings~~ where the flexible cord enters boxes or fittings.

FPN 1: For the requirements for electrical and electronic equipment and wiring for all voltages in Class I, Division 1 or Division 2; Class II, Division 1 or Division 2; Class III, Division 1 or Division 2; and Class I, Zone 0 or Zone 1 or Zone 2 hazardous (classified) locations where fire or explosion hazards may exist due to flammable gases or vapors, flammable liquids, or combustible dusts or fibers, refer to Articles 500 through 505.

FPN 2: Zone 20, Zone 21 and Zone 22 area classifications are based on the modified IEC area classification system as defined in ISA 12.10.05, Electrical Apparatus for Use In Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations- Classification of Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations (IEC61241-10 Mod).

506.20 Equipment Installation

- (A) **Zone 20.** In Zone 20 locations, only equipment specifically listed and marked as suitable for the location shall be permitted.

FPN No. 3: The unique hazards associated with explosives, pyrotechnics, and blasting agents are not addressed in this Article.

Exception: Intrinsically safe apparatus listed for use in Class II, Division 1 locations with a suitable temperature rating shall be permitted, except in areas where metal dust is present.

506.2 Definitions. For purposes of this article, the following definitions apply.

- (B) **Zone 21.** In Zone 21 locations, only equipment specifically ~~identified~~ listed and marked as suitable for the location shall be permitted.

Associated Nonincendive Field Wiring Apparatus. Apparatus in which the circuits are not necessarily nonincendive themselves but that affect the energy in nonincendive field wiring circuits and are relied upon to maintain nonincendive energy levels. Associated nonincendive field wiring apparatus may be either of the following:

Exception: Apparatus listed for use in Class II, Division 1 locations with a suitable temperature rating shall be permitted.

- (C) **Zone 22.** In Zone 22 locations, only equipment specifically ~~identified~~ listed and marked as suitable for the location shall be permitted.

- (1) Electrical apparatus that has an alternative type of protection for use in the appropriate hazardous (classified) location
- (2) Electrical apparatus not so protected that shall not be used in a hazardous (classified) location

Exception: Apparatus listed for use in Class II, Division 1 or Class II Division 2 locations with a suitable temperature rating shall be permitted.

FPN: Associated nonincendive field wiring apparatus has designated associated nonincendive field wiring apparatus connections for nonincendive field wiring apparatus and may also have connections for other electrical apparatus.

- (D) **Manufacturer's Instructions.** Electrical equipment installed in hazardous (classified) locations shall be installed in accordance with the instructions (if any) provided by the manufacturer.

Dust-Ignitionproof. Equipment enclosed in a manner that excludes dusts and does not permit arcs, sparks, or heat otherwise generated or liberated inside of the enclosure to cause ignition of exterior accumulations or atmospheric suspensions of a specified dust on or in the vicinity of the enclosure.

- (E) **Temperature.** The temperature marking specified in 506.9(C)(2)(5) ~~or 506.9(C)(2)(6)~~ shall be less than the ignition temperature of the specific dust, fiber, or flying to be encountered. For organic dusts that may dehydrate or carbonize, the temperature marking shall not exceed the lower of either the ignition temperature or 165°C (329°F).

FPN: For further information on dust-ignitionproof enclosures, see Type 9 enclosure in ANSI/NEMA 250-1991, Enclosures for Electrical Equipment, and ANSI/UL 1203-1994, Explosionproof and Dust-Ignitionproof Electrical Equipment for Hazardous (Classified) Locations.

Dusttight. Enclosures constructed so that dust will not enter under specified test conditions.

FPN: See NFPA 499-1997, *Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical*

FPN: See ANSI/ISA 12.12.01-2000, Nonincendive Electrical Equipment for

Use in Class I and II, Division 2, and Class III, Divisions 1 and 2 Hazardous (Classified) Locations, and UL 1604-1994, Electrical Equipment for Use in Class I and II, Division 2 and Class III Hazardous (Classified) Locations.

Nonincendive Circuit. A circuit, other than field wiring, in which any arc or thermal effect produced under intended operating conditions of the equipment is not capable, under specified test conditions, of igniting the flammable gas-air, vapor-air, or dust-air mixture.

FPN: Conditions are described in ANSI/ISA 12.12.01-2000, Nonincendive Electrical Equipment for Use in Class I and II, Division 2, and Class III, Divisions 1 and 2 Hazardous (Classified) Locations.

Nonincendive Equipment. Equipment having electrical/electronic circuitry that is incapable, under normal operating conditions, of causing ignition of a specified flammable gas-air, vapor-air, or dust-air mixture due to arcing or thermal means.

FPN: Conditions are described in ANSI/ISA 12.12.01-2000, Nonincendive Electrical Equipment for Use in Class I and II, Division 2, and Class III, Divisions 1 and 2 Hazardous (Classified) Locations.

Nonincendive Field Wiring. Wiring that enters or leaves an equipment enclosure and, under normal operating conditions of the equipment, is not capable, due to arcing or thermal effects, of igniting the flammable gas-air, vapor-air, or dust-air mixture. Normal operation includes opening, shorting, or grounding the field wiring.

Nonincendive Field Wiring Apparatus. Apparatus intended to be connected to nonincendive field wiring.

FPN: Conditions are described in ANSI/ISA 12.12.01-2000, Nonincendive Electrical Equipment for Use in Class I and II, Division 2, and Class III, Divisions 1 and 2 Hazardous (Classified) Locations.

Pressurized. The process of supplying an enclosure with a protective gas with or without continuous flow at sufficient pressure to prevent the entrance of combustible dust, or an ignitable fiber or flying.

FPN: For further information, see ANSI/NFPA 496-2003, Purged and Pressurized Enclosures for Electrical Equipment.

Zone 20 Hazardous (Classified) Location. An area where combustible dust or ignitable fibers and flyings are present continuously or for long periods of time in quantities sufficient to be hazardous, as classified by 506.5(B)(1).

Zone 21 Hazardous (Classified) Location. An area where combustible dust or ignitable fibers and flyings are likely to exist occasionally under normal operation in quantities sufficient to be hazardous, as classified by 506.5(B)(2).

Zone 22 Hazardous (Classified) Location. An area where combustible dust or ignitable fibers and flyings are not likely to occur under normal operation in quantities sufficient to be hazardous, as classified by 506.5(B)(3).

506.4 General.

(A) **Documentation for Industrial Occupancies.** Areas 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.

(B) **Reference Standards.** Important information relating to topics covered in Chapter 5 are found in other publications.

FPN: It is important that the authority having jurisdiction be familiar with the recorded industrial experience as well as with standards of the National Fire Protection Association (NFPA) and the ISA- International Society for Measurement and Control, 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.

506.5 Classification of Locations

(A) **Classifications of Locations.** Locations shall be classified depending on the properties of the combustible dust, ignitable fibers or flyings that may be present and the likelihood that a combustible or combustible concentration or quantity is present. Each room, section or area shall be considered individually in determining its classification. Where pyrophoric materials are the only materials used or handled, these locations are outside of the scope of this article

(B) **Zone 20, Zone 21 and Zone 22 Locations.** Zone 20, Zone 21, and Zone 22 locations are those in which combustible dust, ignitable fibers or flyings are or may be present in the air or in layers, in quantities sufficient to

produce explosive or ignitable mixtures. Zone 20, Zone 21 and Zone 22 locations shall include those specified in 506.22(B)(1), (B)(2), and (B)(3).

FPN: Through the exercise of ingenuity in the layout of electrical installations for hazardous (classified) locations, it is frequently possible to locate much of the equipment in a reduced level of classification, and, thus, to reduce the amount of special equipment required.

(1) **Zone 20.** A Zone 20 location is a location in which

- (a) Ignitable concentrations of combustible dust, or ignitable fibers or flyings are present continuously, or
- (b) Ignitable concentrations of combustible dust, or ignitable fibers or flyings are present for long periods of time.

FPN No. 1: As a guide to classification of Zone 20 locations, refer to in ISA 12.10.05, Electrical Apparatus for Use In Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations- Classification of of Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations (IEC61241-10 Mod).

FPN No. 2: Zone 20 classification includes locations inside dust containment systems; hoppers, silos, etc, cyclones and filters, dust transport systems, except some parts of belt and chain conveyors, etc; blenders, mills, dryers, bagging equipment, etc.

(2) **Zone 21.** A Zone 21 location is a location,

(a) In which ignitable concentrations of combustible dust, or ignitable fibers or flyings are likely to exist occasionally under normal operating conditions; or

(b) In which ignitable concentrations of combustible dust, or ignitable fibers or flyings may exist frequently because of repair or maintenance operations or because of leakage; or

(c) In which equipment is operated or processes are carried on, of such a nature that equipment breakdown or faulty operations could result in the release of ignitable concentrations of combustible dust, or ignitable fibers or flyings and also cause simultaneous failure of electrical equipment in a mode to cause the electrical equipment to become a source of ignition; or

(d) That is adjacent to a Zone 20 location from which ignitable concentrations of dust, or ignitable fibers or flyings could be communicated, unless communication is prevented by adequate positive pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.

FPN No. 1: As a guide to classification of Zone 21 locations, refer to in ISA 12.10.05, Electrical Apparatus for Use In Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations- Classification of of Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations (IEC61241-10 Mod).

FPN No. 2: This classification usually includes; locations outside dust containment and in the immediate vicinity of access doors subject to frequent removal or opening for operation purposes when internal combustible mixtures are present; locations outside dust containment in the proximity of filling and emptying points, feed belts, sampling points, truck dump stations, belt dump over points, etc. where no measures are employed to prevent the formation of combustible mixtures; locations outside dust containment where dust accumulates and where due to process operations the dust layer is likely to be disturbed and form combustible mixtures; locations inside dust containment where explosive dust clouds are likely to occur (but neither continuously, nor for long periods, nor frequently) as e.g. silos (if filled and/or emptied only occasionally) and the dirty side of filters if large self-cleaning intervals are occurring.

(3) **Zone 22.** A Zone 22 location is a location

(a) In which ignitable concentrations of combustible dust, or ignitable fibers or flyings are not likely to occur in normal operation, and if they do occur, will only persist for a short period; or

(b) In which combustible dust, or fibers, or flyings are handled, processed or used but in which the dust, fibers, or flyings are normally confined within closed containers of closed systems from which they can escape only as a result of the abnormal operation of the equipment with which the dust, or fibers, or flyings are handled, processed or used; or

(c) That is adjacent to a Zone 21 location, from which ignitable concentrations of dust, or fibers or flyings could be communicated, unless such communication is prevented by adequate positive pressure ventilation from a source of clean air and effective safeguards against ventilation failure are provided.

FPN No. 1: As a guide to classification of Zone 22 locations, refer to in ISA 12.10.05, Electrical Apparatus for Use In Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations- Classification of of Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations (IEC61241-10 Mod).

FPN No. 2: Zone 22 locations usually include; outlets from bag filter vents, because in the event of a malfunction there can be emission of combustible mixtures; locations near equipment that has to be opened at infrequent intervals or equipment that from experience can easily form leaks where, due to pressure above atmospheric, dust will be blow out; pneumatic equipment, flexible connections that can become damaged, etc.; storage locations for bags containing dusty product, since failure of bags can occur during handling, causing dust leakage; and locations where controllable dust layers are formed that are likely to be raised into explosive dust/air mixtures. Only if the layer is removed by cleaning before hazardous dust/air mixtures can be formed, the area is designated non-hazardous.

FPN No. 3: Locations that normally are classified as Zone 21 can fall into Zone 22 when measures are employed to prevent the formation of explosive dust/air mixtures. Such measures include exhaust ventilation. The measures should be used in the vicinity of (bag) filling and emptying points, feed belts, sampling points, truck dump stations, belt dump over points, etc.

506.6 Special Precautions.

Article 506 requires equipment construction and installation that ensures safe performance under conditions of proper use and maintenance.

FPN: It is important that inspection authorities and users exercise more than ordinary care with regard to the installation and maintenance of electrical equipment in hazardous (classified) locations.

- (A) Implementation of Zone Classification System. Classification of areas, engineering and design, selection of equipment and wiring methods, installation, and inspection shall be performed by qualified persons.
- (B) Dual Classification. In instances of areas within the same facility classified separately, Zone 22 locations shall be permitted to abut, but not overlap, Class II or Class III, Division 2 locations. Zone 20 or Zone 21 locations shall not abut Class II or Class III, Division 1 or Division 2 locations.
- (C) Reclassification Permitted. A Class II or Class III, Division 1 or Division 2 location shall be permitted to be reclassified as a Zone 20, Zone 21, or Zone 22 location, provided that all of the space that is classified because of a single combustible dust, or ignitable fiber or flying source is reclassified under the requirements of this article.
- (D) Simultaneous Presence of Flammable Gases and Combustible Dusts, Fibers, or Flyings. Where flammable gases or combustible dusts, fibers, or flyings are or may be present at the same time, the simultaneous presence shall be considered during the selection and installation of the electrical equipment and the wiring methods, including the determination of the safe operating temperature of the electrical equipment.

506.8 Protection Techniques. Acceptable protection techniques for electrical and electronic equipment in hazardous (classified) locations shall be as described in 506.8 (A) through (F).

- (A) Dust Ignitionproof. This protection technique shall be permitted for equipment in Zone 20, Zone 21 and Zone 22 locations for which it is identified.
- (B) Pressurized. This protection technique shall be permitted for equipment in Zone 21 and Zone 22 locations for which it is identified.
- (C) Intrinsic Safety. This protection technique shall be permitted for equipment in Zone 20, Zone 21 and Zone 22 locations for which it is identified. Installation of intrinsically safe apparatus and wiring shall be in accordance with the requirements of Article 504.
- (D) Dusttight. This protection technique shall be permitted for equipment in Zone 22 locations for which it is identified.
- (E) Nonincendive Circuit. This protection technique shall be permitted for equipment in Zone 22 locations for which it is identified.
- (F) Nonincendive Equipment. This protection technique shall be permitted for equipment in Zone 22 locations for which it is identified.

506.9 Equipment Requirements

- (A) Suitability. Suitability of identified equipment shall be determined by one of the following:
 - (1) Equipment listing or labeling
 - (2) Evidence of equipment evaluation from a qualified testing laboratory or inspection agency concerned with product evaluation
 - (3) Evidence acceptable to the authority having jurisdiction such as a manufacturer's self evaluation or an owner's engineering judgment
- (B) Listing.
 - (1) Equipment that is listed for Zone 20 shall be permitted in a Zone 21 or Zone 22 location of the same dust, or ignitable fiber, or flying. Equipment that is listed for Zone 21 may be used in a Zone 22 location of the same dust, fiber or flying.
 - (2) Equipment shall be permitted to be listed for a specific dust, or ignitable fiber or flying, or any specific combination of dusts, fibers or flyings.
- (C) Marking. Equipment shall be marked in accordance with 506.9(C)(1) or (2).
 - (1) Division Equipment. Equipment identified for Class II, Division 1 or Class II, Division 2 shall, in addition to being marked in accordance with 500.8(B), be permitted to be marked with the following:
 - (1) Zone 21 or Zone 22 (as applicable), and
 - (2) Temperature classification in accordance with 506.9(D)(1).
 - (2) Zone Equipment. Equipment meeting one or more of the protection techniques described in 506.8 shall be marked with the following in the order shown:
 - 1) Symbol "AEx";
 - 2) Protection technique(s)
 - 3) Zone
 - 4) Temperature classification, marked as a temperature value, in degrees C
 - 5) Ambient temperature marking in accordance with 506.9(D).
 - (A) Temperature Classifications. Equipment shall be marked to show the operating temperature referenced to a 40°C (104°F) ambient. Electrical equipment designed for use in the ambient temperature range between - 20°C and + 40°C shall require no additional ambient temperature marking. Electrical equipment that is designed for use in a range of ambient temperatures other than -20°C and + 40°C is considered to be special; and the ambient temperature range shall then be marked on the equipment, including the either the symbol "T" or "T_amb" together with the special range of ambient temperatures. As an example such a marking might be "-30°C ≤ T_a ≤ + 40°C". Electrical equipment suitable for ambient temperatures exceeding 40°C (104°F) shall be marked with both the maximum ambient temperature and the operating temperature at that ambient temperature.

Exception No. 1: Equipment of the non-heat producing type, such as conduit fittings, shall not be required to have a marked operating temperature.

Exception No. 2: Equipment identified for Class II, Division 1 or Class II, Division 2 locations as permitted by 506.20(B) and (C) shall be permitted to be marked in accordance with 500.6(D) and Table 500.6(D).
 - (B) Threading. All NPT threads referred to herein shall be threaded with a National (American) Standard Pipe Taper (NPT) thread that provides a taper of 1 in 16 (3/4-in taper per foot). Conduit and fittings shall be made wrenchtight to prevent sparking when the fault current flows through the conduit system, and to insure the integrity of the conduit system. Equipment provided with threaded entries for field wiring connections shall be installed in accordance with 506.9(E)(1) or (2).
 - (1) Equipment Provided with Threaded Entries for NPT Threaded Conduit or Fittings. For equipment provided with threaded entries for NPT threaded conduit or fittings, listed conduit fittings, or cable fittings shall be used.
 - (2) Equipment Provided with Threaded Entries for Metric Threaded Conduit or Fittings. For equipment with metric threaded entries, such entries shall be identified as being metric, or listed adapters to permit connection to conduit or NPT-threaded fittings shall be provided with the equipment. Adapters shall be used for connection to conduit or NPT-threaded fittings. Listed cable fittings that have metric threads shall be permitted to be used.

506.15 Wiring Methods. Wiring methods shall maintain the integrity of the protection techniques and shall comply with 506.15(A), (B), or (C).

(A) Zone 20. In Zone 20 locations, the wiring methods in (1) through (5) shall be permitted.

(1) Threaded rigid metal conduit, or threaded steel intermediate metal conduit.

(2) Type MI cable with termination fittings listed for the location. Type MI cable shall be installed and supported in a manner to avoid tensile stress at the termination fittings.

Exception: MI cable and fittings listed for Class II, Division 1 locations are permitted to be used.

(3) In industrial establishments with limited public access, where the conditions of maintenance and supervision assure that only qualified persons service the installation, Type MC cable, listed for continuous use in Zone 20 locations, with a gas/vaportight continuous corrugated metallic sheath, and 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.

Exception: MC cable and fittings listed for Class II, Division 1 locations are permitted to be used.

(4) Fittings and boxes shall be identified for use in Zone 20 locations.

Exception: Boxes and fittings listed for Class II, Division 1 locations are permitted to be used.

(5) Where necessary to employ flexible connections, liquidtight flexible metal conduit with listed fittings, liquidtight flexible nonmetallic conduit with listed fittings, or flexible cord listed for extra-hard usage and provided with listed fittings shall be used. Where flexible cords are used, they shall also comply with 506.17. 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.

Exception: Flexible conduit and flexible conduit and cord fittings listed for Class II, Division 1 locations are permitted to be used.

FPN: See 506.25 for grounding requirements where flexible conduit is used.

(B) Zone 21. In Zone 21 locations, the wiring methods in (1) through (2) shall be permitted.

(1) All wiring methods permitted in 506.15(A).

(2) Fittings and boxes that are dusttight, provided with threaded bosses for connection to conduit, in which taps, joints, or terminal connections are not made, and are not used in locations where metal dust is present, may be used.

(C) Zone 22. In Zone 22 locations, the wiring methods in (1) through (8) shall be permitted.

(1) All wiring methods permitted in 506.15(B).

(2) Rigid metal conduit, intermediate metal conduit, electrical metallic tubing, dusttight wireways.

(3) Type MC or MI cable with listed termination fittings.

(4) Type PLTC in cable trays.

(5) Type ITC in cable trays.

(6) Type MC, MI, MV, or TC cable installed in ladder, ventilated trough, or ventilated channel cable trays in a single layer, with a space not less than the larger cable diameter between two adjacent cables, shall be the wiring method employed. Single conductor Type MV cables shall be shielded or metallic armored.

(7) Nonincendive field wiring shall be permitted using any of the wiring methods permitted for unclassified locations. Nonincendive field wiring systems shall be installed in accordance with the control drawing(s).

Simple apparatus, not shown on the control drawing, shall be permitted in a nonincendive field wiring circuit, provided the simple apparatus does not interconnect the nonincendive field wiring circuit to any other circuit.

FPN: Simple apparatus is defined in 504.2.

Separation of nonincendive field wiring circuits shall be as follows:

(1) In separate cables, or

(2) In multiconductor cables where the conductors of each circuit are within a grounded metal shield, or

(3) In multiconductor cables where the conductors have insulation with a minimum thickness of 0.25 mm (0.01 in.).

(8) Boxes and fittings shall be dusttight.

506.16 Sealing. Where necessary to protect the ingress of combustible dust, or ignitable fibers, or flyings, or to maintain the type of protection, seals shall be provided. The seal shall be identified as capable of preventing the ingress of combustible dust or ignitable fibers or flyings and maintaining the type of protection, but need not be explosionproof or flameproof.

17.17 Flexible Cords. Flexible cords used in Zone 20, Zone 21, and Zone 22 locations

shall comply with all of the following:

(1) Be of a type listed for extra-hard usage.

(2) Contain, in addition to the conductors of the circuit, a grounding conductor in 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 to minimize tension on the terminal connections

(5) Be provided with suitable seals to prevent the entrance of combustible dust, or ignitable fibers, or flyings where the flexible cord enters boxes or fittings.

506.20 Equipment Installation

(A) Zone 20. In Zone 20 locations, only equipment listed and marked as suitable for the location shall be permitted.

Exception: Intrinsically safe apparatus listed for use in Class II, Division 1 locations with a suitable temperature class shall be permitted.

(B) Zone 21. In Zone 21 locations, only equipment listed and marked as suitable for the location shall be permitted.

Exception No. 1: Apparatus listed for use in Class II, Division 1 locations with a suitable temperature class shall be permitted.

Exception No. 2: Pressurized equipment identified for Class II, Division 1 shall be permitted.

(C) Zone 22. In Zone 22 locations, only equipment listed and marked as suitable for the location shall be permitted.

Exception No. 1: Apparatus listed for use in Class II, Division 1 or Class II Division 2 locations with a suitable temperature class shall be permitted.

Exception No. 2: Pressurized equipment identified for Class II, Division 1 or Division 2 shall be permitted.

(D) Manufacturer's Instructions. Electrical equipment installed in hazardous (classified) locations shall be installed in accordance with the instructions (if any) provided by the manufacturer.

(E) Temperature. The temperature marking specified in 506.9(C)(2)(5) shall comply with (1) or (2).

(1) For combustible dusts, less than the lower of either the layer or cloud ignition temperature of the specific combustible dust. For organic dusts that may dehydrate or carbonize, the temperature marking shall not exceed the lower of either the ignition temperature or 165°C (329°F).

(2) For ignitable fibers or flyings, less than 165°C (329°F) for equipment that is not subject to overloading, or 120°C (248°F) for equipment (such as motors or power transformers) that may be overloaded.

FPN: See NFPA 499-2004, Recommended Practice for the Classification of Combustible Dusts and of Hazardous (Classified) Locations for Electrical Installations in Chemical Processing Areas, for minimum ignition temperatures of specific dusts.

506.21 Multiwire Branch Circuits. In Zone 20 and Zone 21 locations, a multiwire branch circuit shall not be permitted.

Exception: Where the disconnect device(s) for the circuit opens all ungrounded conductors of the multiwire circuit simultaneously.

506.25 Grounding and Bonding. Grounding and bonding shall comply with Article 250 and the requirements in 506.25(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 Zone 20, Zone 21, and Zone 22 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 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 side 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 506.15, it shall be installed with internal or external bonding jumpers in parallel with each conduit and complying with 250.102.

Exception: In Zone 22 locations, the bonding jumper shall be permitted to be deleted where all of the following conditions are met:

- (1) Listed liquidtight flexible metal conduit 1.8 m (6 ft) or less in length, with fittings listed for grounding, is used.
- (2) Overcurrent protection in the circuit is limited to 10 amperes or less.
- (3) The load is not a power utilization load.

Panel Statement: The following changes were made to the proposed Article 506 were made for the stated reasons:

1. The references to IEC standards were removed as directed by the Correlating Committee. Standards that may not yet be published at the time the Code takes effect should not be referenced.
2. Does not define new methods of protection for Zone 20, 21, and 22 hazardous dust areas, and allows those methods of protection available per Article 502.
3. Exclude metal dusts from the scope of this article.
4. Require listed or identified equipment for Zone 20, 21, and 22 areas, so as not to have to address all of the special allowances that exist in Article 502.
5. The marking requirements were reworded to eliminate the layer temperature marking and the IEC protection techniques.
6. The supervision of work section was revised to reflect that it is a total approach to safety that must be undertaken by all involved parties.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 13 Negative: 2

Explanation of Negative:

COOK: I am not opposed to a new Article 506 for Zone requirements in dust applications. I believe including an Article 506 would assist the US members working on IEC Committees and assist in international harmonization efforts and assist in the inclusion of US practices in those IEC Standards. I still have concerns from the ROP that were not addressed and additional concerns that have been raised by the panel action on Comment 14-97. I do not believe the text or the substantiation as presented is enforceable or acceptable.

- **FPN 2:** indicates the Zone 20, Zone 21 and Zone 22 area classifications are based on the modified IEC area classification system as defined in ISA 12.10.05, Electrical Apparatus for Use in Zone 20, Zone 21, and Zone 22 Hazardous (Classified) Locations-Classification of Zone 20, Zone 21, and Zone 22 Hazardous (Classified) locations (IEC61241-10 Mod). Was this ISA document developed through a consensus process that includes contractors, electricians, and electrical inspectors? Was the process subject to public review? The ISA document was not presented for panel or public review.

- The descriptions that constitute the difference between Zone 20, Zone 21 and Zone 22 use vague terms that will be difficult to enforce (long periods of time, occasionally, short periods of time).

- The panel action deleted the requirement for qualified Registered Professional Engineers to supervise the classification of areas and selections of equipment and wiring methods. Although I agree with the action to include the installers and inspectors in the list of individuals that are required to be qualified, I do not believe this will provide the level of accountability that is afforded with the Registered PE requirement. See my vote and statement on Comments 14-74 and 14-75.

- Section 506.6 includes the option of Dual Classification which I was opposed to in Article 505 and during the ROP stage of this cycle for Article 506. Nothing was presented to change my position on this issue.

- In proposed 506.9(C) Marking, items should be deleted since the IEC type protection techniques have been deleted.

- 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 ignitable 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.

- 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.

- 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.

WIRFS: The panel voted to revise and delete the requirement of supervision by a professional engineer for Zone 20, 21, and 22 classifications systems. It

is my opinion that if we needed this requirement for the Zone 0, 1, 2 systems classification it is equally valid here. I have also maintained that we should keep the latter requirement. To be consistent with my opinion to keep the requirement, I must vote to reject the entire proposal (since I don't have any other option) based on the reasoning set forth in my response to Comment 14-74. If "506.6(A) Supervision of Work" had been left as originally drafted in the ROP, I would have voted APR with the rest of the panel. I would expect other panel members that voted to Reject 14-74 and 14-75 should take the same action on 14-97 to be consistent with their opinion on this issue.

Comment on Affirmative:

BRIESCH: The revised Article 506 draft provided as part of the panel action does not incorporate all of the changes the panel made at the meeting. These are:

1. The title was to be revised to read: "Combustible Dusts and Ignitable Fibers and Flyings" instead of "Flammable Dusts Fibers and Flyings". Without this revision, the title will conflict with the scope in 506.1.

2. 506.9(C) should be revised to delete the entire 506.9(C)(2) on Zone Equipment since the IEC protection techniques were deleted and, therefore, this section applies to nothing in Article 506. In addition, Zone 20 was inadvertently omitted from 506.9(C)(1) under the Division Equipment. 506.9(C) should read:

(C) Marking, Equipment, identified for Class II, Division 1 or Class II, Division 2 shall, in addition to being marked in accordance with 500.8(B), be permitted to be marked with the following:

- (1) Zone 20, 21, or 22 (as applicable) and,
- (2) Temperature classification in accordance with 506.9(D)(1).

LAWRENCE: See my comment on affirmative on Comment 14-95.

NEAGLE: I Agree with proposed text, with the corrections provided by B. Lawrence shown below:

When based on the TCC comment to remove the references to the IEC standards, the panel deleted the "IEC" protection techniques from 506.8 and replaced them with the traditional "Division" techniques, it should also have deleted the marking of 506.9(C)(2) which is specific to those "IEC" protection techniques. The text of (2) requires all "Division" equipment to be additionally marked before it can be used, negating the permission of (1). Without the deletion of (2), Article 506 will likely be unusable.

The suggested text change to correct this correlation problem is as follows:

506.9 Equipment Requirements
(C) Marking. Equipment shall be marked in accordance with 506.9(C)(1) or (2).

(1) Division Equipment. Equipment identified for Class II, Division 1 or Class II, Division 2 shall, in addition to being marked in accordance with 500.8(B), be permitted to be marked with the following:

- (1) Zone 21 or Zone 22 (as applicable), and
- (2) Temperature classification in accordance with 506.9(D)(1).

(2) Zone Equipment. Equipment meeting one or more of the protection techniques described in 506.8 shall be marked with the following in the order shown:

- 1) Symbol "AEx"
- 2) Protection technique(s)
- 3) Zone
- 4) Temperature classification, marked as a temperature value, in degrees C
- 5) Ambient temperature marking in accordance with 506.9(D).

ARTICLE 511 — COMMERCIAL GARAGES, REPAIR AND STORAGE

19-5 Log #795 NEC-P19 **Final Action: Accept**
(511.1)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-110

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: CMP 19 accepts the action of CMP 14 on Proposal 14-110. This new section will be 555.22.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-6 Log #1939 NEC-P19 **Final Action: Accept**
(511.1)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc. / Rep. Massachusetts Electrical Code Advisory Committee

Comment on Proposal No: 14-110

Recommendation: Accept the suggested language for a new 555.22 as suggested by CMP 14.

Substantiation: By this comment the Advisory Committee advises that it fully supports the initiative made by CMP 14 in response to this proposal. The Advisory Committee requests that this comment be placed on the agenda of CMP 19 for consideration at 555.22 (new), as well as the agenda for CMP 14. This action is necessary because the TCC action on the proposal left the jurisdiction over this issue in doubt.

Panel Meeting Action: Accept

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

14-98 Log #796 NEC-P14
(511.3)

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-111

Recommendation: 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 Technical Committee on Garages and Parking Structures for comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Add titles as follows: 511.3(A)(2) Alcohol-Based Windshield Washer Fluid.
511.3(A)(6) Flammable Liquids Having Flashpoints Below 38 Degrees C (100 degrees F).

511.3(B)(1) Flammable Fuel Dispensing Areas.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-99 Log #3091 NEC-P14
(511.3)

Final Action: Accept

Submitter: Marshall A. Klein, Marshall A. Klein & Assoc., Inc.

Comment on Proposal No: 14-111

Recommendation: Revise further the wording in the proposed new sections as follows:

511.3(A)(1) Parking and Repair Garages. Parking garages used for parking or storage shall be permitted to be unclassified. Repair garages shall be permitted to be unclassified when designed in accordance with 511.3(A)(2) through 511.3(A)(7).

FPN: For further information, see NFPA 88A-2002, Standard for Parking Structures, and NFPA 30A 2000 2003. Code for Motor Fuel Dispensing Facilities and Repair Garages.

511.3(A)(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, Exception, of NFPA 30A 2000-2003, Code for Motor Fuel Dispensing Facilities and Repair Garages.

511.3(A)(4) 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 m³/min/m² (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 sub-floor work area is unclassified.

[NFPA 30A 2000 2003, 7.4.5.4. and Table 8.3.1]

511.3(A)(6) Where flammable liquids having a flash point below 38°C (100°F) - (such as gasoline) or ~~liquefied natural gas (LNG)~~ gaseous fuels (such as natural gas, hydrogen or LPG) will not be transferred, such location shall be considered to be unclassified.

511.3(A)(7) Within 450 mm (18 in.) of the Ceiling. In major repair garages, where ~~compressed natural gas ((CNG), or liquefied natural gas (LNG), or other lighter-than-air fueled gaseous fuels (such as natural gas or hydrogen))~~ vehicles are repaired or stored, the area within 450 mm (18 in.) of the ceiling shall be considered unclassified where ventilation of at least 1 cfm/sq. ft. of ceiling area taken from a point within 18 inches of the highest point in the ceiling is provided.

FPN: For further information on definition of a "major repair garage", see ~~3-1-16-1-3.3.12.1~~ of NFPA 30 2000-2003, code for Motor Fuel Dispensing Facilities and Repair Garages.

511.3(B)(2) Lubrication or Service Room where Class I liquids or ~~liquefied natural gas (LNG) gaseous fuels (such as natural gas, hydrogen or LPG)~~ are not transferred. The following spaces that are not designed in accordance with 511.3(A)(4) shall be classified as Class I, Division 2:

511.3(B)(3) Lubrication or Service Room where Class I liquids or ~~liquefied natural gas (LNG) gaseous fuels (such as natural gas, hydrogen or LPG)~~ are transferred. The following spaces that are not designed in accordance with

511.3(A)(5) shall be classified as follows:

511.3(B)(4) Within 450 mm (18 in.) of the Ceiling. In major repair garages where ~~compressed natural gas (CNG), liquefied natural gas (LNG) or other lighter-than-air fueled gaseous fuels (such as natural gas or hydrogen)~~ vehicles are repaired or stored, ceiling spaces that are not designed in accordance with 511.3(A)(7) shall be classified as Class I, Division 2. ~~[NFPA 30A-2000, 8.2.1]~~

FPN: For further information on definition of a "major repair garage", see ~~3-1-16-1-3.3.12.1~~ of NFPA 30A 2000-2003, Code for Motor Fuel Dispensing Facilities and Repair Garages.

Substantiation: Recommended revisions are editorial in nature to correlate with the Panel's adding of wording to address lighter-than air gaseous fuels under this code proposal to 511.3(A)(7) and 511.3(B)(4). Also, the revisions to 511.3(A)(7) and 511.3(B)(4) address the ceiling electrical classification for **lighter** -than air gaseous fuels that are common today, which would also include hydrogen.

Revision to 511.3(B)(4) to delete reference to NFPA 30A Section 8.2.1 is needed since this section in the NEC will be more up-to-date than the 2003 NFPA 30A in addressing the lighter-than-air fuel hydrogen. The NFPA 30A Committee will need to update its Code Section 8.2.1 to address hydrogen in its next code cycle.

Revisions to 511.3(A)(6), 511.3(B)(2), and 511.3(B)(3) address the use of **all** gaseous fuels that are common today, which would also include hydrogen and LPG. Please note that LPG is a **heavier** than air fuel, whereas natural gas and hydrogen are **lighter**-than air fuels.

Revision to 511.3(A)(1), 511.3(A)(2), 511.3(A)(4), 511.3(A)(7), and 511.3(B)(4) provide the revised, updated references to the 2003 edition of NFPA 30A.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-99a Log #3906 NEC-P14
(511.3)

Final Action: Reject

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

Comment on Proposal No: 14-111

Recommendation: The proposal should be accepted in principle and in part. Accept correlation with technical provisions of NFPA 30A. Reject the organization of this section based on grouping all classified locations together and all unclassified locations together. Instead, group the classification requirements based on the type of repair facility, as follows:

I. Insert the definitions of "Major Repair Garage" and "Minor Repair Garage" into a new definitions section as follows:

511.2 Definitions.

Major Repair Garage. A building or portions of a building where major repairs, such as engine overhauls, painting, body and fender work, and repairs that require draining of the motor vehicle fuel tank are performed on motor vehicles, including associated floor space used for offices, parking, or showrooms. [NFPA 30A-2003, 3.3.12.1]

Minor Repair Garage. A building or portions of a building used for lubrication, inspection, and minor automotive maintenance work, such as engine tune-ups, replacement of parts, fluid changes (e.g., oil, antifreeze, transmission fluid, brake fluid, air conditioning refrigerants, etc.), brake system repairs, tire rotation, and similar routine maintenance work, including associated floor space used for offices, parking, or showrooms. [NFPA 30A-2003, 3.3.12.2]II. Revise the proposed redraft of Section 3 to read as follows:

511.3 Area Classification, General. Where Class I liquids or gaseous fuels are stored, handled, or transferred, electrical wiring and electrical utilization equipment shall be designed in accordance with the requirements for Class I, Division 1 or 2 hazardous (classified) locations as classified in accordance with 500.5 and 500.6, and this article. A Class I location shall not extend beyond an unpierced wall, roof, or other solid partition that has no openings. [NFPA 30A-2003, 8.3.5, 8.3.2](A) Parking Garages. Parking garages used for parking or storage shall be unclassified.

FPN: For further information, see NFPA 88A-2002, Standard for Parking Structures, and NFPA 30A-2003, Code for Motor Fuel Dispensing Facilities and Repair Garages.(B) Repair Garages. With Dispensing. Major and minor repair garages that dispense motor fuels into the fuel tanks of vehicles, including flammable liquids having a flash point below 38°C (100°F), such as gasoline, or gaseous fuels, such as natural gas, hydrogen, or LPG, shall have the dispensing functions and components classified in accordance with Table 514.3(B)(1) in addition to any classification required by this section. Where Class I liquids, other than fuels, are dispensed, the area within 900 mm (3 ft) of any fill or dispensing point, extending in all directions, shall be a Class I, Division 2 location.(C) Major Repair Garages. Where flammable liquids having a flash point below 38°C (100°F), such as gasoline, or gaseous fuels, such as natural gas, hydrogen, or LPG, will not be dispensed, but repair activities that involve the transfer of such fluids or gases are performed, the classification rules in (1), (2) and (3) shall apply.

(1) Floor Areas.

(a) Ventilation Provided. The floor area shall be unclassified where 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 and

exhaust air shall be taken at a point within 0.3 m (12 in.) of the floor.

(b) Ventilation Not Provided. The entire floor area up to a level of 450 mm (18 in.) above the floor shall be classified as Class I Division 2 if the ventilation does not comply with 511.3(B)(1)(a).

(2) Ceiling Areas. Where lighter-than-air gaseous fueled vehicles, such as vehicles fueled by natural gas or hydrogen, are repaired or stored, the area within 450 mm (18 in.) of the ceiling shall be considered for classification in accordance with (a) and (b).

(a) Ventilation Provided. The ceiling area shall be unclassified where ventilation is provided, from a point not less than 450 mm (18 in.) from the highest point in the ceiling, to exhaust the ceiling area at a rate of not less than 0.3 m³/min/m² (1 cfm/ft²) of ceiling area at all times that the building is occupied or when vehicles using lighter-than-air gaseous fuels are parked below this area.

(b) Ventilation Not Provided. Ceiling areas that are not ventilated in accordance with 511.3(C)(2)(a) shall be classified as Class I, Division 2.

(3) Pit Areas in Lubrication or Service Room. Any pit, belowgrade work area, or subfloor work area shall be classified as provided in (a) or (b).

(a) Ventilation Provided. Where ventilation is provided to exhaust the pit area at a rate of not less than 0.3 m³/min/m² (1 cfm/ft²) 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, belowgrade work area, or subfloor work area, the pit shall be unclassified. [NFPA 30A-2003, 7.4.5.4 & Table 8.3.1]

(b) Ventilation Not Provided. Where ventilation is not provided in accordance with 511.3(C)(3)(a), any pit or depression below floor level shall be a Class I, Division 1 location that extends up to the floor level.(D) Minor Repair Garages. Where flammable liquids having a flash point below 38°C (100°F), such as gasoline, or gaseous fuels, such as natural gas or hydrogen, will not be dispensed or transferred, the classification rules in (1), (2) and (3) shall apply to the lubrication and service rooms.

(1) Floor Areas. Floor areas in minor repair garages without pits, belowgrade work areas, or subfloor work areas shall be unclassified. Where floor areas include pits, belowgrade work areas or subfloor work areas in lubrication or service rooms, the classification rules in (a) or (b) shall apply.

(a) Ventilation Provided. The entire floor area shall be unclassified where 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 and exhaust air shall be taken at a point within 0.3 m (12 in.) of the floor.

(b) Ventilation Not Provided. The floor area up to a level of 450 mm (18 in.) above any unventilated pit, belowgrade work area, or subfloor work area and extending a distance of 900 mm (3 ft) horizontally from the edge of any such pit, belowgrade work area, or subfloor work area shall be classified as Class I Division 2.

(2) Ceiling Areas. Where lighter-than-air gaseous fuels (such as natural gas or hydrogen) will not be transferred, such locations shall be unclassified.

(3) Pit Areas in Lubrication or Service Room. Any pit, belowgrade work area, or subfloor work area shall be classified as provided in (a) or (b).

(a) Ventilation Provided. Where ventilation is provided to exhaust the pit area at a rate of not less than 0.3 m³/min/m² (1 cfm/ft²) 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, belowgrade work area, or subfloor work area, the pit shall be unclassified. [NFPA 30A-2003, 7.4.5.4 & Table 8.3.1]

(b) Ventilation Not Provided. Where ventilation is not provided in accordance with 511.3(D)(3)(a), any pit or depression below floor level shall be a Class I, Division 2 location that extends up to the floor level.(E) Modifications to Classification.

(1) Specific Areas Adjacent to Classified Locations. Areas adjacent to classified locations in which flammable vapors are not likely to be released, such as stock rooms, switchboard rooms, and other similar locations, shall be unclassified where mechanically ventilated at a rate of four or more air changes per hour, or designed with positive air pressure, or where effectively cut off by walls or partitions.

(2) Alcohol-Based Windshield Washer Fluid. The area used for storage, handling, or dispensing into motor vehicles of alcohol-based windshield washer fluid in repair garages shall be unclassified unless otherwise classified by a provision of 511.3. [NFPA 30A-2003, 8.3.5, Exception]

Substantiation: This comment preserves the apparently intended technical content of Proposal 14-111, but presents the information in a much more user-friendly manner. There are two editorial difficulties with the organization of the panel action on the proposal. First, by presenting the user with two disconnected laundry lists of areas that either are or are not classified, it makes finding the requirements for a given area under consideration difficult. Second, the layout fails to take full advantage of the crucial distinctions in NFPA 30A between major and minor repair garages.

It is the submitter's opinion, and only his opinion, that this leads to a serious area of technical confusion centered on the proposed 511.3(A)(6). The submitter is aware that reasonable people can disagree on this point, but nevertheless, it is the issue that initially caused the submitter to develop this comment. The submitter is now aware that this provision is apparently only intended to apply to non-pit areas of minor repair garages, but it does not say this. This leads to unintended conflicts with several provisions of 511.3(B). In the context of working to resolve these issues, the submitter came to the realization that if the section were occupancy based, not only would this confusion disappear, but the

entire format would be much more accessible for the user.

Therefore, and since the distinctions between major and minor repair garages, particularly the potential "transfer" of flammable materials inform most of the technical provisions in the original proposal, the submitter opens this comment with those two definitions extracted from NFPA 30 and placed in 511-2, the appropriate section for definitions. The comment then organizes the requirements based on specific locations, as follows:

511.3 This adds appropriate parent language for area classification for this section, including additional language extracted from 30A. The lettered subsections following all cover area classifications within their scope.

511.3(A) This is the parking garage material, unamended.

511.3(B) This is the language that brings in Article 514 when actual fuel dispensing is part of the operation. This is 511.3(B)(1) and 511.3(B)(3)e in the proposal.

511.3(C) This is where major repair garages land. They have three areas requiring consideration for classification, and the numbered subsections proceed accordingly. The parent language effectively calls attention to the provision in the definition regarding fuel tanks, thereby reiterating the distinction for clarity.

511.3(C)(1)(a) This is 511.3(A)(5) in the proposal.

511.3(C)(1)(b) This is 511.3(B)(3)(a) and (d) in the proposal

511.3(C)(2)(a) and (b) These are 511.3(A)(7) and 511.3(B)(4) in the proposal

511.3(C)(3)(a) and (b) These are 511.3(A)(4), 511.3(B)(3)(b), and 511.3(B)(3)(c) in the proposal. 511.3(C)(3)(a) was further revised to extract and correlate this section with NFPA 30A Section 7.4.5.4 & Table 8.3.1.

511.3(D)(1) This is 511.3(A)(6) in the proposal incorporated into the floor area requirement, and correlation of the floor area requirements for above "pits" that are in 511.3(A)(4) and 511.3(B)(2) in the proposal. If a minor repair garage has an unventilated pit, it could be argued the proposal would classify the floor area around the pit as Div. 2, even if the general shop floor met the ventilation requirements for a major repair garage, even though the pit itself is only Class I Div. 2 [per proposal 511.3(B)(2)(a)]. The structure in this comment provides overall consistent technical content to that of the proposal: The entire floor area is unclassified if ventilated, and even if not, only the floor area over or to the edge (within 3 ft) of an unventilated pit is classified.

511.3(D)(2) The submitter understands that the issue of ceiling classifications for minor repair garages has been discussed within the 30A Committee, and the conclusion reached that potential gas releases were too minor to warrant classification, which is why 30A only imposes the ceiling classification requirement on major repair garages. This does need to be addressed, however, in this part of the requirements in order to avoid obvious questions.

511.3(D)(3) This is 511.3(A)(4) and 511.3(B)(2)(a) of the proposal. Note that 511.3(B)(2)(b) of the proposal is included in 511.3(D)(1)(b) of this comment, assuming no general floor ventilation.

511.3(E) This is 511.3(A)(2) and 511.3(A)(3) in the proposal, editorially modified to make a positive declaration of classification. Since these topics are of comparatively minor interest and application, it made more sense to place them at the end of the section. The reformatted layout includes all provisions contained in the original proposal, but reformatted by location. This comment is offered as a constructive suggestion for the presentation of that material, and the submitter requests CMP 14 consider it accordingly. The submitter wishes to thank Marshall Klein of the 30A Committee, who graciously took time to review this material on several occasions.

Panel Meeting Action: Reject

Panel Statement: The proposed ROP revision of Article 511 has structure consistent with the other articles under the jurisdiction of CMP-14. This consistent format promotes usability of the specific location articles.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-100 Log #2926 NEC-P14
(511.3(A)(6))

Final Action: Accept

Submitter: Peter J. Schram Delray Beach, FL

Comment on Proposal No: 14-111

Recommendation: Add the following phrase at the end of 511.3(A)(6):
"...unless the location is required to be classified in accordance with 511.3(B)(2) or 511.3(B)(4)."

Substantiation: Present wording creates a conflict with other requirements as it negates the requirements in 511.3(B)(2) and 511.3(B)(4).

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-101 Log #188 NEC-P14
(511.4)

Final Action: Reject

Submitter: Peter J. Schram Delray Beach, FL

Comment on Proposal No: 14-115

Recommendation: (1) Accept the proposal in principle. Move the text of 511.4(A)(1) and its exception to a new Section 511.8, titled "Raceways." In the Exception to new 511.8, delete the phrase "that complies with Article 352." In the Exception to 501.4(A)(1)(a), change the reference to "511.4, Exception" to "511.8, Exception."

(2) Reject the panel action.

Substantiation: (1) There is nothing really wrong with the submitter's proposed solution except that the raceway is technically not within a hazardous location as indicated in the proposed heading for 511.4. It is the inside of the raceway that is within the hazardous location. This same problem was solved for Article 514 by the Panel Action on Proposal 14-122 for 514.8. I have proposed the same type of solution for Article 511. The change in the Exception is to comply with the Technical Correlating Committee direction for Proposal 14-122.

(2) The original reason for 511.4(A)(1) was to assure a seal where the conduit emerged from the wall or underground. The panel action to delete 511.4(A)(1) will result in a hazard because the panel action has not maintained the requirement for sealing the conduit. The submitter recognized this problem by adding the requirement for a seal following the (proposed) deleted text. The requirements in 501.4 and 501.5 do not take care of the situation, as indicated in the Panel Statement, because the raceway is not within a hazardous location. The hazardous location is within the raceway. The panel took care of this problem in Article 514 by its action on Proposal 14-122, but did not make the needed addition of a sealing requirement in Article 511.

Panel Meeting Action: Reject

Panel Statement: The panel maintains that it is not necessary to require classification of the area below a Class I location in a commercial garage. The requirement for sealing raceways at boundaries is provided by 511.9, and this addresses the concern of communicating gases or vapors due to leakage accumulation in below-ground raceways to an unclassified location.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-102 Log #1941 NEC-P14 **Final Action: Reject**
(511.4)

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

Comment on Proposal No: 14-115

Recommendation: Accept the panel action in principle. Revise the remaining text of 511.4 to read: "... wiring shall conform to the requirements in Part II of Article 501." Then use the same construction for 511.4(B), i.e., "... shall conform to the requirements in Part III of Article 501."

Substantiation: This will allow for correlation with the panel rewrite on Article 501 and also avoid two whole article cross references that are Style Manual violations.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 14-101.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-103 Log #189 NEC-P14 **Final Action: Reject**
(511.4(A)(1))

Submitter: Peter J. Schram Delray Beach, FL

Comment on Proposal No: 14-116

Recommendation: Reconsider this proposal.

Substantiation: The Panel Statement on its action on Proposal 14-115 that the present requirements in 501.4 and 501.5 take care of the proposal overlooks the fact that the hazardous location is not necessarily in the wall or under the floor, but in the conduit itself, due to liquid seeping into the conduit. See my comment on Proposal 14-115.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 14-101.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-104 Log #190 NEC-P14 **Final Action: Reject**
(511.4(A)(1))

Submitter: Peter J. Schram Delray Beach, FL

Comment on Proposal No: 14-118

Recommendation: Reconsider this proposal.

Substantiation: The Panel Statement on its action on Proposal 14-115 that the present requirement in 501.4 and 501.5 take care of the proposal overlooks the fact that the hazardous location is not necessarily in the wall or under the floor, but in the conduit itself, due to liquid seeping into the conduit. See my comment on Proposal 14-115. The Panel decided that the companion proposal for 511.8 was really for 514.8, so the sealing requirement has not been retained.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 14-101.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-105 Log #1042 NEC-P14 **Final Action: Reject**
(511.4(A)(1))

Submitter: Noel Williams, Noel Williams Consulting

Comment on Proposal No: 14-117

Recommendation: This proposal should be accepted, but it should be modified to read "... installed in a raceway under a floor."

Substantiation: The panel statement is incorrect. Cables installed under buildings are required by 300.5(C) to be installed in raceways. The proposal does concern raceways, although that fact is not clear in the proposal.

Panel Meeting Action: Reject

Panel Statement: The modification is not necessary because the current requirements do not prohibit the installation that the submitter has described in his comment.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-106 Log #3518 NEC-P14 **Final Action: Reject**
(511.4(A)(1))

Submitter: Henry A. Jenkins, Wake County, Inspections Development

Comment on Proposal No: 14-119

Recommendation: Retain the exception.

Substantiation: Retain the existing exception permitting rigid nonmetallic conduit to be installed under the concrete floor of a commercial garage without concrete encasement, as would be required by Section 501.4(A)(1)(a), Exception (new section 501.10(A) Exception. There has been no technical substantiation submitted to the panel to require this concrete encasement after permitting directly-buried rigid nonmetallic conduit in this application since the 1996 NEC. This permission is also given for Article 514 in 514.8 Exception No. 2 and has been in the NEC for many years. There isn't any additional hazard for nonmetallic raceways installed under the concrete floor in a commercial garage than the same type of raceway installed in a motor fuel dispensing location and in some cases, this raceway is installed from dispensers to branch circuit panels within the service bay. It would not make any sense to require rigid nonmetallic raceways for receptacles inside the bay but under the floor to have concrete encasement while the nonmetallic raceways for the dispensers are permitted to be directly buried under the floor without concrete encasement.

Panel Meeting Action: Reject

Panel Statement: The exception is no longer necessary based on the panel action on Proposal 14-115. The area below the commercial garage is not classified based on the substantiation provided for Proposal 14-115. Therefore, RNC is permitted in that location.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-107 Log #797 NEC-P14 **Final Action: Accept**
(511.7(A)(1))

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 14-121

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-108 Log #3677 NEC-P14 **Final Action: Accept**
(511.7(A)(1))

Submitter: George W. Flach, National Armored Cable Manufacturers Assn.

Comment on Proposal No: 14-121

Recommendation: Accept the proposal.

Substantiation: The performance and construction of AC cable is equal to or exceeds that of Flexible Metal Conduit and MC cable that are currently permitted. The UL required thickness of the armor on AC is 0.025 to 0.034 inch. The thickness for the equivalent sized Flexible Metal Conduit is 0.025 to 0.030 inch, and the thickness of MC, which is not specified by UL, is 0.017 inch and lower.

The mechanical performance requirement for AC equals or exceeds those of Flexible Metal Conduit and MC. The armor of MC cable is required to support a 150-pound weight and the armor of Flexible Metal Conduit is required to support a 300-pound weight without the armor opening. AC must support a 300-pound weight without the armor opening up. Type AC must additionally support a 100-pound weight without elongating the armor more than 3-inches.

Type AC cable utilizes THHN insulated conductor that are the same as the insulated conductors utilized in MC cable and that are pulled into Raceways. Type AC is as substantial in construction and performance as currently permitted wiring methods and should be included.

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

14-109 Log #191 NEC-P14 **Final Action: Accept in Principle**
 (511.8)

Submitter: Peter J. Schram Delray Beach, FL
Comment on Proposal No: 14-122

Recommendation: Accept the proposal in principle. Accept the panel action with the changes directed by the Technical Correlating Committee.

Substantiation: See my comment on Proposal 14-115.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 14-111.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

14-110 Log #192 NEC-P14 **Final Action: Reject**
 (511.8)

Submitter: Peter J. Schram Delray Beach, FL
Comment on Proposal No: 14-123

Recommendation: Accept in principle. Accept my comment on Proposal 14-115, which also established a new 511.8

Substantiation: The submitter recognizes the need for a seal, but the Panel Action on Proposal 14-115 does not include the sealing requirement. See the substantiation for my comments on Proposals 14-115 and 14-116. My proposed wording correlates with the wording accepted by the panel on Proposal 14-122 for Article 514. The wording of the requirements in each article should be as nearly the same as possible to avoid confusion by Code users.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 14-101.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

14-111 Log #798 NEC-P14 **Final Action: Accept in Part**
 (511.8)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 14-122

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept in Part

Panel Statement: The panel accepts the recommendation to remove the reference to the entire article and confirms that the soft conversion of 3.05 meters is necessary to correspond to a 10 foot length of conduit.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 513 — AIRCRAFT HANGARS

14-112 Log #193 NEC-P14 **Final Action: Reject**
 (513.8 and 513.9)

Submitter: Peter J. Schram Delray Beach, FL
Comment on Proposal No: 14-123

Recommendation: Accept in principle. Revise to correlate with the wording adopted in Articles 511 and 514.

Substantiation: See my comments on Proposals 14-115, 14-116, 14-118, 14-122, and 14-123. The wording of the requirements in each article should be as nearly the same as possible to avoid confusion by Code users.

When I was on Panel 14 in the 1970s, and there was also a representative of the airline industry on the panel, there was a discussion at a panel meeting of a large fuel spill in an Eastern Airlines hanger in Miami. The discussion included the problems associated with leakage of fuel into raceways beneath the floor and transmission of vapors to unclassified areas as well as into the hollow spaces in the hanger walls. In my opinion, it is essential that there be a clear requirement for suitable seals in all raceways under the floor or passing through walls if there can be any fuel leakage into the raceways. There is a

history of problems with fuel leakage, at least in aircraft hangers.

Panel Meeting Action: Reject

Panel Statement: The comments cited in the substantiation for Articles 511 and 514 have not been accepted. Therefore, correlation is not possible.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

ARTICLE 514 — MOTOR FUEL DISPENSING FACILITIES

14-113 Log #125 NEC-P14 **Final Action: Accept in Principle**
 (514.13)

Note: The Technical Correlating Committee directs that the words “the electrically safe condition” be replaced with the words “the open position” in the panel action text.

The panel’s use of the phrase “the electrically safe condition” is inconsistent with the use of the phrase in NFPA 70E.

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

Comment on Proposal No: 14-142

Recommendation: Accept proposal with the following additional wording at the end:

“...device, where it serves a single device. Where serving more than one device, it shall be permitted to be elsewhere, provided that it is within sight of all devices it serves, and capable of being locked in the off position.”

Substantiation: I share Messrs. Cook’s and Weldon’s concerns, and believe this will reasonably address all parties’ issues.

Panel Meeting Action: Accept in Principle

Revise 514.13 to read: 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. The means shall be capable of being locked in the electrically safe condition.

Panel Statement: The panel modification of the proposed text ensures that all means of disconnecting external voltage sources can be locked in the electrically safe condition regardless of where the means is located.

Number Eligible to Vote: 15
Ballot Results: Affirmative: 15

Comment on Affirmative:

COOK: Although I would prefer to use the words submitted in this comment, it is obvious the panel does not wish to require the disconnect to be within sight of the equipment. The panel chose to require that the disconnecting means be “capable of being locked in the electrically safe condition.” Those words were chosen to correlate with requirements in NFPA 70E. After reviewing the definitions from NFPA 70E for that phrase, I believe the text located in the exception of NEC 430.102(B) would better describe the installation requirement. The phrase “electrically safe work condition” better describes a work practice

NFPA 70E - Electrically Safe Work Condition. A state in which the conductor or circuit part to be worked on or near has been disconnected from energized parts, locked/tagged in accordance with established standards, tested to ensure the absence of voltage, and grounded if determined necessary.

NEC 430.102(B) 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.

Change the last sentence of panel action to read: “The disconnecting means shall be 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.”

14-114 Log #1276 NEC-P14 **Final Action: Accept in Principle**
 (514.13)

Submitter: Mark R. Hilbert Wolfeboro, NH
Comment on Proposal No: 14-142

Recommendation: Accept the proposal in principle and revise the proposed second sentence of 514.13 to read:

“The location of this means shall be permitted to be other than inside or adjacent to the dispensing device, provided it is located within site from the dispensing device or it is readily accessible and capable of being locked in the open position.”

Substantiation: There is merit to locating the disconnecting means outside of the classified location around the dispensing islands. However, there is equal merit, with regards to electrical safety, for locating this maintenance disconnecting means where it is visible to those servicing the dispensing device or

providing a means to lock it in the open position. The addition of the readily accessible reference will make it clear that the disconnecting means must be located where it is accessible to those performing the maintenance or it must be located within site from the equipment being serviced.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 14-113.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

ARTICLE 516 — SPRAY APPLICATION, DIPPING, AND COATING PROCESSES

14-115 Log #799 NEC-P14 Final Action: Accept (516.3)

Submitter: Technical Correlating Committee on National Electrical Code® Comment on Proposal No: 14-145a

Recommendation: 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.

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

Integrate the following into the text proposed in 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."

5. In 516.3(A) title, add "I" after "Class" to make title "Class I, Division 1 or..."

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

14-116 Log #3686 NEC-P14 Final Action: Reject (516.7(A))

Submitter: George W. Flach, National Armored Cable Manufacturers Assn. Comment on Proposal No: 14-146

Recommendation: Accept the original proposal to add AC cable to 516.7(A) as follows:

(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: The performance and construction of AC cable is equal to or exceeds that of a metal raceway, Flexible Metal Conduit, and MC cable that are currently permitted. The UL required thickness of the armor on AC is 0.025 to 0.034 inch. The thickness for the equivalent sized Flexible Metal Conduit is 0.025 to 0.030 inch, and the thickness of MC, which is not specified by UL, is 0.017 inch and lower.

The mechanical performance requirement for AC equals or exceeds those of Flexible metal Conduit and MC. The armor of MC cable is required to support a 150-pound weight and the armor of Flexible Metal Conduit is required to support a 300-pound weight without the armor opening. AC must support a 300-pound weight without the armor opening up. Type AC must additionally support a 100-pound weight without elongating the armor more than 3-inches.

Type AC cable utilizes THHN insulated conductor that are the same as the insulated conductors utilized in MC cable and that are pulled into Raceways. Type AC is as substantial in construction and performance as currently permitted wiring methods and should be included.

Panel Meeting Action: Reject

Panel Statement: The performance requirements for Type MC cable in UL 1569 exceed the performance requirements for Type AC cable in UL 4.

Number Eligible to Vote: 15

Ballot Results: Affirmative: 15

ARTICLE 517 — HEALTH CARE FACILITIES

15-3 Log #803 NEC-P15 Final Action: Accept (517)

Submitter: Technical Correlating Committee on National Electrical Code® Comment on Proposal No: 15-5

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

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel has reviewed the following references and verified that they are correct:

- Text: Article 517 - Start of Article
FPN: Change reference to NFPA 99 - 2002 Section 517.25
FPN: Change reference to NFPA 99 - 2002 Section 517.30(A)
FPN No. 1: Change reference to NFPA 99 - 2002
FPN No. 2: Change reference to NFPA 99 - 2002 Section 517.30(B)(4)
FPN No. 1: Change reference to NFPA 99 - 2002, Standard for Health Care Facilities; 4.4.3.2, Transfer Operation Type I
4.4.2.1.4 Automatic Transfer Switch Features
4.4.2.1.6 Nonautomatic Transfer Device Features
Section 517.30(B)(6)
Delete the first reference and change the second reference to NFPA 99, 13.3.4.3
Section 517.30(E)
Change reference to NFPA 99, 4.4.2.2.4.2(B)
Section 517.31
Change reference to NFPA 99, 4.4.2.2.2.1 and 4.4.3.1
Section 517.32(C)(2)
FPN: Change reference to NFPA 99, 4.4.2.2.2(3)
Section 517.32(G)
Change reference to NFPA 99, 4.4.2.2.2.2(7)
Section 517.33(A)(9)
Change reference to NFPA 99, 4.4.2.2.2.3(9)
Section 517.34
Change reference to NFPA 99, 4.4.2.2.3.2
Section 517.34(A)(5)
Change reference to NFPA 99, 4.4.2.2.3.4(5)
Section 517.34(B)(3) which is relocated to 517.34(A)(6)
(Renumber paragraphs 517.34(B)(4) through (B)(9); to 517.34(B)(3) through (B)(9))
Change reference to NFPA 99, 4.4.2.2.3.4(6)
Section 517.34(B)(9)
Change reference to NFPA 99, 4.4.2.2.3.5(9)
Section 517.35(A)
Change reference to NFPA 99, 4.4.1.1.4
Section 517.40(A) Exception (c)
Change reference to NFPA 99, 17.3.4.1.2(3) and 18.3.4.1.2(3)
Section 517.40(C)
FPN: Change reference to NFPA 99 - 2002
Section 517.41(A)
Change reference to a FPN; NFPA 99, Annex A4.5.2.2.1
Section 517.41(B)
Change reference to NFPA 99, 4.5.2.2.1
Section 517.41(B)
FPN No. 1 Change reference to NFPA 99 - 2002 Standard for Health Care Facilities;
4.5.3.2 Transfer Switch Operation Type II
4.4.2.1.4 Automatic Transfer Switch Features
4.4.2.1.6 Nonautomatic Transfer Device Features
Section 517.41(E)
Change reference to NFPA 99, 4.5.2.2.4.2
Section 517.42
FPN: Change reference to NFPA 99 - 2002
Section 517.42(C)(2)
FPN: Change reference to NFPA 99, 4.4.2.2.2.2(3)
Section 517.42(G)
Change references to NFPA 99, 4.4.2.2.2.2(6) and 4.5.2.2.2(7)
Section 517.43(B)(3)
Change reference to NFPA 99, 4.5.2.2.3.3(C)
Section 517.44(A)
Change reference to NFPA 99, 4.4.1.1.4, and delete the second reference.
Section 517.44(B), Exception No. 2
Change reference to NFPA 99, 17.3.4.1.3 and 18.3.4.1.1. Two of the references were deleted.

Section 517.45(A)
 Change reference to FPN; NFPA 99 - 2002
 Section 517.45(B)
 Change reference to NFPA 99, 14.3.4.2.1
 Section 517.45(C)
 Change reference to NFPA 99, 14.3.4.2.2
 Title IV
 FPN: Change reference to NFPA 99 - 2002
 Section 517.60(A)(1)
 Change reference to NFPA 99, Annex E, E.1 and E.2
 Section 517.61(A)(1)
 Change reference to NFPA 99, Annex E.6.6.2
 Section 517.61(A)(3)
 Change reference to NFPA 99, Annex E, E.2.1, E.4.5, E.4.6, and E.4.7
 Section 517.64(F)(Section deleted by Panel Proposal 15-52b)
 Section 517.160(A)(2)
 Change reference to NFPA 99, 4.3.2.6.1
 Section 517.160(A)(4)(b)(2)
 Change reference to NFPA 99, 13.4.1.2.6.6
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

2-181 Log #804 NEC-P02 **Final Action: Accept**
 (517.1)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 15-8
Recommendation: 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.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: Accept
 The panel accepts the direction of the TCC to consider the referred proposal and is rejecting the proposal.
Panel Statement: See panel statement on Comment 2-164.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-4 Log #3217 NEC-P15 **Final Action: Reject**
 (517.10(B)(2) (New))

Submitter: Michael I. Callanan, IBEW
Comment on Proposal No: 15-14
Recommendation: This proposal should be accepted.
Substantiation: The submitter raises valid concerns. The suggested text states that 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. Patient sleeping areas in nursing homes and limited care facilities do not receive the (210.12) protection, because they are not recognized as dwelling unit bedrooms. The submitter's intent of the Code change is correct in stating that 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, receive the same fire safety protection as dwelling unit bedrooms. The definitions of nursing homes and limited care facilities show that we are dealing with the protection of people with an incapacity or who are incapable of self-preservation. This protection becomes even more critical due to these circumstances. This Comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.
Panel Meeting Action: Reject
Panel Statement: The panel recognizes the concern for residents with limited capacity in nursing homes and limited care facilities. However, the submittal did not provide evidence of fires originating from an arcing fault within wiring within patient sleeping rooms of these facilities. In addition, 517.10(B) states that Part II shall not apply to nursing homes and limited care facilities.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 10 Negative: 3
Explanation of Negative:

SHELLY: The submitter's substantiation is correct and, in addition, I reiterate my Explanation of Negative Vote on the panel's rejection of Proposal 15-14. That recommendation was to require arc-fault circuit interrupter protection in the same locations as required in similar locations in other structures. Sleeping areas of all limited care facilities are not necessarily held to higher construction standards as noted in the panel statement in rejecting the proposal. I question whether the supervisory staff in such facilities can accomplish the same level of safety as the arc-fault circuit interrupter. We should not wait until statistics are collected as to the number of deaths and injuries that occur before imple-

menting a known safety precaution.
 WHITE: The concerns of the submitter are valid. You have the same type hazards in a nursing home or limited care facilities and the people that reside in them are usually incapacitated to some extent. This would give just another layer of protection.
 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.

15-5 Log #1301 NEC-P15 **Final Action: Reject**
 (517.12)

Submitter: Frank Martucci Fort Lee, NJ
Comment on Proposal No: 15-15
Recommendation: Please accept this proposal. 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 exception is an alternate to my proposal mandating the use of my electrocution-proof and fireproof cord and plug connected system for the entire nation. It provides a second standard for health care facilities similar to the Hospital Grade standard established for outlets and cord components.
 My Hospital Grade Cord and Cordset will provide a far superior standard desperately needed to protect patients who must have electrical devices attached to, or inserted into, their bodies while in an environment as dangerous as a bathtub.
 NEC listing in the 2005 code, and UL approval, will make it possible to market the system as a second standard, scientifically tested, and approved, by code panels, for healthcare facilities.
 In rejecting my proposal, the panel violates Article 90.1 (A) The entire purpose of the NEC, the practical safeguarding of persons and property from hazards arising from the use of electricity.
 The panel rejected a proposal that truly provides the safeguards mandated in Article 90.1 (a) without making scientifically based tests to refute the following:
 Does my safeguard compensate for reductions in the grounding conductor?
 Yes.
 Does my safeguard ensure grounding integrity during massive shorts?
 Yes
 Does my safeguard adjust in size to compensate for voltage drop?
 Yes
 Does my safeguard prevent massive current to flow through raceways?
 Yes
 Does my safeguard prevent shock or electrocution due to miswired cords?
 Yes
 The panel rejected my proposal because the Safe Medical Device Tracking Act requires all medical equipment failures to be reported and that there have been no reports of any incidents resulting in injury and death.
 The Safe Medical Device Tracking Act is a joke. In no way would any hospital volunteer information that could cause bankrupting lawsuits, jail sentences, or loss of jobs. A letter I received from the FDA states: Quote. "fewer than 1 percent (device problems) were reported to the FDA; the same study also found that the more serious the device problems, the less likely the hospitals were to report the incident."
 Ralph Nader, alluding to an article in the 1970 Federal Register, accused doctors of electrocuting 5000 patients each year and covering them up. The electrocution I uncovered was also covered up. When I reported the electrocution, the coroner's report had to be changed from heart attack to electrocution.
 And the number of covered up electrocutions should be considerably higher since the ten fold proliferation of medical devices.
 Conclusion: Each and every year more people are electrocuted in hospitals than those lost in the World Trade Center because of design defects in our cord and plug connected grounding system. They die without memorials, financial assistance, and in vain because no attempt, except mine, has ever been made to correct the design defects responsible for them.
 Because electrocutions can be covered up, or mistaken, as heart attacks, it behooves NEMA, and the NFPA, to provide our men, women, and children with every possible safeguard as mandated in Article 90.1 (A).
 A second, redundant, ground is a safeguard desperately needed to prevent loss of grounding and line drop, especially on cords with severely undersized 7 ampacity grounding conductors. And especially since cords are rarely, if ever, tested for continuity. A second, redundant, ground is a safeguard needed to prevent the protective grounding conductor from burning open during massive shorts.
 A second, redundant, ground in all cords is a safeguard desperately needed to compensate for line drop in lengthy cordsets.
 A second, redundant, ground is a safeguard desperately needed to prevent miswired cord components from causing shock or electrocution; especially cords without color coding.
 A second, redundant, ground in all cords is a safeguard desperately needed to

prevent miswired cords from causing massive current to flow through raceways inside walls. Massive current that will micro-energize the ground pole of all downstream outlets and cause "unseen" fires inside walls.

So do not violate the code regarding safeguards and at the very least, grant me an exception that permits my Hospital Grade cord and cordsets in Health Care Facilities.

The NEC listing as an exception in the 2005 code, and UL approval, will make it possible to market my Hospital Grade Cord and Cordset in all Health Care Facilities.

I am unfortunate to have invented cord components that require a change in a standard almost 100 years old. My electrocution-proof and fireproof cord components cannot be marketed unless there are two grounding conductors in all cords and only code panels have the power to make it possible.

And since you continue to refuse to mandate my standard for double grounded cords and cordsets, all I am asking for is an exception permitting its use in Health Care Centers.

Panel Meeting Action: Reject

Panel Statement: The submittal does not provide any new documentation or evidence supporting the claim of electrocution caused by failure of an equipment ground within a cord set. Recent, supporting evidence from the FDA or from JCAHO is needed before implementing a change of this magnitude.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-6 Log #1302 NEC-P15 **Final Action: Reject**
(517.12)

Submitter: Frank Martucci Fort Lee, NJ

Comment on Proposal No: 15-16

Recommendation: Please accept this proposal. After existing material add:

(A) Equipment connected by cord and plug: Exposed noncurrent carrying metal parts of cord and plug connected equipment 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 female connectors and attachment plugs shall be provided with two separate wiring sites only at existing grounding poles. Cord female connectors and male attachment plugs shall be designed so that only the ground pole can be wired with two conductors.

(c) Hospital grade components shall be used on all cords and cordsets.

Substantiation: In rejecting my proposal, the panel violates Article 90.1 (A) The entire purpose of the NEC, the practical safeguarding of persons and property from hazards arising from the use of electricity.

The panel rejected a proposal that truly provides the safeguards mandated in Article 90.1 (a) without making scientifically based tests to refute the following;

Does my safeguard compensate for reductions in the grounding conductor?
Yes.

Does my safeguard ensure grounding integrity during massive shorts?
Yes

Does my safeguard adjust in size to compensate for voltage drop?
Yes

Does my safeguard prevent massive current to flow through raceways?
Yes

Does my safeguard prevent shock or electrocution due to miswired cords?
Yes

The panel rejected my proposal because the Safe Medical Device Tracking Act requires all medical equipment failures to be reported and that there have been no reports of any incidents resulting in injury and death. The Safe Medical Device Tracking Act is a joke. In no way would any hospital volunteer information that could cause bankrupting lawsuits, jail sentences, or loss of jobs. A letter I received from the FDA states: Quote. "fewer than 1 percent (device problems) were reported to the FDA; the same study also found that the more serious the device problems, the less likely the hospitals were to report the incident."

Ralph Nader, alluding to an article in the 1970 Federal Register, accused doctors of electrocuting 5000 patients each year and covering them up. The electrocution I uncovered was also covered up. When I reported the electrocution, the coroner's report had to be changed from heart attack to electrocution. And the number of covered up electrocutions should be considerably higher since the ten fold proliferation of medical devices.

Conclusion: Each and every year more people are electrocuted in hospitals than those lost in the World Trade Center because of design defects in our cord and plug connected grounding system. They die without memorials, financial assistance, and in vain because no attempt, except mine, has ever been made to correct the design defects responsible for them.

Because electrocutions can be covered up, or mistaken, as heart attacks, it behooves NEMA, and the NFPA, to provide our men, women, and children with every possible safeguard as mandated in Article 90.1 (A).

A second, redundant, ground is a safeguard desperately needed to prevent loss of grounding and line drop, especially on cords with severely undersized 7 ampacity grounding conductors. And especially since cords are rarely, if ever, tested for continuity.

A second, redundant, ground is a safeguard needed to prevent the protective

grounding conductor from burning open during massive shorts.

A second, redundant, ground in all cords is a safeguard desperately needed to compensate for line drop in lengthy cordsets.

A second, redundant, ground is a safeguard desperately needed to prevent miswired cord components from causing shock or electrocution; especially cords without color coding.

A second, redundant, ground in all cords is a safeguard desperately needed to prevent miswired cords from causing massive current to flow through raceways inside walls. Massive current, that will micro-energize the ground pole of all downstream outlets, and cause "unseen" fires inside walls.

So do not violate the code regarding safeguards and provide patients the maximum protection while one or more medical devices are attached to, or inserted into, their bodies.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 15-5.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-7 Log #3024 NEC-P15 **Final Action: Reject**
(517.13(A))

Submitter: Monte Ewing, State of Wisconsin

Comment on Proposal No: 15-17

Recommendation: Revised text:

All circuits to equipment located within 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.

Substantiation: The present language allows a nonmetallic feeder to directly supply equipment located within the patient care area. The definition of equipment is general and covers anything electrical that may be installed. Ever since the definition of branch circuit was changed to apply to the conductors following the final overcurrent device there has been the problem of wiring x-ray equipment, MRI scanners, and such with nonmetallic conduit. A feeder can go from a service with nonmetallic conduit to a panelboard or a fused switch with the patient care area to supply a single piece of equipment. There may be a 100 ampere circuit breaker at the service and a 150 ampere fuse in the disconnect, but it is still a feeder until it leaves the final overcurrent device. I assume it is the panel's intent to have all wiring that can be contacted within a patient care room to be installed in a metallic raceway or cable (other than the equipment cable or cord).

Panel Meeting Action: Reject

Panel Statement: The proposed language would require the dual or redundant ground path to serve equipment such as magnetic resonance imaging or CRT scanners. No steel or ferrous metal can be used within the shielded room where the equipment is located due to the intense magnetic fields created during use. Patient safety is provided through other means with this equipment.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-8 Log #3536 NEC-P15 **Final Action: Reject**
(517.13(A) and (B))

Submitter: William A. Wolfe, Steel Tube Institute of North America

Comment on Proposal No: 15-17

Recommendation: Reject this proposal.

Substantiation: Panel 17 (now CMP 15) has historically been adamant that redundant (or two) grounding means must be provided in patient care areas. The panel emphasized this again in their rejection of Proposal 15-18 this cycle. The proposal (15-17) addressed by this comment accepts in concept what was rejected in Proposal 15-18.

It is also evident in the panel action on Proposal 15-42 that the panel does not deem flexible metal raceway OR cable wiring systems as "equal to metal raceways," as the substantiation would have one believe. Section 250-118 may permit grounding as outlined in the substantiation, but the panel does not. Acceptance of this proposal is contrary to the historical position in patient care. The panel was correct in their statement on 15-18: "Patient care area wiring methods require two independent ground return paths. Interlocked metal armor, does not of itself, provide the redundant ground path, and is not consistent with the basic requirement of 517.13(A)." It is also interesting to note that "flex and fittings listed for grounding" are permitted in 250.118, but that none are actually listed. Therefore, there is no actual history of safe use of such an installation. This proposal relies on a metallic sheath in conjunction with a ground wire to be one means of providing an equipment ground. The panel has long noted that this is nothing more than using a larger equipment ground wire

and it has not been demonstrated that two separate means of grounding would be provided under these conditions.

Panel Meeting Action: Reject

Panel Statement: Existing language 517.13 of in the 2002 NEC refers to 250.118 for the established grounding requirements. The intent of proposal 15-17 is to ensure that requirements for one of the two grounding paths are consistent with 250.118. Requirements for the second ground path, required for patient care areas, is not changed by this proposal.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-9 Log #3541 NEC-P15
(517.13(A)and (B))

Final Action: Reject

Submitter: William A. Wolfe, Steel Tube Institute of North America

Comment on Proposal No: 15-17

Recommendation: Reject this proposal.

Substantiation: Panel 17 (now CMP 15) has historically been adamant that redundant (or two) grounding means must be provided in patient care areas. The panel emphasized this again in their rejection of Proposal 15-18 this cycle. The proposal (15-17) addressed by this comment accepts in concept what was rejected in Proposal 15-18.

It is also evident in the panel action on Proposal 15-42 that the panel does not deem flexible metal raceway OR cable wiring systems as "equal to metal raceways," as the substantiation would have one believe. Section 250-118 may permit grounding as outlined in the substantiation, but the panel does not. Acceptance of this proposal is contrary to the historical position in patient care. The panel was correct in their statement on 15-18: "Patient care area wiring methods require two independent ground return paths. Interlocked metal armor, does not of itself, provide the redundant ground path, and is not consistent with the basic requirement of 517.13(A)." It is also interesting to note that "flex and fittings listed for grounding" are permitted in 250.118, but that none are actually listed. Therefore, there is no actual history of safe use of such an installation. This proposal relies on a metallic sheath in conjunction with a ground wire to be one means of providing an equipment ground. The panel has long noted that this is nothing more than using a larger equipment ground wire and it has not been demonstrated that two separate means of grounding would be provided under these conditions.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 15-8.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-10 Log #766 NEC-P15 **Final Action: Accept in Principle in Part**
(517.14)

Submitter: Michael J. Johnston Plano, TX

Comment on Proposal No: 15-22

Recommendation: This proposal should continue to be accepted and incorporate an editorial revision to the last sentence as follows:

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 be terminated on the equipment grounding terminal ground bus in each panelboard panel, and shall be protected where subject to physical damage.

Substantiation: The last sentence as it currently appears after the proposed revision is redundant because it is already implied in the first two sentences of the rule that the equipment grounding terminal buses of panelboards are being bonded together. In addition, the word "panel" is inconsistent with the term panelboard, but it is generally understood to mean the same thing. The first two sentences of the rule each use the word "continuous" which can also be removed from the last sentence. The requirement for protection from physical damage is appropriate in this section.

Panel Meeting Action: Accept in Principle in Part

Accept the proposal with the editorial revision to last sentence. Change the last sentence of 517.14 to read as follows: "This conductor shall be permitted to be broken in order to terminate on the equipment grounding terminal bus in each panelboard."

Panel Statement: The panel agrees with the submitter's recommendation and adds minor editorial changes to ensure clarity of this sentence. The panel notes and finds that the requirements regarding physical protection are located in 250.102(E) and 300.4.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

MORGAN: The panel statement should have included a reference to 250.12(C) for physical protection of the equipment bonding conductor.

15-11 Log #1360 NEC-P15
(517.15)

Final Action: Reject

Submitter: Andre R. Cartal, Princeton Borough Building Dept.

Comment on Proposal No: 15-23

Recommendation: Please reconsider Proposal.

Substantiation: The Panel should be reminded that where was the "Demonstrated Hazard for such a significant change" when the addition of a back-up ground path requirement for branch-circuits was added in the 1987 NEC? The reason presented at that time included concerns regarding the quality of workmanship. Now when it concerns the feeder ground path reliability, the quality of workmanship is all that we depend on. No backup ground path is necessary. We all know that this ground path is not monitored so failure (A demonstrated hazard) would not be apparent, but that's our system - for normal occupancies. For feeders in health care facilities, we can do better. The practice of installing an equipment grounding conductor in metal raceways is common in many jurisdictions. This should not be considered a "significant change".

Panel Meeting Action: Reject

Panel Statement: The panel continues to reject the proposal. No documentation has been presented to substantiate failure of equipment grounding at the feeder level. The panel would give serious consideration to such evidence if and when it is presented.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-12 Log #805 NEC-P15
(517.16, FPN)

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 15-24

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Delete "dedicated" from the FPN.

Panel Statement: The intent of the FPN is achieved without the word "dedicated" in the existing sentence.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-13 Log #784 NEC-P15
(517.16, FPN)

Final Action: Accept in Principle

Submitter: Michael J. Johnston Plano, TX

Comment on Proposal No: 15-24

Recommendation: This proposal should be rejected to be consistent with the action on Proposals 1-77, 5-243, 5-249, and 18-9.

Substantiation: The term "dedicated equipment grounding conductor" is not currently defined in the NEC. The term dedicated could imply that only one device may be connected. This section is applies to the identification of receptacles with insulated grounding terminals. (Isolated grounding terminals) and visibility requirements once installed. The FPN would not benefit from an informative standpoint by the insertion of this term or the proposed new sentence because parallel equipment grounding conductor paths are required by 517.13(A) and (B). Where isolated (insulated) equipment grounding conductors are installed in areas requiring two equipment grounding conductor paths as specified in 517.13, this isolated equipment grounding conductor becomes a third path that is not in parallel with the two required by 517.13 for patient care areas. This additional sentence in the FPN would probably be more appropriate if located after 250.146(D). The submitter's concept may have merit and may provide clarification, but the terminology used in the proposal is not appropriate and could lead to confusion.

Panel Meeting Action: Accept in Principle

Panel Statement: The concerns expressed by the TCC and by this comment are answered by deleting the word "dedicated" in the text of Proposal 15-24.

See panel action and statement on Comment 15-12.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-14 Log #767 NEC-P15 **Final Action: Accept in Principle in Part**
(517.17)

Submitter: Michael J. Johnston Plano, TX

Comment on Proposal No: 15-24a

Recommendation: Continue to accept the proposal and revise the text for clarity as follows: (A) Applicability. The requirements of 517.17 shall apply to hospitals and other buildings, including multiple occupancy buildings, housing with critical care areas or utilizing life support equipment, and buildings which that require provide essential utilities or services for the operation of the critical care areas or electrical life support equipment.

Substantiation: The word “with” is a more appropriate fit to replace the word “housing.” The addition of the term “including multiple occupancy buildings” more appropriately addresses the proposed changes accepted in principle under Proposal 15-27 and addresses the concerns of the submitter and will also provide needed clarification for enforcement of this requirement in such buildings as strip centers that include various occupancy types. Changing the word “provide” to the term “that require” provides clarity from permissive context to required.

Panel Meeting Action: Accept in Principle in Part

Revise text of item (A) to read as follows:“(A) Applicability. The requirements of 517.17 shall apply to hospitals and other buildings (including multiple occupancy buildings) with critical care areas or utilizing electrical life support equipment, and buildings that provide the required essential utilities or services for the operation of critical care areas or electrical life support equipment.”

Panel Statement: The panel clarified the wording and satisfied the submitter’s intent.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-15 Log #1284 NEC-P15 **Final Action: Reject**
(517.17)

Submitter: George Ritchie, City of Phoenix, AZ

Comment on Proposal No: 15-24a

Recommendation: Delete the proposed new section (A) Applicability.

Substantiation: The proposed change contradicts NFPA 99, section 3-3.2.1.5 (copy provided). The new proposed text would exempt distribution systems serving Patient Care Areas from the higher degree of power reliability that 2 GFP levels provide. NFPA 99 clearly requires 2 levels for systems serving Patient Care Areas, not just Critical Care Areas. Proposal 15-24a sets up a conflict; does NFPA 70 or 99 prevail? Certainly, we should not knowingly introduce a contradiction between these standards. Additionally, this proposal diminishes the intent and increasing necessity of providing reliable power in Health Care Facilities. (See NFPA 99, 3-2.4 that I have provided). IEEE standard 602-1996, lists functions such as medical lab work, tissue and blood banks, MRI and scanning equipment, etc. as vital functions requiring a high degree of reliable power (copy provided). Why would this panel desire to further reduce the minimum requirement that has been in the NEC since 1978? If anything, as our society becomes more dependent on reliable electricity, the NEC should be looking to expand the types of occupancies, buildings, and systems deserving 2 levels of GFP. Not only does the 2nd level improve safety, but anyone who has experienced a total building black out because a light fixture caused the main breaker to trip on ground fault, knows that reliability is greatly enhanced with an additional level of GFP. Perhaps this section is not well written, and should be revised completely. I suggest a special panel be formed to review the intent of this section, work with NFPA 99, and revise both standards as appropriate to reflect our society’s growing dependence on safety and reliability.

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

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 15-14. Proposal 15-24a does not create a conflict with NFPA 99. Rather, it clarifies the level of patient care requiring protection against a power outage resulting from the ground-fault protection tripping at the service or main building feeder. Article 517 gives clear direction for those facilities where the level of patient care requires an alternate power source. IEEE standard 602-1996 does not address the applicability of secondlevel ground fault protection.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-16 Log #1414 NEC-P15 **Final Action: Accept in Principle in Part**
(517.17)

Submitter: Lanny G. McMahlil Phoenix, AZ

Comment on Proposal No: 15-24a

Recommendation: Continue to accept this proposal; however, reconsider the action requiring “an additional step of ground-fault protection shall be provided

in all next level feeder disconnecting means downstream toward the load”.

Substantiation: Panel 15 did a great job clarifying the requirement for ground-fault protection requirements in health care facilities. This was long overdue and should provide the necessary guidance and clear understanding for the design and enforcement communities. However, the panel should reconsider the requirement that ground-fault protection be provided in all next level feeder disconnecting means as this would seem to be more restrictive then necessary. A feeder is defined as “All circuit conductors between the service equipment, the source of a separately derived system, or other power supply source and the final branch-circuit overcurrent device”. Knowing this, is it the intent of the revised text to require ground-fault protection on a 60-ampere feeder serving an isolated power supply? If so, then the text can stay as is; if not then the text should be revised. If revised, perhaps the text should state that the additional levels of ground-fault protection are not required to be installed on feeders of a certain ampere rating, such as, 100 ampere or less. Just a thought.

Panel Meeting Action: Accept in Principle in Part

The panel accepts the submitter’s recommendation to continue to accept the proposal as modified by Comment 15-14. The panel rejects the submitter’s recommendation to reconsider the action requiring a second level of ground-fault protection.

Panel Statement: 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.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-17 Log #3510 NEC-P15 **Final Action: Accept**
(517.17)

Submitter: Henry A. Jenkins, Wake County, Inspections Development

Comment on Proposal No: 15-25

Recommendation: I support the action of the committee.

Substantiation: None.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

4-99 Log #806a NEC-P04 **Final Action: Accept**
(517.17)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 15-24a

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the TCCs recommendation to reconsider.

Add a new FPN No. 4 after FPN. No. 3 in 230.95(C) to read as follows: FPN. No. 4: See 517.17(A) for information on where an additional step of ground fault protection is required for hospitals and other buildings with critical areas or life support equipment.

Panel Statement: This new fine print note was added at the request of Panel 15 to bring attention to a new applicability section that was added to 517.17 for ground fault protection of equipment. The new text in 517.17 will help clarify that only buildings with critical care areas or utilizing life support equipment require an additional step of ground fault protection. The text, as it was worded previously, would have required an extra level of GFP for a doctor’s office in a multifunction building even where there wasn’t life support equipment or critical care areas.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

2-182 Log #806 NEC-P02 **Final Action: Accept**
(517.17)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 15-24a

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the

Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the direction of the TCC to consider the referred proposal and is accepting the proposal in principle.

Add a new FPN following the main paragraph of 215.10 to read as follows: "FPN: For buildings that contain healthcare occupancies, see the requirements of 517.17."

Panel Statement: The panel has added a fine print note to 215.10 to provide the additional information.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-18 Log #12 NEC-P15
(517.18(D) (New))

Final Action: Accept

Submitter: Brian E. Rock, Hubbell Inc.

Comment on Proposal No: 15-30

Recommendation: Reject the proposal: ~~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.~~

Substantiation: The CMP specifically deleted this language for the 1993 NEC! See NFPA 70-A92 TCR, page 467, NEMA proposal 17-47 (Log #1761) to "Accept" by then-CMP-17 (*now CMP-15).

That unanimous Panel Action, with NO subsequent opposing public Comment, specifically deleted the words "and psychiatric" from the heading of 517-18(C) and deleted the words "or psychiatric" from the first sentence of 517-18(C) that had appeared in the 1990 NEC.

"Substantiation:" The receptacles that are available with tamper resistant features are designed to be resistant to tampering by small children. These receptacles are not designed to prevent adults with intent and ability from contacting energized components.

In some cases, because CMP 17* did not accept this proposal for the 1990 code, manufacturers have affixed instructions that such devices are not for use in psychiatric areas. A product should not be installed in a manner contrary to the use recommended by its manufacturer." NFPA 70 - A92 TCR, page 467.

CMP-15's Acceptance of this new Proposal 15-30 (Log #3404) for the 2005 NEC is a step backwards and ignores fundamentally the differing classification degrees of psychiatric patients. Solely the psychiatric facility's care providers, not an electrical Authority Having Jurisdiction untrained in psychiatric evaluation, must determine a psychiatric patient's access to any electrical power and associated control and protection levels. The Code is not intended as a design specification.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-19 Log #2581 NEC-P15
(517.18(D))

Final Action: Accept

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

Comment on Proposal No: 15-30

Recommendation: Reject the proposal:

~~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.~~

Substantiation: The CMP specifically deleted this language for the 1993 NEC! See NFPA 70-A92 TCR, page 467, NEMA Proposal 17-47 (Log #1761) to "Accept" by then-CMP-17 (*now CMP-15).

That unanimous Panel Action, with NO subsequent opposing public comment, specifically deleted the words "and psychiatric" from the heading of 517-18(c) and deleted the words "or psychiatric" from the first sentence of 517-18(c) that had appeared in the 1990 NEC.

"SUBSTANTIATION: The receptacles that are available with tamper resistant features are designed to be resistant to tampering by small children. These receptacles are not designed to prevent adults with intent and ability from contacting energized components.

"In some cases, because CMP 17* did not accept this proposal for the 1990 code, manufacturers have affixed instructions that such devices are not for use in psychiatric areas. A product should not be installed in a manner contrary to the use recommended by its manufacturer." - NFPA 70 - A92 TCR, page 467.

CMP-15's Acceptance of this new Proposal 15-30 (Log #3404) for the 2005 NEC is a step backwards and ignores fundamentally the differing classification degrees of psychiatric patients. Solely the psychiatric facility's care providers, not an electrical AHJ untrained in psychiatric evaluation, must determine a psychiatric patient's access to any electrical power and associated control and protection levels. The Code is not intended as a design specification.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-20 Log #3216 NEC-P15
(517.22 (New))

Final Action: Reject

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 15-37

Recommendation: This proposal should be accepted.

Substantiation: The submitter raises valid concerns. The suggested text states that 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. Patient sleeping areas in nursing homes and limited care facilities do not receive the (210.12) protection, because they are not recognized as dwelling unit bedrooms. The submitter's intent of the Code change is correct in stating that 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, receive the same fire safety protection as dwelling unit bedrooms. The definitions of nursing homes and limited care facilities show that we are dealing with the protection of people with an incapacity or who are incapable of self-preservation. This protection becomes even more critical due to these circumstances. This Comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 15-4.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 11 Negative: 2

Explanation of Negative:

SHELLY: The submitter's substantiation is correct and, in addition, I reiterate my Explanation of Negative Vote on the panel's rejection of Proposal 15-37. That recommendation was to require arc-fault circuit interrupter protection in the same locations as required in similar locations in other structures. Sleeping areas of all limited care facilities are not necessarily held to higher construction standards as noted in the panel statement in rejecting the proposal. I question whether the supervisory staff in such facilities can accomplish the same level of safety as the arc-fault circuit interrupter. We should not wait until statistics are collected as to the number of deaths and injuries that occur before implementing a known safety precaution.

WHITE: The substantiation the submitter gave was clear and to the point. The references he gave had a lot of back-up and technical information on AFCIs. I think it would give another level of protection that could not hurt.

15-21 Log #3511 NEC-P15
(517.25)

Final Action: Accept

Submitter: Henry A. Jenkins, Wake County, Inspections Development

Comment on Proposal No: 15-39

Recommendation: I support the action of the committee.

Substantiation: None.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-22 Log #2183 NEC-P15
(517.30(C)(3))

Final Action: Reject

Submitter: John H. Schwab, Jr., City of Wauwatosa, WI

Comment on Proposal No: 15-42

Recommendation: After the word "equipment", add new sentence. 517.30(c) 3) (3)(d). This does not include luminaire(s).

Substantiation: By adding this sentence, it would clearly state you can not use flexible metallic conduit (fixture whips) to feed 2x2, 2x4 (words not readable by NFPA) in luminaire(s) that are required to be securely fastened to a suspended ceiling. If we do not allow flexible metallic conduit to feed outlets in a new dry walled or plastered partition (wall), then surely we can not use FMC above a suspended ceiling. It stands to reason that luminaire securely fasten to (words not readable by NFPA) is work 10 not a flexible connection.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 15-27.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-23 Log #3023 NEC-P15
(517.30(C)(3))

Final Action: Reject

Submitter: Monte Ewing, State of Wisconsin

Comment on Proposal No: 15-42

Recommendation: 1. Keep first sentence and reword second sentence:

Nonmetallic raceways shall not be used to supply equipment located within patient care areas.

2. Keep first sentence and reword second sentence:

Nonmetallic raceways shall not be used to supply equipment located within patient care areas.

Substantiation: The definition of equipment is general and covers anything electrical that may be installed. Ever since the definition of branch circuit was changed to apply to the conductors following the final overcurrent device there has been the problem of wiring x ray equipment, MRI scanners, and such with nonmetallic conduit. They can go from a service with nonmetallic conduit to a panel board or a fused switch within the patient care area to supply a single piece of equipment and call it a feeder. They may have a 100 ampere circuit breaker at the service and a 150 ampere fuse, in the disconnect but it is still a feeder until it leaves the final overcurrent device. My proposal will eliminate a conflict with 517.13(A) and will require any raceway installed within the patient care area supplying equipment within that area to be metallic as intended by 517.13(A).

Panel Meeting Action: Reject

Panel Statement: No steel or ferrous metal can be used within the shielded room where the equipment is located due to the intense magnetic fields created during use. Patient safety is provided through other means with this equipment.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-24 Log #3215 NEC-P15
(517.30(C)(3))

Final Action: Reject

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 15-42

Recommendation: This proposal should be rejected.

Substantiation: The reworded text developed by the panel does not match the panel statement and there is more than editorial changes created by deleting the exceptions. As noted in Mr. White's comment, the word "listed" is not a requirement in (3)(d). This Comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Reject

Panel Statement: The panel acknowledges that editorial improvements as well as incorporation of Proposal 15-42, accepted in principle, were included in the revised text. The panel notes that action was also taken relative to Proposals 15-43 through 15-46.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-25 Log #3608 NEC-P15
(517.30(C)(3))

Final Action: Accept in Principle

Submitter: Lanny G. McMahon Phoenix, AZ

Comment on Proposal No: 15-42

Recommendation: Continue to accept this change; however, revise item (3) as follows: "(3) Mechanical Protection of the Emergency System. The wiring of the emergency system in a hospital shall be mechanically protected. Where installed as branch circuits in patient care areas, the installation shall comply with the grounding requirements of 517.13(A) and (B). The following wiring methods shall be permitted:" Revise item (3)(3)d as follows: "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)"

Substantiation: Panel 5 did a fine job of clarifying the mechanical protection requirements of this section. However, questions still exist regarding the acceptable wiring methods for the emergency system and the grounding requirements in patient care areas. Many are of the opinion that the reference to 517.13 is intended to recognize those wiring methods as acceptable for the emergency system without limitations. The changes note above should help to clarify the intent and the requirements. The primary change to this section is simply relocating a sentence and adding the word "grounding" to it. The word "grounding" clarifies the reason for the reference to 517.13. In addition, the reference to 517.13 should apply to item "c." Relocating the sentence corrects that oversight.

Panel Meeting Action: Accept in Principle

Revise item (3) to read as follows: "(3) Mechanical Protection of the Emergency System. The wiring of the emergency system in a hospital shall be mechanically protected. Where installed as branch circuits in patient care areas, the installation shall comply with the requirements of 517.13(A) and (B). The following wiring methods shall be permitted:" Also, revise (3)(d) as follows:

"Where necessary for flexible connection to equipment."

Panel Statement: Relocating the reference to 517.13(A) and (B) to the basic requirements in (C)(3) will provide a better understanding that all raceway systems for branch circuits serving 15- and 20-amp outlets in patient care areas shall comply with the provisions of 517.13(A) and (B). It is unnecessary to provide the word "grounding" in the proposed revision, as that is clear in the referenced sections.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-26 Log #3682 NEC-P15 **Final Action: Accept in Principle in Part**
(517.30(C)(3) Exception No. 4)

Submitter: George W. Flach, National Armored Cable Manufacturers Assn.
Comment on Proposal No: 15-45

Recommendation: Accept the original proposal with an additional FPN that identifies the marking for MC cable that is suitable for encasement in concrete 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.

FPN: Jacketed interlocked armored Type MC cable that is suitable for installation in concrete is marked for "Direct Burial"

Substantiation: The Panel Action to Accept in Principle with reference to the panel action on proposal 15-42 does not address this proposal. The panel action on proposal 15-42 added metal-sheathed cable assemblies where fished into existing walls or ceilings, not otherwise accessible and not subject to physical damage. This proposal addresses Type MC cable encased in concrete. Jacketed interlocked armored Type MC cable is UL listed as suitable for encasement in concrete when marked for "Direct Burial". The restriction of wiring methods to non-flexible types does not appear to apply when encased in concrete as electrical nonmetallic tubing is currently permitted. 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 in Part

Revise (3)(2) to read as follows: "Where encased in not less than 50 mm (2 in.) of concrete, Schedule 40 rigid nonmetallic conduit, flexible nonmetallic or jacketed metallic raceways, or jacketed metallic cable assemblies listed for installation in concrete."

Panel Statement: It is not the panel's intent to exclude any flexible raceway listed for installation in concrete, subject to the other requirements for this section. The submitter's concerns can be addressed with the addition of "jacketed metallic" in the text, rather than addition of an FPN.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

MORGAN: Editorial Comment: The panel statement should read:

"It is not the panel's intent to exclude any flexible raceway or metallic cable assembly listed for installation in concrete...". This would more accurately express the panel's action.

15-27 Log #3581 NEC-P15
(517.30(C)(3) Exception No. 5)

Final Action: Reject

Submitter: William Benard Winnisquam, NH

Comment on Proposal No: 15-42

Recommendation: Revise former Exception 5 (new 517.30(C)(3), (3)(d) first sentence as follows: Where a flexible connection is required to install or service the equipment.

Substantiation: The interpretation of the language, "Where necessary for flexible connection to equipment" is not consistent and has been varied for the sake of convenience of installation and not for actual mechanical need. For several years, it has been my experience to encounter examples where the enforcing authority and/or installer has misinterpreted the intent of this section and permitted a flexible method for all luminaires located in suspended ceilings. The installation and service of luminaires in most suspended ceilings do not require a flexible connection.

Panel Meeting Action: Reject

Panel Statement: The intent of this paragraph is to permit the use of a flexible connection to equipment; the term "equipment" is defined in the NEC. The panel's intent is to allow flexible metallic raceway and metal sheathed cable assemblies for wiring of emergency electrical system luminaires.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

MORGAN: I strongly disagree with the panel statement, which is in conflict with both the existing and proposed new Code language. The Code only allows use of flexible metal raceways and metallic sheathed cable assemblies for emergency electrical system luminaires "...where necessary for flexible connections to equipment." The panel statement wrongly implies that flexible metal raceways and metallic sheathed cable assemblies could be used for emergency system luminaires whether the installation requires flexibility or not.

15-28 Log #2873 NEC-P15 **Final Action: Accept**
(517-30(C)(3)(3))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 15-42

Recommendation: Revise (3) to read:

“Listed flexible metal raceways and listed metal sheathed cable assemblies as follows:”.

Substantiation: This assures that listed products are required even in existing installations. CMP 7 does not require listing for cable (other than NM Cable). Note: The numbering in this section should be reviewed for accuracy.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-29 Log #3542 NEC-P15 **Final Action: Accept**
(517-30(C)(3)(3.))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 15-42

Recommendation: Revise (3) to read:

“Listed flexible metal raceways and listed metal sheathed cable assemblies as follows:”.

Substantiation: This assures that listed products are required even in existing installations. CMP 7 does not require listing for cables (other than NM cable.) Note: The numbering in this section should be reviewed for accuracy.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-29a Log #3907 NEC-P15 **Final Action: Accept**
(517.34(B)(2))

Submitter: Code-Making Panel 15

Comment on Proposal No: 15-3

Recommendation: The TCC notes that limitation on the use of the term “may” in 3.1.1 and 3.1.2 of the NEC Style Manual is in the context of describing mandatory and permissive code rules and not definitions or fine print notes.

Substantiation: This is a direction from the Technical Correlating Committee on Boiler Combustion System Hazards in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel notes that the change in 517.34(B)(2) is in mandatory text. The other references in definitions and fine print notes results in language that is correct, although not specifically required by the NEC Style Manual.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-29b Log #CC1501 NEC-P15 **Final Action: Accept**
(517.34(C))

Submitter: Code-Making Panel 15

Comment on Proposal No: 15-47

Recommendation: Insert the word “not” in 517.34(C) to read as follows:

“(C) AC Equipment for Nondelayed Automatic Connection. Generator accessories, including but not 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: The word “not” was mistakenly omitted. Reference 15-47 NEC-P15

(517-34(C) (New)). Note that this is extract material from NFPA 99.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

ARTICLE 518 — PLACES OF ASSEMBLY

15-30 Log #3209 NEC-P15 **Final Action: Reject**
(518)

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 15-61

Recommendation: This proposal should be accepted in part.

Substantiation: I disagree with the conclusion that the panel reached in its panel statement that “it is necessary to make the definition and scope of assembly occupancy consistent with NFPA 101 and NFPA 5000.” This Committee represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Reject

Panel Statement: The panel action at the ROP meeting is consistent with direction given by the TCC regarding consistency between the various codes.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-31 Log #3213 NEC-P15 **Final Action: Reject**
(518)

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 15-55

Recommendation: This proposal should be rejected.

Substantiation: There was no substantiation given for the proposed change to the title of Article 518. The submitter recommends adding a list in 518.1. The proposed list presented by the submitter is in violation of Table 3.2.1 of the 2003 NEC Style manual. The use of the term “similar” is recognized as “possibly unenforceable and vague” and therefore its use is prohibited. Additionally, the submitter recommends deleting the existing list in 518.2(A) with one in violation of the style manual. This Comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Reject

Panel Statement: Use of the word “similar” in describing locations is not in violation of the 2003 NEC Style Manual. “Similar” is prohibited when describing materials or methods.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-32 Log #3214 NEC-P15 **Final Action: Reject**
(518)

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 15-54

Recommendation: This proposal should be rejected.

Substantiation: There was no substantiation given for the proposed change to the title of Article 518. The submitter recommends adding a list in 518.1. The proposed list presented by the submitter is in violation of Table 3.2.1 of the 2003 NEC Style manual. The use of the term “similar” is recognized as “possibly unenforceable and vague” and therefore its use is prohibited. This Comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Reject

Panel Statement: Article titles are the responsibility of the TCC, and they have accepted the panel action. See panel action and statement on Comment 15-31.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-33 Log #807 NEC-P15 **Final Action: Accept**
(518.1)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 15-60

Recommendation: The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee “Rejects” the Panel Action.

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 of Article 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See panel action and statement on Comment 15-34. The panel agrees with the deletion of the words “assembly or” in Proposals 15-58 and 15-60.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-34 Log #3122 NEC-P15 **Final Action: Accept in Principle**
(518.1)

Note: 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: Kenneth E. Vannice, Leviton/NSI-Colortran / Rep. United States Institute for Theatre Technology

Comment on Proposal No: 15-60

Recommendation: Change the first phrase of the sentence to read "Except for the assembly occupancies explicitly covered by Articles 520, 525, and 530." Leave the phrase "or structures" in the text.

Substantiation: To provide the clarification required by the Technical Correlating Committee. Article 518 covers the assembly occupancies not already covered in Articles 520, 525, and 530. The Technical Correlating Committee has identified "assembly or" to be in conflict with 15-58. This is not true. The conflict is the words "or structure". These words should be left in the Scope and 15-58 corrected accordingly.

Panel Meeting Action: Accept in Principle

Change 518.1 to read as follows: "Except for the assembly occupancies explicitly covered by 520.1, this article covers all buildings or portions of buildings or structures designed or intended for the 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 changes the applicable reference to a specific section rather than to three entire articles. Reference to 520.1 satisfies the submitter's intent. Reference to Articles 525 and 530 is unnecessary.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

Comment on Affirmative:

VANNICE: See my affirmative comment on ROP 15-60. Also see my comment on affirmative to Comment 15-37.

15-35 Log #3210 NEC-P15 **Final Action: Reject**
(518.1)

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 15-60

Recommendation: The panel meeting action should be rejected.

Substantiation: I disagree with the determination of the submitter that "in order to effect proper cross reference it is necessary to have consistent language in each of the codes." The submitter has not provided documented substantiation of that necessity. The submitter noted that a task group "is of the opinion that" there should be consistency between the mentioned documents. Additionally, the proposed list presented in 518.1 is in violation of Table 3.2.1 of the 2003 NEC Style manual. The use of the term "similar" is recognized as "possibly unenforceable and vague" and therefore its use is prohibited. This Comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comments 15-30, 15-31 and 15-34.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-36 Log #808 NEC-P15 **Final Action: Accept**
(518.1, 518-2(a))

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 15-58

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See panel action and statement on Comment 15-37.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-37 Log #3108 NEC-P15 **Final Action: Accept in Principle**
(518.1, 518.2(A))

Submitter: Kenneth E. Vannice, Leviton/NSI-Colortran / Rep. United States Institute for Theatre Technology

Comment on Proposal No: 15-58

Recommendation: In 518-1, add to the beginning of the paragraph the following "Except for the assembly occupancies explicitly covered by Articles 520, 525, and 530." Do not delete the words "or structures". In 518-2(A), replace all the items in the list with the items in the list from Proposal 15-63, as shown on page 2741 of the ROP.

Substantiation: To provide consistency with 15-60 as directed by the Technical Correlating Committee. The first change is to provide consistency with a Technical Correlating Committee directed proposed change to 15-60. The second change is to correct the confusion between this action and that of 15-60. To provide consistency with 15-63 as directed by the Technical Correlating Committee. The change is to correct the confusion between this action and that of 15-63.

Panel Meeting Action: Accept in Principle

Change 518.2(A) to read as follows: "(A) Examples. Assembly occupancies shall include, but not be limited to, the following:

- Armories
- Assembly Halls
- Auditoriums
- Bowling Lanes
- Club Rooms
- Conference Rooms
- Courtrooms
- Dance Halls
- Dining and Drinking Facilities
- Exhibition Halls
- Gymnasiums
- Mortuary Chapels
- Multipurpose Rooms
- Museums
- Places of Awaiting Transportation
- Places of Religious Worship
- Pool Rooms
- Restaurants
- Skating Rinks"

Panel Statement: The first two recommendations are addressed by panel action and statement on Comment 15-34. This list of examples clarifies the panel's intent with regard to the action taken on Proposal 15-63.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

Comment on Affirmative:

HEFTER: This is the List - period.

VANNICE: See the second paragraph of my comment on affirmative to ROP 15-63.

15-38 Log #3211 NEC-P15 **Final Action: Reject**
(518.1 and 518.2(A))

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 15-59

Recommendation: This proposal should be accepted.

Substantiation: I disagree with the determination of the panel in its panel statement that "it is necessary to make the definition and scope of assembly occupancy consistent with NFPA 101 and 5000". The panel has not provided substantiation of that necessity. This Comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Reject

Panel Statement: Consistency of definitions and scope between the various NFPA standards is an important goal that the code making panels should embrace. Inconsistent standards would lead to a Code that would not be understood and could not be enforced. See panel action and statement on Comment 15-30.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-39 Log #3212 NEC-P15 **Final Action: Reject**
(518.1 and 518.2(A))

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 15-58

Recommendation: Reject the panel meeting action.

Substantiation: There was no substantiation given for the proposed change to the title of Article 518. The proposed list presented in 518.1 is in violation of Table 3.2.1 of the 2003 NEC Style manual. The use of the term "similar"

is recognized as “possibly unenforceable and vague” and therefore its use is prohibited. This Comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comments 15-30, 15-31, and 15-34.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-40 Log #3208 NEC-P15 **Final Action: Accept in Principle**
(518.2)

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 15-62

Recommendation: This proposal should be accepted.

Substantiation: I disagree with the conclusion that the panel reached in its panel statement that “it is necessary to make the definition and scope of assembly occupancy consistent with NFPA 101 and 5000.” Additionally, deleting the present list of examples will decrease the usability of this Code. This Comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Accept in Principle

Panel Statement: Consistency of definitions and scope between the various NFPA standards is an important goal that the code making panels should embrace. Inconsistent standards would lead to a Code that would not be understood and could not be enforced. The panel agrees that a list of examples is necessary. See panel action and statement on Comment 15-37.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

Comment on Affirmative:

VANNICE: It is my understanding that the list as documented in ROC 15-37 is the intent of the panel; and that any variants of that list from any other source is not the intent of the panel.

15-41 Log #3207 NEC-P15 **Final Action: Reject**
(518.2(A) and (B))

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 15-63

Recommendation: This proposal should be rejected.

Substantiation: There was no substantiation given for the proposed change to the title of Article 518. I disagree with the determination of the submitter that “in order to effect proper cross reference it is necessary to have consistent language in each of the codes”. The submitter has not provided documented substantiation of that necessity. The submitter noted that a task group “is of the opinion that” there should be consistency between the mentioned documents. I do not feel the submitter has provided substantiation of that opinion to this committee. This Comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 15-38.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-42 Log #809 NEC-P15 **Final Action: Accept**
(518.2(A) and (B))

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 15-63

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See panel action and statement on Comment 15-37.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-43 Log #3121 NEC-P15 **Final Action: Accept in Principle**
(518.2(A), (B))

Submitter: Kenneth E. Vannice, Leviton/NSI-Colortran / Rep. United States Institute for Theatre Technology

Comment on Proposal No: 15-63

Recommendation: Retain the list of examples as edited on page 2741. Add to (A) a comma between “limited to” and “the following.”

Substantiation: In response to the Technical Correlating Committee, it is our understanding that this is the complete list. The comma is editorial.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 15-37.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

3-92 Log #818 NEC-P03 **Final Action: Accept**
(518.3)

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 15-64

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the direction of the TCC and rejects the proposal.

Panel Statement: New Section 590.5, based on Proposal 3-120 and the NEC TCC decision to move Article 527 to Article 590, already contains the text for holiday lighting, so putting the same text in 518.3 is not necessary.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-93 Log #3206 NEC-P03 **Final Action: Reject**
(518.3)

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 15-64

Recommendation: This proposal should be accepted.

Substantiation: The panel statement reads as follows: 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 the action. Panel 3 accepted in part a similar proposal. Decorative lighting used for holiday lighting and similar purposes in accordance with 527.3(B) shall be listed. Reject the remainder of the proposal. The vote was 11-1. The submitter’s intent is correct on getting the decorative lighting listed for the purpose. There have been recommendations from a large number of organizations that all tree lights should be listed. Some of these organizations are the U.S. Fire Administration, the National Safety Council, U.S. Department of Agriculture, various universities, and Underwriters Laboratories. This Comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 3-92.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

15-44 Log #3205 NEC-P15 **Final Action: Accept**
(518.4(C))

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 15-68

Recommendation: This proposal should continue to be accepted.

Substantiation: The proposer submitted compelling technical substantiation to warrant this change. This Comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Accept

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-45 Log #3543 NEC-P15 **Final Action: Accept**
(518.4(C))

Submitter: William A. Wolfe, Steel Tube Institute of North America
Comment on Proposal No: 15-68

Recommendation: Continue to accept this proposal.

Substantiation: With the terrorist atmosphere and the high profile nightclub fires that have occurred, there is even more reason to maintain as much non-combustible wiring as possible in these occupancies. Actually, there should be more of the permitted uses deleted, but this proposal takes action on those assembly occupancies of greatest concern. If egress from these occupancies is of concern to NFPA 101, then it is obvious that a fire involving the wiring method would add to delay in egress. The NEC already permits twice as many occupants as 101 before implementing safer wiring methods. 518.4(C) changes that number to unlimited and permits a combustible wiring method. Do the 101 egress requirements provide enough safety factor? The fires mentioned, as well as the recent high-rise fire in Chicago show we cannot depend totally on acceptable means of egress being available. Are there other things that contribute to inhibiting egress? Absolutely. However, those things are not the responsibility of CMP 15 — wiring is!

Panel Meeting Action: Accept

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

6-84 Log #811 NEC-P06 **Final Action: Hold**
(518.4(D) (New))

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 15-69

Recommendation: 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.

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: Hold

Panel Statement: The panel holds the comment for further study. Section 310.15 properly references Table 310.16 or calculated method for determining ampacities and adequately provides derating factors for conditions of higher ambient temperature. Due to the time constraints, the panel has not had a chance to review the referenced study to be able to make any additional comments on the proposal.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

6-85 Log #812 NEC-P06 **Final Action: Hold**
(518.4(D) (New))

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 15-70

Recommendation: It was the action of the Technical Correlating Committee that 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.

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: Hold

Panel Statement: The panel holds the comment for further study. Section 310.15 properly references Table 310.16 or calculated method for determining ampacities and adequately provides derating factors for conditions of higher ambient temperature. Due to time constraints, the panel has not had a chance to review the referenced study to be able to make any additional comments on the proposal.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

15-46 Log #3290 NEC-P15 **Final Action: Hold**
(519 (New))

Note: The Technical Correlating Committee notes that the panel action is to hold both the comment and Proposal 15-72.

Submitter: Steve Alkhoja, ITEC Entertainment Corporation

Comment on Proposal No: 15-72

Recommendation: I have no modifications to the proposed new wording. I would like to encourage the implementation of this proposal.

Substantiation: There are several areas of concern with the present interpretation of the current document which this new proposal addresses. I believe that the proposed Article 519 address the areas of concern.

Panel Meeting Action: Hold

Panel Statement: The panel recognizes the value of an article which provides requirements for permanent amusement attractions. However, the proposed language and requirements need substantial revisions which cannot be completed in time for a fair public review. The panel acknowledges the requirements of the NEC Style Manual, in particular, Section 2.2.1. The panel seeks the guidance of the TCC and asks that a task group be formed, composed of members of Panel 15 and representatives of the permanent amusement attraction industry. The panel requests that the proposed task group document and justify all proposed deviations from the existing NEC requirements.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-47 Log #3318 NEC-P15 **Final Action: Hold**
(519)

Submitter: Jody D. Gerstner, Walt Disney Imagineering / Rep. Walt Disney World Company

Comment on Proposal No: 15-72

Recommendation: Recommend Accepting Proposal in Principle with the understanding that the submittal was not per the NFPA style guide.

Substantiation: Permanent Amusement attractions embody large scale integrated Control Systems similar in nature to that found in the Industrial Complex. When inspected by our Authority Having Jurisdiction, we have been judged against the NEC. The tools of the trade in industrial controls includes predominantly low voltage (NEC Class 2) devices of insulation and wire size that do not comply with Class 1 category against which we are judged.

Therefore, we are left with the option of getting exceptions on every product from the AHJ, or forgo the use of common industrial products (sensors, switches, high-tech integrated vision & optical devices). Since we cannot accomplish our mission of guest safety and system functionality without the tools of the trade, we are required to appeal for variances and request alternate methods. This is no way to regulate an industry! Article 519 provides the foundation for which inspection can be made against a consistent standard rather than on subjective variances and alternate methods consideration. Article 519 would result in consistent safe implementations across the industry rather than subjective variances based upon the perspectives of the municipality and the AHJ. Article 519 would also allow the practitioner to use the products unique to our amusement industry in a manner that would be consistent with the goals of the NEC and would be acceptable to the AHJ.

Panel Meeting Action: Hold

Panel Statement: See panel action and statement on Comment 15-46.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-48 Log #3383 NEC-P15 **Final Action: Hold**
(519)

Submitter: Sam McCoy, Walt Disney World Co

Comment on Proposal No: 15-72

Recommendation: Recommended Accepting Proposal 15-72 or Accept in Principle.

Substantiation: In regards to proposal 15-72 Log #2495 NEC-P15: I would submit to the Panel that this article (519) gives a clear attempt to the Permanent Amusement Attraction Industry (who by the way is totally focused on the health and safety of the public) the ability to install control systems that would not compromise the ability to install or maintain attractions such as a high speed roller coaster ride. Today, the Authority Having Jurisdiction is holding our industry to Article 725 of the NEC. Article 725 and the fact that all our safety critical applications fall in the Class 1 power requirements by NEC definition, requires that wiring size and insulation type usage of unreasonable size and restricts safe construction and maintainability. One example: the use of low voltage, and current limited circuits (24 volts dc) in attractions for controls does not pose any failure or hazard that would cause a shock or fire hazard that 600-volt insulation and 18-awg wire fixes (given that separation practices are used). This higher insulation and gauge class required by article 725 sometimes compromises good design practices. I agree on the panel's point that this Proposal is limited in scope and does not cover all that should be addressed, however, by your own words in the panel's statement the panel agrees that other electrical considerations of permanent amusement attractions should be addressed, implying some merit in the Proposal. This proposal is the start of addressing some of the issues and if we do not start somewhere then it becomes very difficult to move forward in the quest for safety. I agree that the NEC is not intended to be a design manual and in that regard, the proposed Article (519) was not intended to do that but to give a minimum guideline for the inspector. I appeal to you as engineers to reconsider this Proposal 15-72 Log #2495 NEC-P15 and accept it to be adopted into the 2005 NEC.

Panel Meeting Action: Hold

Panel Statement: See panel action and statement on Comment 15-46.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-49 Log #3430 NEC-P15
(519)

Final Action: Reject

Submitter: Glenn A. Birket, Birket Engineering, Inc.
Comment on Proposal No: 15-72

Recommendation: 1) Revise proposal to include the following text:

Except as modified by article, all other applicable articles of this Code shall apply.

2) Recommend Accepting Proposal as revised, or Accepting in Principle.

Substantiation: The proposed Article 519 addresses a growing problem throughout the entire theme entertainment industry. It allows designers to use proven time-tested wiring and power distribution methods which currently require special permission from the AHJ. Specifically, it allows the implementation of critical safety systems using components and methods in ways that reduce complexity, increase reliability, and simplify maintenance activities. The new Article 519 eliminates obstacles to the implementation of the required level of guest safety at rides and other attractions. It enjoys wide support among the theme entertainment control system engineering community. Birket Engineering strongly encourages acceptance of this new Article substantially as written.

Panel Meeting Action: Reject

Panel Statement: This is unnecessary text and is already covered in Article 90. See panel action and statement on Comment 15-46.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-50 Log #3472 NEC-P15
(519)

Final Action: Hold

Submitter: Joseph F. Maida, Maida Engineering Inc.
Comment on Proposal No: 15-72

Recommendation: There have been significant additions and some modifications

Add new text as follows:

I. General.

519.1 Scope

This article covers the installation of electrical equipment and wiring that are an integral part of a permanent amusement attraction including associated control wiring, where the conditions of maintenance and supervision ensure that qualified persons service the systems.

Control circuits and equipment associated with permanent amusement attractions, herein referred to as permanent amusement control circuits, shall comply with Article 519. Only those sections of Article 725 referenced in this article shall apply to permanent amusement control circuits.

519.2 Definitions

Control Circuit. A circuit that carries the electric signals directing the performance of a controller, but does not carry the main power current.(UL-508A)

Entertainment Device. Mechanical device such as show action props, animated props, show action equipment, animated figures and special effects coordinated with audio and lighting to provide an entertainment experience for patrons.

Over current Protection. A device designed to open a circuit when the current through it exceeds a predetermined value. The ampere rating of the device is selected for a circuit to terminate a condition where the current exceeds the rating of conductors and equipment due to overloads, short circuits and faults to ground.(UL-508A)

Permanent Amusement Attraction. An amusement ride or attraction consisting of ride devices, entertainment devices, or combination thereof, that is affixed or installed in such a manner so as to make relocation impractical, or whereby the nature of design, is not portable.

Redundancy. The application of more than one device or system, or part of a device or system, with the objective of ensuring that in the event of one failing to perform its function another is available to perform that function.(NFPA 79-2002)

Ride Device. A device or combination of devices or elements that carry, convey or direct a person(s) over or through a fixed or restricted course or within a defined area, for the primary purpose of amusement of entertainment.(ASTM F 747)

Self Checking. An automated test method that detects a fault and the result is indicated.

II Supply.

519.10 Power sources

(A) Alternating-Current (AC). AC Power source control transformers supplying permanent amusement attraction control circuits shall not exceed 120 volts AC and the available short circuit current shall not exceed 1, 000 amperes rms.(NFPA 79-2002)

(B) Direct-Current (DC). DC power source supplying permanent amusement

attraction control circuits shall be 250 V DC or less.(NFPA 79-2002)

III. Wiring Methods.

519.20 Conductors

(A) Power Source Supply Side: Wiring methods on the supply side of the power source shall be installed in accordance with appropriate requirements of Chapters 1 thru 4. A control transformer or other power supply or device supplied from an AC light or power circuit shall be protected by an over current device rated not greater than 20 amperes.

(B) Power Source Load Side: Wiring methods can include individual conductors in raceways, multiconductor cables supported in accordance with the methods defined in 300.11(A) and 300.17 and multiconductor cables in a cable tray.

(C) Plenum. Permanent amusement attraction control circuit cables installed in ducts, plenums, and other spaces used for environmental air shall be Type CL2P or CL3P.

Abandoned cables shall not be permitted to remain. Listed wires and cables installed in compliance with 300.22 shall be permitted. (725.61(A))

(D) Riser. Permanent amusement attraction control circuit cables installed in risers shall be as described in any of (1) or (2):

(1) Cables installed in vertical runs and penetrating more than one floor, or cables installed in vertical runs in a shaft shall be type CL2R or CL3R. Floor penetrations requiring Type CL2R or CL3R shall contain only cables suitable for riser or plenum use. Abandoned cables shall not be permitted to remain.

(2) Other cables as covered in Table 519-20 and other listed wiring methods as covered in Chapter 3 shall be installed in metal raceways or located in a fire-proof shaft having fire stops at each floor. (725.61(B))

(E) Cable Trays. Permanent amusement attraction control circuit cables installed in cable trays outdoors shall be Type PLTC. Cables installed in cable trays indoors shall be Types PLTC, CL3P, CL3R, CL3, CL2P CL2R and CL2. (725.61)(C)

(F) Other wiring within Buildings. Permanent amusement attraction control circuit cables installed in building locations other than those covered in 519.20(C) through (E) shall be as described in any of (1) through (4). Abandoned cables in hollow spaces shall not be permitted to remain.

(1) Type CL2 or CL3 shall be permitted.

(2) Type CL2X or CL3X shall be permitted to be installed in a raceway or in accordance with other wiring methods covered in Chapter 3.

(3) Cables shall be permitted to be installed in nonconcealed spaces where the exposed length of cable does not exceed 3 m (10 ft).

(4) Type CMUC undercarpet communications wires and cables shall be permitted to be installed under carpet. (725.61(E))

(F) Cross Connect Arrays Type CL2 or CL3 conductors or cables shall be used for cross-connect arrays. (725.61(F))

(G) Permanent Amusement Attraction Control Circuit Cable Uses and Permitted Substitutions. The uses and permitted substitutions for Class 2 and Class 3 cables listed in Table 725.61 shall be considered suitable for the purpose and shall be permitted. (725.61)(G);

(H) Conductors. Stranded conductors shall be permitted. Solid conductors shall be permitted where not subject to flexing.

(I) Conductors other than Copper. Conductors constructed of materials other than copper where required for their functions shall be permitted.

(J) Printed Wire Assemblies. Printed wire assemblies of listed flame-retardant material shall be permitted in place of conductor assemblies provided they are within control enclosures and mounted in such ways to minimize flexing or stress. (NFPA 79-2002)

519.21 Conductor Sizing

(A) Conductors within a listed component or assembly. Conductors of size 30 AWG or larger shall be permitted within a listed component or as part of the wiring of a listed assembly.

(B) Conductors within an enclosure. Conductors of Size 30 AWG or larger shall be permitted in a multiconductor cable within an enclosure. Conductors in a non-jacketed multiconductor cable assembly such as ribbon cable, shall not be smaller than 26 AWG. Single conductors shall not be smaller than 24 AWG.

Exception: Single Conductors 30 AWG or larger shall be permitted for jumpers and special wiring applications. (NFPA 79-2002)

(C) Conductors outside of enclosures. The size of conductors in a multiconductor cable shall not be smaller than 2 AWG. Single Conductors shall not be smaller than 18 AWG. (ref Article 760.71 (B))

519.22 Conductor Ampacity

The continuous current carried by conductors 16 AWG and smaller shall not exceed the values given in Table 519.22. The continuous current carried by conductors shall not exceed the values given in Table 310.16 for general wiring. Tables 400.5(A) and (B) for flexible cords and cables, or Table 402.5 for fixture wires.

519.23 Overcurrent protection

Overcurrent protection shall be in accordance with the conductor ampacity.

519.24 Separation

Permanent amusement attraction control circuit conductors and multiconductor cables shall be separated by at least 50 mm (2 in), separated by a nonconductive sleeve such as flexible tubing, or separated by a barrier, from lighting and power class 1, class 2 and class 3 circuits, power limited fire alarm non-power limited fire alarm and medium power network-powered broadband communications circuits. For other than the circuit types listed above, a permanent

Table 519.22 Conductor Ampacity based on copper conductors with 60°C and 75°C insulation in an ambient temperature of 30°C. {NFPA 79-2002}			
Conductor Size AWG	Ampacity in	Ampacity in	Control Enclosure 60° C
	Cable or Raceway 60° C	Cable or Raceway 75° C	
30		0.5	0.5
28		0.8	0.8
26		1	1
24	2	2	2
22	3	3	3
20	5	5	5
18	7	7	7
16	10	10	10
Note 1: for ambient temperature other than 30°C see table 310.16 correction factors. {NFPA 79-2002}			
Note 2: Ampacity adjustment for conductors with 90°C or greater insulation shall be based on ampacities in the 75° C Column. {NFPA 79-2002}			

amusement attraction control circuit conductors and multiconductor cables shall be separated by at least 50 mm (2 in.), separated by a nonconductive sleeve such as flexible tubing, or separated by a barrier from a conductor used in a different circuit unless the conductors of both circuits are insulated for the maximum voltage present of either circuit and are functionally associated.

Exception No. 1: Associated circuits within enclosures utilizing 150 volts or less to ground and requiring separation shall be permitted to be separated by at least 6 mm (1/4 in.).

Exception No. 2: Different voltage insulation levels or conductor properties shall be permitted in the same cable assembly, provided the cable assembly is listed and has been designed and tested to the identified application. {NFPA 79-2002}

Exception No. 3: Permanent amusement attraction control circuit conductors and multiconductor cables shall be permitted within the same raceways, cable assembly or enclosure with lighting and power circuits when the circuits are functionally associated; the permanent amusement attraction control circuit conductors and multiconductor cables are #18 AWG or larger and have 600 volt insulation; and when installed in accordance with Article 300 and other appropriate articles in Chapter 3, {NEC 725.25}

519.25 Grounding and Detection

Two-wire dc circuits shall be permitted to be ungrounded. A Ground Fault Detection Device shall monitor ungrounded control circuits operating at greater than 50 volts. {NEC 685.12, NEC 250.162(A) Exception No. 1}

519.26 Wet or Submerged locations

Where wet contact (immersion not included) is likely to occur, ungrounded two-wire dc permanent amusement attraction control circuits shall be limited to 30 volts. {NEC Table 11(B) Note 4}

A Ground Fault Detection Device shall monitor ungrounded permanent amusement attraction control circuits in wet or submerged locations operating at greater than 15 volts.

Permanent amusement attraction control circuit wiring, components and enclosure in submerged environments shall be listed for usage in that environment. {NEC 400.4}

519.27 Safety-Control Equipment

(A) Remote Control Circuits. Remote-control circuits utilizing redundancy and self-checking for safety-control permanent amusement attraction control equipment, shall be permitted to follow the wiring methods listed in this article if the failure of the equipment to operate introduces a direct fire or life safety hazard.

(B) Physical Protection. Where damage to remote-control circuits of safety-control equipment would introduce a hazard, as covered in 519.7(A), all conductors of such remote-control circuits shall be installed in rigid metal conduit, intermediate metal conduit, rigid nonmetallic conduit, electrical metal tubing, Type MI cable, Type MC cable, or be otherwise suitably protected from physical damage.

Substantiation: Amusement and theme parks evolved from what were once known as “Carnivals”, where the rides, side shows, booths, and other structures such as the haunted house, dunking barrel and fast food serving, were supplied by temporary wiring. These structures were moved all over the country. Therefore, the power and control wiring systems for the rides and shows, collectively referred to as amusements, were unique because the amusements had to be arranged so that their mechanical parts could be disassembled and their power and control wiring easily disconnected and reconnected at another site without damaging them. The NEC Article 305, Temporary Wiring applies to these “Carnivals”. It was introduced into the 1971 NEC, prior to 1971, it was “fly by the seat of your pants”, depending on how strict the local ordinances were at the time.

With the opening of Disneyland followed by Walt Disney World in 1971, more sophisticated rides and shows were needed to satisfy the demands of a more sophisticated amusement industry. These rides and shows have prompted engineers to create new control equipment and complex control circuits which have become an integral part of permanent amusement attractions within the theme park industry. The NEC has not been revised since 1971 with regard to the installation of permanent amusement attractions, therefore permanent amusement attraction control systems must be inspected using the same “fly by the seat of your pants” that existed for Carnivals until 1971.

The patrons of theme parks want an experience that combines both the traditional rides, like the merry-go-round, with the latest and the greatest in thrill

rides and shows. The demand for more thrills, and in many cases bringing the movies to life, has been the impetus for new rides and shows which are a hundred times more complex than rides and shows developed less than thirty years ago. Designing and building the effects which have been seen on the movie screen and having the patron of the theme park safely experience the excitement and sometimes fear caused by these effects, has been the responsibility of the engineers in the theme park industry.

Traditionally, many engineers within the theme park industry came from high technology industries. This was beneficial in that much of the advanced control technology utilized to build permanent amusement attractions in the theme park industry required the training derived from their experience in the high technology industries. Because of their training, the advanced control technology they developed did not follow standards established for the building and construction industry. The control system they developed however, met the theme park industry’s standards for safety and sustainability. The safety requirement is essential in that millions of theme park patrons pay to safely experience the joy of these rides and shows every year. The sustainability requirement is essential because the effects created for the theme park are built to happen thousand of times and must be repeated many times everyday. With these requirements for safety and sustainability and the advantage of today’s control system technology enhanced by personal computers, the design, testing and commissioning of a ride and show control system for permanent amusement attractions follows a path that is similar to the design, testing and commissioning of a pharmaceutical manufacturing line or process. Although phrases like Standard Operating Procedures, Qualifications and Validation are not as commonly used in the theme park industry other phrases like Detailed Design Review (DDR), Failure Modes Effects Analysis(FMEA) and Factory and Site Acceptance Tests (FAT and SAT) are commonly used in both industries. In many ways, steps taken to create, qualify and validate the safeguards and repeatability of a ride or show are the same steps taken by the pharmaceutical industry for the manufacturer of pharmaceutical drugs which is governed by standards which are enforced by the Federal Drug Administration (FDA).

The theme park industry, although subject to review and final acceptance by local governmental agencies, has largely been responsible for policing itself for the rides and shows they have constructed in permanent amusement parks. The Local Authorities Having Jurisdiction in defining the methods to be utilized to construct the rides or shows rarely have the resources available to review every part of a ride and show control systems. For the most part, the agencies which are supported by the local tax base, have relied on the knowledge and skills of the theme park industry engineer who is responsible for making the ride and show safe for the patrons, actors and operators and also compliant with all applicable code and standards, such as the NEC. As a result, many safe and sustainable ride and show permanent amusement attraction control circuits are:

1. Being inspected using the standard defined with the NEC that were never intended to be used for a permanent amusement attraction.
2. Require variances in that they do not comply with some of the provisions of the NEC.
3. Are designed and installed with NEC violations that are missed by inspectors.

The construction material and techniques utilized in many of today’s ride and show control system comply with standards like ASTM FM-24 and Underwriter’s Laboratories, Inc. (UL) and comply with many of the standards and recommendations written by the National Fire Protection Association (NFPA) but they do not comply with specific articles found within NFPA 70, the National Electrical Code (NEC). The NEC which is one of the finest and most complete codes ever developed has been the basis for electrical codes utilized throughout the world. The NEC however, is a lengthy document and until recently articles in Chapters 5, 6,7 and 8 have not been the focus of many of the theme park industry’s controls engineers and the inspectors employed by local governing bodies.

The theme park industry wants to comply with the NEC but finds itself in a situation where the risks and cost associated with doing so requires that they first explore ways of changing the NEC to accept the industry’s established techniques and materials. The techniques and materials have been field proven to be safe. Changing the techniques and materials:

- * Will introduce opportunities for omissions or errors.
- * Will not enhance the safety of the control systems.

* Will decrease the theme park industry engineers abilities to create the rides and shows that are now expected by patrons visiting theme parks. In an effort to correct an omission of many years, Kevin Schultz, PE of WDW has submitted a proposed Article 519 to the 2005 NEC. I have reviewed this Article and believe that it is an excellent beginning of an Article that should have been included in the NEC many years ago. I have made additions and modifications to the original Article submitted by Kevin Shultz and I am recommending that this revised Article 519 be included into the 2005 NEC. The inclusion of Article 519 into the 2005 NEC will resolve the following technical issues and omissions within the NEC:

1. The 2005 NEC will permit the use of non Class 1 circuits that are as reliable, or even more reliable than class 1 circuits due to the redundancy and self checking for life safety applications in permanent amusement attractions. These circuits are currently permitted on moving vehicles that are not covered by the NEC and should be permitted for ride and show equipment that is tested upon installation and periodically thereafter where conditions of maintenance and supervision ensure that qualified persons service the systems. This will enable the addition of safety features to rides and shows which are not or might not be possible with larger size conductors required for Class 1 circuits.

2. The 2005 NEC will prohibit installing permanent amusement attraction control circuit conductors with other conductors that are utilized for systems not related to the ride or show, thus making these systems easier to inspect and minimizing the possibility that someone working on the building's BAS, fire alarm or telephone system could damage or disturb the permanent amusement attraction control circuit conductors.

3. The 2005 NEC will permit the installation of adequately sized power supplies for all of the permanent amusement attraction control circuits within a ride or show. Presently, in order to comply with the Article 725's provision for Class 2 circuits, a show control system can require multiple, and in one case as many as twelve (12) separate Class 2 power supplies even though these control systems are maintained by qualified personnel. Prior to 1996 NEC, a power supply with properly sized overcurrent protection could be used for Class 2 circuits. The revisions within the 1996 NEC should not have applied to installation where condition of Maintenance and supervision exist that will ensure that only qualified persons service the Class 2 system. The same conditions that apply to power and lighting circuits, which are derived from a comparatively unlimited power source and are protected by overcurrent protection, should be applied to permanent amusement attraction control circuits because of the requirement that they be maintained by qualified personnel. The installation of multiple power supplies increases complexity and therefore increases the probability of failure of a control system that needs to be safe, repeatable and sustainable.

4. The 2005 NEC will provide a standard which engineers and contractors can use for the proper installation of and which inspectors can use for the proper inspection of permanent amusement attraction control circuits. For once, the methods permitted for properly installing permanent amusement attraction control circuits will be clearly defined. Although the 2002 NEC does define the methods for Class 1 and Class 2 cables very well, it is not unusual for engineers and inspectors who are not familiar with Chapter 7 of the 2002 NEC to over look these methods or not apply them properly. Even when they are applied properly, they are not as well suited or as safe as some field proven techniques which are not permitted.

5. Additional provisions for ground fault monitoring have been added for permanent amusement attraction control circuits in wet or submerged locations operating at greater than 15V DC. Currently, there are no standards applicable to control or power circuits for flume rides and other water rides.

With the inclusion of Article 519 into the 2005 NEC, there will now be a place to address many of the specialized type of structures utilized within theme parks which are presently not covered by the NEC. Not including this article in the form presented herein or some variation the form presented herein could not only jeopardize the theme park industry but could jeopardize the life safety of millions of patrons who visit theme parks every year. Currently, rides and shows which include pyrotechnics and special effects and could present hazard to both the actors and audiences, are being engineered and constructed with standards that are less than adequate or nonexistent. The inclusion of Article 519 into the 2005 NEC is a necessary first step to correct this deficiency for the good and well being of the general public.

Panel Meeting Action: Hold

Panel Statement: See panel action and statement on Comment 15-46.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-51 Log #3475 NEC-P15
(519)

Final Action: Reject

Submitter: Kevin C. Shultz, P.E., Walt Disney World Co.

Comment on Proposal No: 15-72

Recommendation: 1) Revise proposal to include the following:

519.3 Other Articles

Except as modified by article, all other applicable articles of this Code shall

apply.

2) and recommend Accepting Proposal as revised or Accepting it in Principle. **Substantiation:** I agree with the Panel that the NEC is intended to be an installation code. This proposal was written with the intent to be an inspection code, to provide direction for inspectors, and not intended to be a design manual (which is being addressed by the new ASTM 2291). Designers would use the proposed article in the same vein as they currently use the rest of the NEC, to validate that the specified materials and directions for installation meet or exceed the code inspection requirements. Contractors and installers would use it to verify they are using the correct materials and methods of installation. Inspectors would use it to verify the materials and methods used and the installation meet the code. I trust that phraseology of the article can be made consistent with the rest of the NEC and that will not prevent its acceptance.

I fully agree with the Panel that there are many other electrical considerations of permanent amusement attractions that should be addressed and that many articles of the Code and other documents provide the necessary guidance in the installation of permanent amusement attractions. The intention was to implicitly imply inclusion of the rest of the code by limiting the scope to control systems wiring or permanent amusement attractions. I intended this proposal to harmonize with and build upon the time-tested provisions of the NEC. I favor the original proposal be modified as suggested by the Panel to explicitly state the applicability of the other articles of the Code (as suggested in Section 4. Comment, above).

Control systems wiring methods were specifically addressed in the proposed new article because this area constitutes the greatest opportunity to increase the level of safety and protection of the public over what is currently available in the NEC. In complex control systems for permanent amusement attractions, where control reliability principles are employed, the current wiring methods limit and prevent the use of newer micro devices, connectors, and computer based technologies used for the increased monitoring, verification, redundancy and diagnostics of the apparatus under control (This same situation was evident for elevators and resolved in and by Article 620). We regularly petition and work with our Authority Having Jurisdiction to allow alternate materials and methods appropriate to the application to be used which allow us to increase the level of safety that we can offer our guests, the public. (See NEC Digest, Aug/Sept. 2002, pp. 23-28). Adoption of this proposal will put these safety proven, time tested methods into the code where they can be consistently used for inspection, throughout the industry, for the benefit of the public.

Panel Meeting Action: Reject

Panel Statement: This is unnecessary text and is already covered in Article 90. See panel action and statement on Comment 15-46.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-52 Log #3583 NEC-P15
(519)

Final Action: Hold

Submitter: Terance J. Hoffman, Ridetronics LLC

Comment on Proposal No: 15-72

Recommendation: 1. 519.12 Power Limitations

Supply power sources, regardless of technology employed, shall not be power limited by this Article. Conductors connected to the load side of power supplies not sized to accommodate the full rated output current of the supply shall be protected by suitable overcurrent protection. Multiple taps from the same load side of a power supply are permissible provided separate overcurrent protection is provided for each conductor.

2. Recommend accepting proposal for addition of Article 519 as revised or accepting it in principle.

Substantiation: The Theme Park and Amusement Industry employs state of the art technology in non-traditional, unique applications that often do not fall within the intent of the NEC of NFPA standards. We often use industrial controls normally used for factory automation to physically handle people. This, as experience has shown, can be a very safe practice. Experience has also shown that local inspectors are often uncertain how to interpret and apply codes written for buildings with elevators and fire alarms to what are essentially industrial systems. We ask that the NEC recognize Permanent Amusement Attractions (PAAs) as a unique entity requiring special attention and provide clear, useable codes for the installation and inspection of such systems. Article 725, although applicable for some PAA systems, is not applicable for the majority of those systems. For example, Article 725, in the case of power supply limitations requires that our large low voltage, high current supplies be split into a number of smaller supplies, increasing the complexity of wiring, circuit isolation, emergency shutdown, etc., thereby decreasing reliability and increasing risk of failure.

The proposed Article 519 is probably not all-inclusive of every legitimate concern in the industry, but it does address a set of immediate needs. As with all other codes, Article 519 will expand and mature with time. The current proposal gives us a solid platform on which to build a set of installation standards to complement the new Design standards of ASTM F2291.

Panel Meeting Action: Hold

Panel Statement: See panel action and statement on Comment 15-46.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

**ARTICLE 520 — THEATERS, AUDIENCE AREAS OF
MOTION PICTURE AND TELEVISION STUDIOS,
AND SIMILAR LOCATIONS**

1-253e Log #2395a NEC-P01 **Final Action: Accept**
(520.2)

Submitter: James M. Daly, General Cable

Comment on Proposal No: 15-73

Recommendation: Proposal 15-73 should be rejected.

Substantiation: The definition of "Bundled" should not be moved from Article 520 to Article 100.

The definition of "Bundled" in 520.2 is very explicit in that it indicates "Cables or conductors that are physically tied, wrapped, taped, or otherwise periodically bound together."

The term "bundled" as used in the following sections does not require that the cables or conductors be physically bound together and does not meet the definition in 520.2.

310.15(B)(2)(a), Exception No. 5(3), and the last paragraph.

334.80 (Accepted Proposal 7-150a)

The term "bundled" as used in the above Sections by CMP 6 and CMP 7 applies to conductors or cables in close proximity such as through holes in framing materials; there is no requirement for them to be "physically bound together." In fact, it is not the intent that they be "physically bound together."

520.53(H)(2) is very explicit that "Single-conductor supply cables shall be grouped together but not bundled." The use of the term "grouped" is consistent with the use of the term "bundled" as used in 310.15(B) and 334.80.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

15-53 Log #123 NEC-P15 **Final Action: Reject**
(520.2.Bundled)

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

Comment on Proposal No: 15-73

Recommendation: I recommend not just moving this to Article 100, but replacing it there with the definition from 310.

Substantiation: As mentioned in my comment on Proposal 1-67, 310's definition is more general, but equally useful for 520's purposes.

Panel Meeting Action: Reject

Panel Statement: The definition is unique to Article 520. The panel notes that there is no definition of "bundled" in 310.15 and 640.8. See the submitter's substantiation on Comment 15-56.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-54 Log #395 NEC-P15 **Final Action: Reject**
(520.2.Bundled)

Submitter: Harry J. Sassaman, Forest Electric Corporation

Comment on Proposal No: 15-73

Recommendation: Relocate definition of "Bundle" from 520.2 to Article 100.

Substantiation: The use of "bundled" as it appears in Article 310 (i.e., 310.15(B)(2)(a)) is applicable to the definition as written in 520.2 "bundled".

520.2 - Definition

Bundled. Cables or conductors that are physically tied, wrapped, taped or otherwise periodically bound together.

The terminology "bundled" as it appears in Article 310 is a direct conveyance of the definition as it is written in Article 520, which results in the use of the adjustment factors as indicated in Table 310.15(B)(2)(a) predicate on the length, spacing and are not installed raceways. Additionally, (B)(2)(a) exception No. 5 uses the word "bundled". Again, the definition as it is written in Article 520 is applicable.

Seeing that the word "bundled" was not defined in Article 100 as the word evolved in context throughout the NEC Articles (With the exception of the insertion of the definition "bundled" in Article 520 in the 1996 NEC). It is my strong recommendation to relocate the definition of "bundled" as it appears in Article 520 to Article 100 as a definition. This relocation will assist anyone who questions the implied meaning of the word bundled as it appears in Articles 310, 520 and 640.

Article 100 Definitions; Scope precisely states, "In general, only those terms that are used in two or more articles are defined in Article 100." Therefore, since the definition of "bundled" is generic to all related NEC articles and complies with the Scope of Article 100 (when definitions are applicable), the relocation of the definition "bundled" should be approved.

Panel Meeting Action: Reject

Panel Statement: The definition is unique to Article 520, and Panel 1 has declined to add this definition to Article 100. The panel notes that there is no definition of "bundled" in 310.15 and 640.8. See the submitter's substantiation on Comment 15-56.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-55 Log #1377 NEC-P15 **Final Action: Reject**
(520.2.Bundled)

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

Comment on Proposal No: 15-73

Recommendation: CMP-12 agrees with the Panel Action taken by Panel 15.

Substantiation: None necessary.

Panel Meeting Action: Reject

Panel Statement: The definition is unique to Article 520, and Panel 1 has declined to add this definition to Article 100. The panel notes that there is no definition of "bundled" in 310.15 and 640.8. See the submitter's substantiation on Comment 15-56.

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-56 Log #2395 NEC-P15 **Final Action: Accept**
(520.2.Bundled)

Submitter: James M. Daly, General Cable

Comment on Proposal No: 15-73

Recommendation: Proposal 15-73 should be rejected.

Substantiation: The definition of "Bundled" should not be moved from Article 520 to Article 100.

The definition of "Bundled" in 520.2 is very explicit in that it indicates "Cables or conductors that are physically tied, wrapped, taped, or otherwise periodically bound together."

The term "bundled" as used in the following sections does not require that the cables or conductors be physically bound together and does not meet the definition in 520.2.

310.15(B)(2)(a), Exception No. 5(3), and the last paragraph.

334.80 (Accepted Proposal 7-150a)

The term "bundled" as used in the above Sections by CMP 6 and CMP 7 applies to conductors or cables in close proximity such as through holes in framing materials; there is no requirement for them to be "physically bound together." In fact, it is not the intent that they be "physically bound together."

520.53(H)(2) is very explicit that "Single-conductor supply cables shall be grouped together but not bundled." The use of the term "grouped" is consistent with the use of the term "bundled" as used in 310.15(B) and 334.80.

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

1-254 Log #813 NEC-P01 **Final Action: Accept**
(520.2.Bundled)

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 15-73

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See panel action and statement on Comments 1-42 and 1-43.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

1-255 Log #123a NEC-P01 **Final Action: Reject**
(520.2.Bundled)

Submitter: David Shapiro, Safety First Electrical Contracting, Consulting, and Safety Education
Comment on Proposal No: 15-73
Recommendation: I recommend not just moving this to Article 100, but replacing it there with the definition from 310.
Substantiation: As mentioned in my comment on Proposal 1-67, 310's definition is more general, but equally useful for 520's purposes.
Panel Meeting Action: **Reject**
Panel Statement: See panel action and statement on Comment 1-42.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-255a Log #395a NEC-P01 **Final Action: Reject**
(520.2.Bundled)

Submitter: Harry J. Sassaman, Forest Electric Corporation
Comment on Proposal No: 15-73
Recommendation: Relocate definition of "Bundle" from 520.2 to Article 100.
Substantiation: The use of "bundled" as it appears in Article 310 (i.e., 310.15(B)(2)(a) is applicable to the definition as written in 520.2 "bundled".
 520.2 - Definition
 Bundled. Cables or conductors that are physically tied, wrapped, taped or otherwise periodically bound together.
 The terminology "bundled" as it appears in Article 310 is a direct conveyance of the definition as it is written in Article 520, which results in the use of the adjustment factors as indicated in Table 310.15(B)(2)(a) predicate on the length, spacing and are not installed raceways. Additionally, (B)(2)(a) exception No. 5 uses the word "bundled". Again, the definition as it is written in Article 520 is applicable.
 Seeing that the word "bundled" was not defined in Article 100 as the word evolved in context throughout the NEC Articles (With the exception of the insertion of the definition "bundled" in Article 520 in the 1996 NEC). It is my strong recommendation to relocate the definition of "bundled" as it appears in Article 520 to Article 100 as a definition. This relocation will assist anyone who questions the implied meaning of the word bundled as it appears in Articles 310, 520 and 640.
 Article 100 Definitions; Scope precisely states, "In general, only those terms that are used in two or more articles are defined in Article 100." Therefore, since the definition of "bundled" is generic to all related NEC articles and complies with the Scope of Article 100 (when definitions are applicable), the relocation of the definition "bundled" should be approved.
Panel Meeting Action: **Reject**
Panel Statement: See panel action on Comment 1-253e.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

1-255b Log #1377a NEC-P01 **Final Action: Reject**
(520.2.Bundled)

Submitter: Charles M. Trout, Maron Electric Co. Inc.
Comment on Proposal No: 15-73
Recommendation: CMP-12 agrees with the Panel Action taken by Panel 15.
Substantiation: None necessary.
Panel Meeting Action: **Reject**
Panel Statement: See panel action on Comment 1-253e
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

15-57 Log #3115 NEC-P15 **Final Action: Accept**
(520.5)

Submitter: Kenneth E. Vannice, Leviton/NSI-Colortran / Rep. United States Institute for Theatre Technology
Comment on Proposal No: 15-74
Recommendation: Continue to reject adding the proposed next text.
Substantiation: We have recently checked with UL and Intertek (ETL). We can find no record of available Listed Special Purpose GFCIs (also known as Class C, D and E GFCIs) to implement the proposed requirement. Even if Listed equipment were to become available in the near future, there would be insufficient time to evaluate it for appropriate application in this situation.
Panel Meeting Action: **Accept**
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

15-58 Log #3621 NEC-P15 **Final Action: Accept**
(520.5)

Submitter: Michael D. Skinner, Alliance of Motion Picture and Television Producers (AMPTP).
Comment on Proposal No: 15-74
Recommendation: Continue to Reject this Proposal.
Substantiation: The Motion Picture and Television Industry fully supports the Panel Action and Statement. This Proposal would mandate GFCI for all circuits including critical supply to Special Effects, Flying Effects, Powered Stage Rigging, Lifts, etc. This may create additional hazards if critical equipment nuisance trips.
Panel Meeting Action: **Accept**
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

3-94 Log #3297 NEC-P03 **Final Action: Reject**
(520.5)

Submitter: Dennis Robbins, GFS, Incorporated
Comment on Proposal No: 15-76
Recommendation: Add new paragraph (X):
(X) Ground-Fault Circuit Interrupter for Personnel Protection.
Within the scope of this Article, temporary outdoor installations, where unprotected from rain or wet conditions, shall have the electrical services protected with a special purpose Ground-Fault Circuit Interrupter system.
Substantiation: New technology now being provided by multiple manufacturers, has evolved and provides listed Ground-Fault Circuit Interrupter devices to protect personnel and equipment at 240 vac, 480 vac, up to 600 vac, single and three phase, 20 amperes to 400 amperes.
 There are many industrial and commercial applications where personnel are exposed to shock hazards 230 volts and above. Such as welding machines, power saws, steam cleaners, milling machines, food processing equipment.
 Personnel are exposed to electrical shock hazards where equipment may be connected to power through 240 vac, 480 vac, three and single phase power at higher amperes cord receptacles in hostile environments. Such as food processing facilities, shipyards, construction job sites, mining, etc.
Panel Meeting Action: **Reject**
Panel Statement: The submitter did not provide any technical data detailing new technology for providing special purpose GFCI protection of a service up to 400 amps at voltages that range from 240 volts to 600 volts. A fact finding report should be generated on this issue and submitted to the panel to help in determining the acceptability of these products for use in these applications. In addition, this comment does not address anything being proposed in Proposal 15-76 so this information has not had public review.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

3-95 Log #814 NEC-P03 **Final Action: Accept**
(520.5(C) (New))

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 15-76
Recommendation: 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.
Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.
Panel Meeting Action: **Accept**
 The panel accepts the direction of the TCC and rejects the proposal.
Panel Statement: New Section 590.5, based on Proposal 3-120 and the NEC TCC decision to move Article 527 to Article 590, already contains the text for holiday lighting, so requiring the same text in 520.5 is redundant.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

15-59 Log #3116 NEC-P15 **Final Action: Accept**
(520.10)

Submitter: Kenneth E. Vannice, Leviton/NSI-Colortran / Rep. United States Institute for Theatre Technology
Comment on Proposal No: 15-77
Recommendation: Continue to reject adding the proposed next text.
Substantiation: We have recently checked with UL and Intertek (ETL). We can find no record of available Listed Special Purpose GFCIs (also known as

Class C, D and E GFCIs) to implement the proposed requirement. Even if Listed equipment were to become available in the near future, there would be insufficient time to evaluate it for appropriate application in this situation.

Panel Meeting Action: Accept
Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

ARTICLE 525 — CARNIVALS, CIRCUSES, FAIRS, AND SIMILAR EVENTS

15-62 Log #815 NEC-P15 **Final Action:** Accept (525.10)

15-60 Log #3299 NEC-P15 **Final Action:** Reject (520.10)

Submitter: Dennis Robbins, GFS, Incorporated
Comment on Proposal No: 15-77

Recommendation: Revise this section:
 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 exposed to rain or wet locations shall have the electrical service protected with ground-fault circuit interrupted system.
Substantiation: New technology now being provided by multiple manufacturers, has evolved and provides listed Ground-Fault Circuit Interrupter devices to protect personnel and equipment at 240 vac, 480 vac, up to 600 vac, single and three phase, 20 amperes to 400 amperes.

There are many industrial and commercial applications where personnel are exposed to shock hazards 230 volts and above. Such as welding machines, power saws, steam cleaners, milling machines, food processing equipment.

Personnel are exposed to electrical shock hazards where equipment may be connected to power through 240 vac, 480 vac, three and single phase power at higher amperes cord receptacles in hostile environments. Such as food processing facilities, shipyards, construction job sites, mining, etc.

Panel Meeting Action: Reject

Panel Statement: GFCI protection is not a substitute for proper application of equipment intended only for dry location. The submitter did not provide sufficient answers to the questions raised by the panel in the proposal panel statement (15-77 Log #3408 NEC-P15).

Number Eligible to Vote: 16
Ballot Results: Affirmative: 16

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 15-91

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Change Part II of Article 525 to read as follows:

“II Power Sources.525.10 Services. Services shall comply with (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 solid backing and be installed so as to be protected from the weather, unless of weatherproof construction.525.11 Multiple Sources of Supply. Where multiple services or separately derived systems or both supply rides, attractions, and other structures, all sources of supply that serve rides, attractions, or other structures separated by less than 3.7 m (12 ft.) shall be bonded to the same grounding electrode system.”

Panel Statement: Under the direction of the TCC, and consistent with the requirements of the NEC Style Manual, the panel has deleted references to Articles 230, 445 and 450; and Sections 240.4(A), (B)(3) and (C) and 250.30. Installation requirements for Portable Vehicle Mounted Generators, and Separately Derived System generators and transformers are covered in Chapters 1 through 4. This revision also includes the panel action on Comment 15-65, with a change in reference location from the proposed location of 525.10(C) to 525.11.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 14 Negative: 3

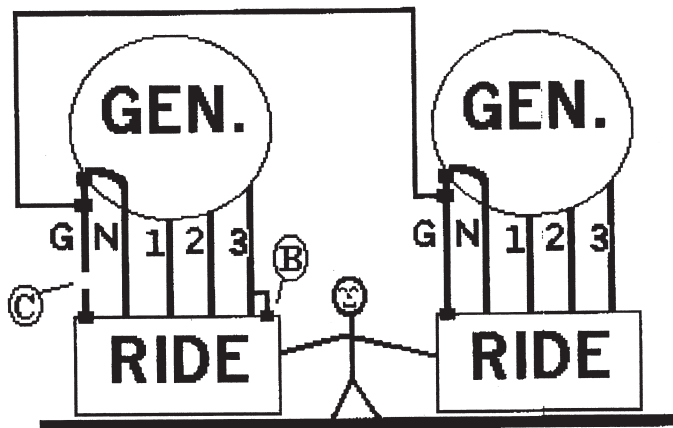
Explanation of Negative:

DUNN: The proposed change to the NEC will not improve electrical safety in the carnival environment. But, will make it less safe!

The submitters of the original proposal (15-93), and the ensuing comments (15-62; 15-65; and 15-65a) have not provided technical substantiation. Especially when compared to the following technical substantiation which explains why this proposal will set up conditions for an electrocution.

This is an attempt to show why having the grounds of multiple generators interconnected will result in an unsafe electrical condition in the carnival environment.

Following is a drawing which shows two rides, each being supplied by a different generator, being touched by the person between them. On the right side, the ride is correctly bonded back to it's generator. Both generators have the "grounded" and "grounding" conductors bonded together correctly. On the left side the "grounding conductor" is open at "C". Also, on the left side there is a fault at "B" where phase 3 touches the frame of the ride.



There will be an electrical path from phase three of the generator on the left side - to the left ride which has the fault - through the person touching both rides - to the ride on the right - thru the right ride's "grounding" conductor (green) - to the generator which supplies power to the right ride - thru the bonding conductor between generators - back to the original generator, on the left side.

Not having the "grounding conductors" of multiple generators "bonded", would leave this path for electrical current open. Thereby, eliminating the potential for electrical shocks.

At first, the fault at "B" appears to be the cause of the electrocution. However, the true cause is the open "grounding conductor" at "C". If this "grounding conductor" is not open, it will provide a low impedance path for the fault current to return to its source; and, trip an over-current device before electrocution occurs. Or, in the case of a fault of sufficient resistance to limit the current flow below the trip setting of the over-current device, the "grounding" of the ride's frame back to the generator's neutral (grounded conductor) will limit the potential at the ride's frame.

Having the grounds of the two generators interconnected is also a cause of the electrocution. This provides the low impedance path for the fault current, which is trying to pass thru the person touching both rides to return to its generator. Without bonding the generators together, the impedance of this path will be high. And, the person will not be electrocuted.

It is possible, easy, and inexpensive, to find these open "grounding conductors" between both rides and their respective generators. And, this is where our efforts should be invested in keeping a carnival safe. We should not become distracted from performing this important and effective safety function; and, intentionally set up unsafe situations by bonding the generators together.

As another example, consider the following:

If you had to change a receptacle outside your house without turning the power off. Would you intentionally ground yourself by touching the conduit? Or, would you take the precaution of standing on a rubber mat to isolate yourself from the ground? Would you check to see that there are no holes in your rubber shoe soles? Perhaps change into dry socks? Would you prefer to use an aluminum, or a fiberglass ladder? Grounding is not always good!

Why doesn't a bird get electrocuted when it roosts on a "high voltage" wire? Grounding is not always good!

The effective way to address the submitter's concerns includes two parts; First, good workmanship and maintenance will reduce the possibility of a fault.

Second, assure that the "grounding" wire is not open between the ride with the fault and the generator which supplies its electrical power; and, that the "grounding" and "grounded" conductors are bonded together at that generator.

If a fault, where on phase becomes electrically connected to the ride's frame, occurs, the "grounding" wire will provide a low impedance path to the generator. This will cause an overcurrent device to open the supply to the fault. Or, in the case of a fault of sufficient resistance to limit the current flow below the trip setting of the overcurrent device, the "grounding" of the ride's frame back to the generator's neutral will limit the potential between the ride's frame and "another ride".

Following are some questions about the enforcement of this proposed change as it is written:

First, does the 3.7 m (12 ft) spacing apply to the "sources of supply", or to the "rides, attractions, or other structures"?

Second, why 3.7 m (12 ft)?

Third, the most expeditious way to enforce this will be to require all of the sources of supply to be bonded. Some of these bonding conductors will be 1,000 ft long. What size and type of conductor? 250.66(A), requires only 6 AWG? 525.20(B) requires: "Single-conductor cable shall be permitted only in sizes 2 AWG or larger."

Fourth, only one grounding electrode system will be required? It will not be necessary to have grounding electrode(s) at each source?

SKINNER: I do not agree with adding Section 525.11 in this comment. Please see my Explanation of Negative Vote on Comment 15-65.

VANNICE: I do not agree with adding 525.11 in this comment. See my explanation of negative vote on Comment 15-65.

Comment on Affirmative:

KRAMER: The claim is made that the proposed change in Comment 15-62 "will not improve electrical safety in the carnival environment, but make it less safe" by Mr. Dunn in his negative comment.

The argument is essentially the same one that has been used since the 1892 report of the New York Board of Fire Underwriters in "Grounding of Electric Wires" including "certain parts of a report by Professor Henry Morton" which contained "if on the other hand, the middle wire is 'grounded', then every gas, water or steam pipe becomes in fact a 'live wire' contact with which results in a current, only limited in amount by the capacity of the conductors (including fusible catches and the like) between the point of contact and the general network of supply wires".¹

The only new thing is the assertion by Mr. Dunn is that it "will result in an unsafe electrical condition in the carnival environment". In carnivals, amusement rides, attractions, tents or similar structures are not electrically different from any other installation "where two or more buildings or structures are supplied from a common AC service by a feeder(s) or branch circuit(s)".²

The arguments advanced against the change illustrate an extremely rare set of circumstances. A number of unlikely events must occur in a specific sequence

to allow this condition. First, the ride illustrated on the left side of Mr. Dunn's drawing must become ungrounded. Typically, there is more than one connection to ground from such things as metal steps to the ride resting on the earth, water pipes supplying either cooling water or potable water, and other electrodes mentioned in 250.52(A) of the NEC. Furthermore, rides are typically the tallest structures in a carnival. Ferris wheels may be higher than 75 feet and other rides can approach that. In locations where the ride may be the tallest structure for hundreds of feet, prudence dictates a separate lightning protective grounding system. The isolation of the ride from ground must occur prior to any contact between the ride and a faulted conductor. Secondly the fault must occur. If the conductor fault were to occur prior to the isolation of the ride, the short circuit protective device (typically fuse or circuit breaker) would operate, removing the source of current.

Therefore, as illustrated above, the chance of this occurrence is extremely low. Furthermore, there have been no reports of accidents, injuries or deaths under the circumstances speculated upon.

1. J. Philip Simmons, IAEI Soares Book on Grounding, Seventh Edition, Richardson, TX, International Association of Electrical Inspectors, 1999
2. NFPA 70 National Electrical Code, 2002 Edition, NFPA, 250.32(A)

15-63 Log #869 NEC-P15
(525.10)

Final Action: Reject

Submitter: Jamie McNamara Hastings, MN

Comment on Proposal No: 15-91

Recommendation: Change "or" to "and" so it reads:

525.10 Generators. Generators shall comply with the requirements of Article 445 and, as applicable, 250.30 ~~or~~ and 250.34.

Substantiation: To make it clear when a generator is portable or vehicle mounted and a separately derived system it must comply with both 250.30 and 250.34 not only one of the two at the installer option. Consider reverting back to the text in the 2002, it's fairly clear.

Panel Meeting Action: **Reject**

Panel Statement: See panel action and statement on Comment 15-62.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-64 Log #816 NEC-P15
(525.10(A))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 15-92

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: **Accept**

Panel Statement: See panel action and statement on Comment 15-62.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-65 Log #1919 NEC-P15 **Final Action: Accept in Principle in Part**
(525.10(C) (New))

Note: The Technical Correlating Committee notes that the accepted text becomes 525.11 based on the panel action on Comment 15-62.

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

Comment on Proposal No: 15-93

Recommendation: The proposal should be accepted in principle. Revise as follows:

(C) Multiple Sources of Supply. Where multiple services or separately derived systems or both supply rides, attractions, and other structures, all sources of supply that serve rides, attractions, or other structures separated by less than 3.7 m (12 ft) shall be grounded to the same grounding electrode system. Two or more grounding electrodes that are bonded together using a conductor not smaller than that required by 250.66 or 250.30 for the largest grounding electrode conductor of the systems required to be bonded shall be considered as a single grounding electrode system.

Substantiation: The proposal identifies a significant safety issue that has been a settled requirement in Article 250 for generations. The wording in this comment uses the spacing in the original proposal together with the terminology and provisions in the last paragraph of 250.58 modified to adequately define the concept of "effectively bonded together" in the context of this article. Note that these separately derived systems could be eligible, by the wording of this comment, to use the new common grounding electrode conductors now recognized in 250.30.

Panel Meeting Action: Accept in Principle in Part

Revise 525.10(C) to read as follows:
 “(C) Multiple Sources of Supply. Where multiple services or separately derived systems or both supply rides, attractions, and other structures, all sources of supply that serve rides, attractions, or other structures separated by less than 3.7 m (12 ft.) shall be bonded to the same grounding electrode system.” The panel does not accept the second sentence of the recommendation.
Panel Statement: The panel has addressed the submitter’s concern. The second sentence is already addressed by Article 250.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 13 Negative: 4

Explanation of Negative:

DUNN: See my explanation of negative vote on Comment 15-62.
 HEFTER: I think the panel focused too much on the tic-tracer discussion as part of an assured grounding program. Yes, it should not be the only part of a ground assurance program, but it can be a tool.

Also, the submitter failed to substantiate the specific of the proposal. Why 3.7m (12 in.)? As I read the accepted language, it is unclear whether the distance involved is at the services or the rides, attractions, etc. Mr. Hartwell’s reference to 250.58 talks about separate services to a single building. Here in Article 525, I believe we are talking about separate services to separate “building.” What problem is this text correcting that isn’t already covered by the Code?

This comment should have been Rejected or Held for Further Study.
 SKINNER: The panel should have Rejected this comment as they did the original proposal. The original submitter did not present any technical substantiation to prove that a problem exists with the use of multiple portable generators in the carnival arena. 250-34 requires portable and vehicle mounted generators to have their supply neutrals bonded to the frame of the generator and that all non-current-carrying metal parts of any equipment supplied by the generator are grounded to the frame by an equipment grounding conductor. This is why earth grounding is not required; the frame can serve as the grounding electrode. Electrons will only flow from a generator, through the equipment, and back to that specific generator. Electric current will not flow out of one generator and into another and no potential will exist between equipment supplied by different portable generators as long as there are no common tie points between the generators. The equipment grounding conductor between the portable equipment and the portable generator provides the safety of a low-impedance path back to the supply source and 525.32 requires this to be verified every time portable equipment is re-connected. Mr. Dunn’s many years of experience finding that tying multiple generators together introduces a hazard warrants further study. I would also agree to hold this comment until more technically scientific studies can be made.

VANNICE: We should be proceeding with more caution. No actual substantiation was given in support of this concept. No one said that X happened resulting in Y. No one said that by doing Z it has been shown that X will no longer happen. The substantiation is based on good ideas that are believed to be effective because they have been effective in other applications for generators. The laws of physics don’t change but the assumptions made in their application do change. These venues have such wide variations in their applications spread out over large areas that existing assumptions may no longer be valid.

In past code cycles other radically different proposals have been made to deal with the problem expressed in this proposal. They were rejected by the previous panel 15 because while potentially solving the problem they created several new ones. The one thing we do believe in is that a return path for the fault current to open the overcurrent device as soon as possible is essential; and we have that requirement.

Since the general public is involved we want to provide an extra level of safety. While we might be adding a level of safety with this proposal we might be removing a level of safety we don’t realize. Given that no statement of an actual problem has been presented, I recommend that we hold this issue for further study until someone actually sets up several of these conditions and measures the actual results.

15-65a Log #3204 NEC-P15 **Final Action: Accept in Principle**
(525.10(C))

Submitter: Michael I. Callanan, IBEW
Comment on Proposal No: 15-93
Recommendation: This proposal should have been accepted.
Substantiation: The submitter has adequately substantiated that a potential for electrocution exists. This Comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.
Panel Meeting Action: Accept in Principle
Panel Statement: See panel action and statement on Comment 15-65.
Number Eligible to Vote: 17
Ballot Results: Affirmative: 13 Negative: 4

Explanation of Negative:

DUNN: See my explanation of negative vote on Comment 15-62.
 HEFTER: See my explanation of negative vote on Comment 15-65.
 SKINNER: See my Explanation of Negative Vote on Comment 15-65.
 VANNICE: See my explanation of negative vote on Comment 15-65.

(Note: The sequence no. 15-66 was not used)

15-67 Log #1921 NEC-P15 **Final Action: Reject**
(525.23)

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 15-94
Recommendation: The proposal should be accepted in principle. Add the following exception following 525.23(A)(2):
 “Exception to (2): Receptacle supplying appliances, such as some heating and refrigeration equipment, that are incompatible with GFCI protective devices shall not be required to have GFCI protection. Such appliances shall be grounded in accordance with 250.138.
Substantiation: Just because new appliances have to pass a 1 mA leakage test does not mean they will continue to do so over time, even relatively short periods of time. Appliances such as popcorn makers rely on a resistive conductor run inside a metallic element, and insulated from the outer element surface by refractory material, typically magnesium oxide. After repeated heating cycles this compound can break down, resulting in traces of elemental magnesium that eventually cause a ground fault resulting in the failure of the element. This problem is curable by allowing the ends of the elements to breathe slightly; atmospheric oxygen will recombine with the traces of magnesium and restore the insulating qualities of the refractory compound. Unfortunately the air also brings with it some water vapor. Water vapor combines with magnesium oxide to form magnesium hydroxide, which is conductive. When the element is first energized, the heat drives off the water, again restoring the insulating qualities of the refractory material, but not without substantial leakage current during the initial heating process. This current will often trip any Class A GFCI device that is functioning properly.
 There are, in fact, many appliances that are incompatible with conventional GFCI protective devices for this reason. They are only hazardous in the event they are ungrounded. The solution is to retain the 2002 permission, but modified to require an equipment grounding connection to such equipment. See also the CMP 19 response on Proposal 19-25 as a further example of the problems cited in this comment.

Panel Meeting Action: Reject
Panel Statement: The panel reaffirms its position on Proposal 15-94. The panel action on Proposal 15-95 was to remove the exception that allowed for “incompatible equipment” to be exempt from GFCI protection.

Number Eligible to Vote: 17
Ballot Results: Affirmative: 16 Negative: 1

Explanation of Negative:
 VANNICE: I agree with the submitter. Furthermore, there are whole classes of equipment not technically “appliances” that are not required by UL to be earth-leakage tested. This is a problem.
 Furthermore, I asked UL if these venues met their definition of ordinary locations found in the Scope of their GFCI standard. They responded “You inquire whether in UL’s opinion applications found in NEC Special Occupancies Articles 518, 520, 525, and 530 are considered “ordinary applications”. To make such a determination regarding these special occupancy articles, UL would need to take the inquiry on a case-by-case basis depending on the specific product and intended use.”
 We need to require the use of GFCI where it functions properly. Unfortunately, there are field conditions where it does not.

15-68 Log #3117 NEC-P15 **Final Action: Accept**
(525.23(D))

Submitter: Kenneth E. Vannice, Leviton/NSI-Colortran / Rep. United States Institute for Theatre Technology
Comment on Proposal No: 15-96
Recommendation: Continue to reject adding the proposed new text.
Substantiation: We have recently checked with UL and Intertek (ETL). We can find no record of available Listed Special Purpose GFCIs (also known as Class C, D and E GFCIs) to implement the proposed requirement. Even if Listed equipment were to become available in the near future, there would be insufficient time to evaluate it for appropriate application in this situation.
Panel Meeting Action: Accept
Number Eligible to Vote: 17
Ballot Results: Affirmative: 17

15-69 Log #3300 NEC-P15
(525.23(D))

Final Action: Reject

Submitter: Dennis Robbins, GFS, Incorporated
Comment on Proposal No: 15-96

Recommendation: Add a new paragraph (D):

(D) Portable Rides, Games and Amusements Structures.

All Amusement rides, "Wet rides" games and conductive structures shall be protected by ground fault circuit interrupters where subject to wet locations.

Substantiation: New technology now being provided by multiple manufacturers, has evolved and provides listed Ground-Fault Circuit Interrupter devices to protect personnel and equipment at 240 vac, 480 vac, up to 600 vac, single and three phase, 20 amperes to 400 amperes.

There are many industrial and commercial applications where personnel are exposed to shock hazards 230 volts and above. Such as welding machines, power saws, steam cleaners, milling machines, food processing equipment.

Personnel are exposed to electrical shock hazards where equipment may be connected to power through 240 vac, 480 vac, three and single phase power at higher amperes cord receptacles in hostile environments. Such as food processing facilities, shipyards, construction job sites, mining, etc.

Panel Meeting Action: Reject

Panel Statement: The submitter has 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 has 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. Section 525.3(D) directs the user to Article 680 for water attractions.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-70 Log #3624 NEC-P15
(525.23(D))

Final Action: Accept in Principle

Submitter: Michael D. Skinner, Alliance of Motion Picture and Television Producers (AMPTP).

Comment on Proposal No: 15-94

Recommendation: Add after Section title: "The ground-fault circuit interrupter shall be permitted to be an integral part of the attachment plug or located in the power-supply cord, within 300 mm (12 in.) of the attachment plug."

Substantiation: The Code Panel inadvertently left out this text when rewriting this Section to comply with NEC Style Manual.

Panel Meeting Action: Accept in Principle

After 525.23(A) "Where GFCI Protection is Required." add the following: "The ground-fault circuit interrupter shall be permitted to be an integral part of the attachment plug or located in the power-supply cord, within 300 mm (12 in.) of the attachment plug. Listed cord sets incorporating ground-fault circuit interrupter for personnel shall be permitted." Subsections (1) and (2) of ROP 15-94 Log #53 are to remain.

Panel Statement: The panel provided specific location for the text that was inadvertently left out. Text changes were made still satisfying the submitter's intent.

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

15-71 Log #3625 NEC-P15
(525.23(D))

Final Action: Accept

Submitter: Michael D. Skinner, Alliance of Motion Picture and Television Producers (AMPTP).

Comment on Proposal No: 15-96

Recommendation: Continue to Reject this Proposal.

Substantiation: The Motion Picture and Television Industry fully supports the Panel Action and Statement.

Panel Meeting Action: Accept

Number Eligible to Vote: 17

Ballot Results: Affirmative: 17

ARTICLE 527 — TEMPORARY INSTALLATIONS

3-96 Log #2197 NEC-P03
(527)

Final Action: Reject

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

Comment on Proposal No: 3-108

Recommendation: The TCC action should be accepted in principle. Move the article to become Article 710 or 715.

Substantiation: The relocation of this material out of Chapter 3 in the 2002 cycle was appropriate, but not to Chapter 5. The location in Chapter 5 squarely violates the express wording of 90.3. Temporary wiring is not, never has been, and never will be an occupancy. It is a special condition that can apply, and often does apply, in any occupancy. Now that the reorganization of Chapter 3 is settled and the emotions accompanying that process have cooled, the location of this article needs to be thoroughly reconsidered, or else 90.3 should be reworded. The location should be near the beginning of Chapter 7 adjacent to the power-limited articles, but well after Article 700-705. The submitter recognizes that CMP 3 has no final jurisdiction, but requests a panel action to advise the TCC of panel support for this relocation. A Chapter 7 location will be a more effective response to the concerns that prompted this and other similar proposals.

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 this article without specific direction to do so.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-97 Log #554 NEC-P03
(527.4(B))

Final Action: Accept in Principle

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 3-112

Recommendation: 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.

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

The panel accepts the direction of the TCC.

Revise the last sentence in 527.4(B) in the proposal to read as follows: "(B) Feeders. Feeders shall be protected ...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 and without concealment within walls, floors, or ceilings as described in 334.10(3)."

Revise the last sentence in 527.4(C) in the proposal to read as follows: "(C) Branch Circuits. All branch circuits shall originate...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 and without concealment within walls, floors, or ceilings as described in 334.10(3)."

Panel Statement: By deleting the section reference, the proposal still addresses the specific permission to use NM cable as temporary branch circuits and feeders within any building and without concealment within walls, floors, or ceilings. Text was added to ensure the cable can be used without being required to be concealed within walls, floors, or ceilings. Removing any section reference will ensure its correctness without regard to any changes within Article 334.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-98 Log #2397 NEC-P03
(527.4(B))

Final Action: Accept in Principle

Submitter: James M. Daly, General Cable

Comment on Proposal No: 3-113

Recommendation: The Proposal should continue to be Accepted in Principle and the last sentence in 527.4(B) (New 590.4(B)) and 527.4 (C) (New 590.4(C)) be revised to read:

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 334.12(A)(1) and the requirements in 334.12(A)(2) that the cable be concealed in non-dwelling construction shall not apply.

Substantiation: The Panel Action on Proposal 3-112 removed the height and building type limitations on the use of NM cable. However, as the Code now reads, 334.12(A)(2) will still apply and NM cable in temporary installations "in non-dwelling construction" will still be required to be "concealed within walls, floors, or ceilings that provide a thermal barrier of material that has at least a 15-minute finish rating." This requirement would even apply to a one-story structure if it was not a dwelling. This is not very practical for temporary wiring.

I agree with the Panel that it would be useful to specify that height limitations do not apply, even though Article 334 no longer references any height limitation, since the height limitation has been around for so long.

Panel 7 deleted 334.10 so the references have been changed to 334.12. The reference in the Preprint referred to 334.12(2) when it should be 334.12(A)(2)

Article 527 has been relocated to 590.

Panel Meeting Action: Accept in Principle

Panel Statement: See the panel action and statement on Comment 3-97 addressing the submitter's concerns.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-99 Log #2974 NEC-P03 **Final Action: Reject**
(527.4(B))

Submitter: Samuel B. Friedman, General Cable

Comment on Proposal No: 3-111

Recommendation: Proposal should have been accepted in principle and in part.

Substantiation: The panel action on 3-114 revised the first sentence to agree with the NEC Style Manual. The remainder of Proposal 3-111 was intended to eliminate the exception, add the ability to use single conductor as a feeder in applications other than those in 527.3(C) and make the section on feeder cable easier to read. #8 AWG was chosen as the minimum size for single conductor feeder cable because that is the smallest size permitted for single conductor in Tables 400.4 and 400.5. Likewise #14 AWG was chosen as the smallest size for applications in 527.3(C) because that is the smallest size permitted in products in Table 310.3 for power leads.

Panel Meeting Action: Reject

Panel Statement: The substantiation of the first sentence for ROP 3-114 is correct. Elimination of the second sentence is not acceptable.

Substantiation provided in 1996 and 1999 ROP-ROC cited damage to single conductors on construction sites. The third sentence is rejected because it is the intent of CMP 3 to not permit any single conductor on construction sites, conductor size is not relevant, and the construction activity is the main concern. The fourth sentence is not acceptable because single conductors are simply not to be used at any time and for any purpose other than as permitted by 590.4(B) Exception [old 527.4(B) Exception] for feeders and 590.4(C) Exception for branch circuits.

The submitter eliminated conductors within cable assemblies as a viable wiring method, which totally invalidates the last sentence of this section that permits NM and NMC cables for temporary wiring in any construction within a building or structure. The submitter is incorrect in stating that 8 AWG is the smallest single conductor in Table 400.4 that can be used. Type W is extra hard usage portable cord available in 12 AWG through 500 kcmil. Stating the minimum size conductor is not necessary since the size will be based on the load as calculated by Article 220.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-100 Log #2396 NEC-P03 **Final Action: Accept in Principle**
(527.4(B) and (c))

Submitter: James M. Daly, General Cable

Comment on Proposal No: 3-112

Recommendation: The Proposal should have been Accepted in Principle in Part and the last sentence in 527.4(B) (New 590.4(B)) and 527.4 (C) (New 590.4(C)) be revised to read:

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 334.12(A)(1) and the requirements in 334.12(A)(2) that the cable be concealed in non-dwelling construction shall not apply.

Substantiation: The Panel Action on the Proposal removed the height and building type limitations on the use of NM cable. However, as the Code now reads, 334.12(A)(2) will still apply and NM cable in temporary installations "in non-dwelling construction" will still be required to be "concealed within walls, floors, or ceilings that provide a thermal barrier of material that has at least a 15-minute finish rating." This requirement would even apply to a one-story structure if it was not a dwelling. This is not very practical for temporary wiring.

Panel 7 deleted 334.10 so the references have been changed to 334.12.

The reference in the Preprint referred to 334.12(2) when it should be 334.12(A)(2)

Article 527 has been relocated to 590.

Also, see my Comment on Proposal 3-113.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 3-97.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-101 Log #555 NEC-P03 **Final Action: Accept**
(527.4(B) & (C))

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 3-113

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the TCC's direction to reconsider panel action on Proposal 3-113 and to accept the proposal in principle.

Panel Statement: See panel action and statement on Comment 3-97.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-102 Log #122 NEC-P03 **Final Action: Reject**
(527.4(D))

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

Comment on Proposal No: 3-117

Recommendation: Accept with a revised last phrase, replacing the wording from "...shall..." forward with "...shall be guarded where subject to damage or spray."

Substantiation: Both the submitter's and the CMP's concerns are valid; this will address both, at least in part.

Panel Meeting Action: Reject

Panel Statement: Section 527.2(A) [590.2(A)] requires compliance with all other parts of the NEC, unless specifically modified by Article 527 [590]. 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. The suggested modification in the comment would delete this very important safety requirement.

Receptacles that are subject to damage are already required to be guarded or otherwise protected based on 110.2(A) to be suitable for the conditions of use.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-103 Log #3656 NEC-P03 **Final Action: Accept in Principle**
(527.4(J) Exception No. 1 (New))

Note: The Technical Correlating Committee directs that the word "proper" be deleted from the Panel Action Text to comply with Table 3.2.1 of the NEC Style Manual.

Submitter: Ronald E. Maassen, Lemberg Electric Co., Inc.

Comment on Proposal No: 3-119

Recommendation: Add new exception (1) in accordance with 527.3(B), (C) & (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: Sturdy live vegetation (i.e., large trees) is more supportive than braced 2 x 4 that would be used to support feeders and branch circuits in many installations. I believe the panel should reconsider their rejection.

Panel Meeting Action: Accept in Principle

Amend the comment to read as follows:

"For holiday lighting in accordance with 527.3(B), where the conductors or cables are arranged with proper strain relief devices, tension take-up devices, or other approved means to avoid damage from the movement of the live vegetation, trees shall be permitted to be used for support of overhead spans of branch circuit conductors or cables."

Panel Statement: The panel rearranged the text for editorial reasons and restricted the live vegetation to trees, since most of the substantiation for both the proposal and the comment involved temporary support to sturdy vegetation, such as trees.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

18-67 Log #1075 NEC-P18 **Final Action: Reject**
(527.5)

Submitter: Neil F. LaBrake, Jr., Niagara Mohawk, a National Grid Company / Rep. Edison Electric Institute

Comment on Proposal No: 3-120

Recommendation: Reject this Proposal.

Substantiation: This proposal should be rejected. It is the Edison Electric Institute's position that the requirements for end-use electrical devices that are not installed as part of the permanent premises wiring system are best covered by appropriate product standards. It is not the National Electrical Code's intent or scope to set requirements for end-use electrical devices that would typically be purchased by the after market consumer.

The Edison Electric Institute supports the entire electrical safety system that integrates product standards, installation standards, product testing and evaluation, electrical inspection, manufacturer's products, qualified electrical installation and maintenance, electric supply system characteristics, and the owner's use and operation. Covering product standards in the National Electrical Code installation standard could negate the responsibility of the appropriate product standard and adversely impact the entire process.

The integrity of the electrical safety system is anchored in the systematic integration of the National Electrical Code, installation inspection, product safety standards and product testing. If non-premises end-use product safety issues are usurped by the National Electrical Code, the product safety standard process will be weakened resulting in the entire process being weakened.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-70.

The panel concludes that there is a need for installation requirements and listing of these products.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-68 Log #3658 NEC-P18 **Final Action: Reject**
(527.5 (New))

Submitter: Marcelo M. Hirschler, GBH International

Comment on Proposal No: 3-120

Recommendation: Add text to read as follows:

527.5 Decorative Lighting Decorative lighting used for holiday lighting and similar purposes, in accordance with 527.3(B) shall be listed.

Substantiation: The TCC requested that a title be given to the section, and decorative lighting is the logical title.

For CMP 3 information:

(1) a comment has also been submitted to CMP 18 to add a Fine Print Note to their scope, 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: With regard to the applicability of this article, luminaires include decorative lighting products and accessories for temporary seasonal and holiday use, and portable flexible lighting products.

(2) A comment has also been made to CMP 1 to add the product listing standard (UL 588) to the Annex, for consistency with other product listing standards.

Panel Meeting Action: Reject

Panel Statement: CMP 18 does not have jurisdiction on Article 527. See the panel action and statement on Comment 18-70.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-69 Log #3847 NEC-P18 **Final Action: Reject**
(527.5 (New))

Submitter: Marcelo M. Hirschler, GBH International / Rep. Fire Retardant Chemicals Association

Comment on Proposal No: 3-120

Recommendation: Revise to read as follows:

527.5 Decorative Lighting Decorative lighting used for holiday lighting and similar purposes, in accordance with 527.3(B) shall be listed.

Substantiation: The TCC requested that a title be given to the section, and decorative lighting is the logical title.

For CMP 3 information:

(1) a comment has also been submitted to CMP 18 to add a Fine Print Note to their scope, 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: With regard to the applicability of this article, luminaires include decorative lighting products and accessories for temporary seasonal and holiday use, and portable flexible lighting products.

(2) A comment has also been made to CMP 1 to add the product listing standard (UL 588) to the Annex, for consistency with other product listing standards.

Panel Meeting Action: Reject

Panel Statement: CMP 18 does not have jurisdiction on Article 527. See the panel action and statement on Comment 18-70.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-70 Log #556 NEC-P18 **Final Action: Accept**
(527.5 and A.527.5 (New))

Note: The Technical Correlating Committee directs that a title be added to 410.110 and to 527.5 to read: "Listing of Decorative Lighting".

Titles are required in accordance with the NEC Style Manual.

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 3-120

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Add a new Part XVI to Article 410 to read as follows:

XVI. Decorative Lighting and Similar Accessories.

410.110. Decorative lighting and similar accessories used for holiday lighting and similar purposes, in accordance with 527.3 (B), shall be listed.

Panel Statement: The panel accepts the direction of the TCC to review Proposal 3-120.

The panel believes that the substantiation presented in Proposal 3-120 is compelling. CMP 18 also agrees with CMP 3 that only the first sentence of the proposal is appropriate for the NEC and that the balance would be more appropriately considered by the UL STP responsible for UL 588.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

3-104 Log #3118 NEC-P03 **Final Action: Accept**
(527.6(A))

Submitter: Kenneth E. Vannice, Leviton/NSI-Colortran / Rep. United States Institute for Theatre Technology

Comment on Proposal No: 3-122

Recommendation: Continue to reject adding the proposed new text.

Substantiation: We have recently checked with UL and Intertek (ETL). We can find no record of available Listed Special Purpose GFCLs (also known as Class C, D and E GFCLs) to implement the proposed requirement. Even if Listed equipment were to become available in the near future, there would be insufficient time to evaluate it for appropriate application in this situation.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

3-105 Log #3301 NEC-P03 **Final Action: Reject**
(527.6(A))

Submitter: Dennis Robbins, GFS, Incorporated

Comment on Proposal No: 3-121

Recommendation: Revise 527.6(A) Receptacle outlets. All 120 vac, 240 vac, 480 vac, 15, 20, 30, 50, up to 400 ampere, receptacles outlets that are or are not part of the permanent wiring of a building, structure, marina, that are used by personnel shall have ground fault circuit interrupter for personnel protection.

Substantiation: New technology now being provided by multiple manufacturers, has evolved and provides listed Ground-Fault Circuit Interrupter devices to protect personnel and equipment at 240 vac, 480 vac, up to 600 vac, single and three phase, 20 amperes to 400 amperes.

There are many industrial and commercial applications where personnel are exposed to shock hazards 230 volts and above. Such as welding machines, power saws, steam cleaners, milling machines, food processing equipment.

Personnel are exposed to electrical shock hazards where equipment may be connected to power through 240 vac, 480 vac, three and single phase power at higher amperes cord receptacles in hostile environments. Such as food processing facilities, shipyards, construction job sites, mining, etc.

Panel Meeting Action: Reject

Panel Statement: The submitter did not provide any technical data detailing new technology for providing special purpose GFCI protection up to 400 amps at voltages that range from 240 volts to 600 volts. A fact finding report should be generated on this issue and submitted to the panel to help in determining the acceptability of these products for use in these applications. The use of these products is not prohibited. The panel concludes that this comment was on Proposal 3-122 and not 3-121.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

Comment on Affirmative:

AYER: The submitter is requesting that GFCI protection for temporary outlets be mandated for up to 400 amps. 527.6(B) already permits the use of these sizes of GFCI outlets in lieu of the assured equipment grounding conductor program. The submitter has not provided sufficient evidence of why the assured equipment grounding conductor program is inadequate for other size receptacles beyond the required 15-, 20-, and 30-amp receptacles.

3-106 Log #3620 NEC-P03
(527.6(A))

Final Action: Accept

Submitter: Michael D. Skinner, Alliance of Motion Picture and Television Producers (AMPTP).

Comment on Proposal No: 3-122

Recommendation: Continue to Reject This Proposal

Substantiation: The Motion Picture and Television Industry fully supports the Panel Action and Statement. This device is not yet UL Listed and the ground fault trip current is 15 to 20 mA, above established let-go currents. Accepting the Proposal would require GFCI on every receptacle outlet regardless of its rating. This may create additional hazards if critical equipment nuisance trips.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

ARTICLE 530 — MOTION PICTURE AND TELEVISION STUDIOS AND SIMILAR LOCATIONS

15-72 Log #3111 NEC-P15
(530.6)

Final Action: Accept

Submitter: Kenneth E. Vannice, Leviton/NSI-Colortran / Rep. United States Institute for Theatre Technology

Comment on Proposal No: 15-101

Recommendation: Continue to reject adding the proposed new text.

Substantiation: We have recently checked with UL and Intertek (ETL). We can find no record of available Listed Special Purpose GFCI's (also known as Class C, D and E GFCIs) to implement the proposed requirement. Even if Listed equipment were to become available in the near future, there would be insufficient time to evaluate it for appropriate application in this situation.

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

15-73 Log #3302 NEC-P15
(530.6)

Final Action: Reject

Submitter: Dennis Robbins, GFS, Incorporated

Comment on Proposal No: 15-101

Recommendation: Revise text:

530.6 Portable equipment. Portable stage and studio electrical power distribution equipment shall be permitted for temporary use outdoors provided the equipment is supervised by while energized and barriered from the public or special purpose Ground-Fault Circuit Interrupter provided personnel protection.

(1) Pumps, Lighting Fixtures, fixtures, etc. that are exposed to rain or water shall have the power supply circuit protected by Ground -Fault Circuit Interrupters.

(2) Portable electrical power distribution systems installed indoors, and subject to wet locations shall be protected by Ground-Fault Circuit Interrupters at 120 vac, 240 vac, 480 vac.

(3) All portable motion picture lighting fixtures, portable power distribution equipment, feeders, and branch circuits that or can be exposed to wet conditions, including special effects shall have personnel protection by special purpose Ground-Fault Circuit Interrupter Systems.

Substantiation: New technology now being provided by multiple manufacturers, has evolved and provides listed Ground-Fault Circuit Interrupter devices to protect personnel and equipment at 240 vac, 480 vac, up to 600 vac, single and three phase, 20 amperes to 400 amperes.

There are many industrial and commercial applications where personnel are exposed to shock hazards 230 volts and above. Such as welding machines, power saws, steam cleaners, milling machines, food processing equipment.

Personnel are exposed to electrical shock hazards where equipment may be connected to power through 240 vac, 480 vac, three and single phase power at higher amperes cord receptacles in hostile environments. Such as food processing facilities, shipyards, construction job sites, mining, etc.

Panel Meeting Action: Reject

Panel Statement: GFCI protection is not a substitute for proper application of equipment intended only for dry location. The submitter has 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: 16

Ballot Results: Affirmative: 16

15-74 Log #3627 NEC-P15
(530.6)

Final Action: Accept

Submitter: Michael D. Skinner, Alliance of Motion Picture and Television Producers (AMPTP).

Comment on Proposal No: 15-101

Recommendation: Continue to Reject this Proposal.

Substantiation: The Motion Picture and Television Industry fully supports the Panel Action and Statement. This Proposal would mandate GFCI for all circuits including critical supply to Special Effects, Flying Effects, Powered Stage Rigging, Lifts, etc. This may create additional hazards if critical equipment nuisance trips.

Panel Meeting Action: Accept

Number Eligible to Vote: 16

Ballot Results: Affirmative: 16

ARTICLE 547 — AGRICULTURAL BUILDINGS

19-7 Log #840 NEC-P19
(547.5(A))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 19-8

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Revise 547.5(A) to read:(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. The wiring methods of Article 502, Part II shall be permitted for areas described in 547.1(A).

Panel Statement: The panel action is based on the proposed reorganization of Article 502 as shown in Proposal 14-51a.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-8 Log #3026 NEC-P19
(547.5(F))

Final Action: Hold

Submitter: Monte Ewing, State of Wisconsin

Comment on Proposal No: 19-10

Recommendation: Where an equipment grounding conductor is installed within a location falling under the scope of Article 547 it shall be a copper conductor. Where an equipment grounding conductor is installed underground it shall be insulated or covered copper.

Substantiation: Article 250 already requires noncurrent-carrying metal parts of equipment to be grounded (redundant language). The requirement to use copper from the building disconnect to the equipment does not prohibit the use of the equipment grounds where the supply comes from other than the building disconnect. The copper restriction prohibits the use of aluminum messenger supported cable located outside the 547 area to get overhead from the building disconnect to other areas of the building (such as to a silo). This revision will allow copper out of the building to aluminum (above grade) and back to copper to go back in.

Panel Meeting Action: Hold

Panel Statement: The proposed text introduces new text regarding the equipment grounding conductor material that has not had public review and comment.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-9 Log #841 NEC-P19
(547.5(G))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 19-10a

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

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel has reviewed the comments expressed in the voting and has revised the proposed text for 547.5(G) as a result of their action on Comment 19-10.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-10 Log #3465 NEC-P19 **Final Action: Accept in Principle in Part**
(547.5(G))

Submitter: Daniel J. Kissane, Pass & Seymour/Legrand

Comment on Proposal No: 19-10a

Recommendation: Recommend revising the wording of 547.5(G) accepted by the panel as follows:

547.5(G) Ground Fault Protection. Ground-fault circuit-interrupter 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 circuit-interrupter protection. Equipment on these circuits that is incompatible with ground-fault circuit interrupter devices shall not be required to have ground-fault circuit-interrupter protection.

Substantiation: The revisions made by the panel resulted in requiring Ground Fault Protection of Equipment (GFPE) instead of Ground Fault Circuit Interrupter (GFCI) protection for the areas described in 547.10(B). Apparently this change was made because certain types of equipment used in these areas may not be compatible with GFCI. As noted in the Article 100 definitions, GFPE is intended to provide protection of equipment. GFPE should not be used to provide personnel protection. GFPE must not be substituted for GFCI where personnel protection is necessary. If it is anticipated that the "other circuits" described in the panel revision to 547.5(G) require GFCI protection for personnel, then GFPE must not be permitted as an alternative. If there are products that are used in these areas that are not compatible with GFCI, then a statement similar to 525.23(B) should be included in 547.5(G). This would maintain the GFCI as the appropriate device for personnel protection but would permit incompatible equipment to be used on a non-protected circuit.

Panel Meeting Action: Accept in Principle in Part

Revise 547.5(G) as proposed in Proposal 19-10a to read:(G) 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:

- (1) In areas having an equipotential plane
- (2) Outdoors
- (3) Damp or wet locations
- (4) Dirt confinement areas for livestock

Panel Statement: The panel concluded that the text in 547.5(G) of the 2002 NEC, revised as follows, addresses the submitter's request for the addition of the full-term "ground fault circuit interrupter". By eliminating in Proposal 19-10a, the text proposed by the panel in 547.5(G)(2), the concerns for incompatible equipment are also addressed. The panel recalled that the purpose of the requirement for GFCI protection for personnel in these areas is to address shock hazards at frequently used general-purpose receptacles. The panel rejects the concept of using ground-fault protection of equipment as a protection technique for these applications. The panel has modified the proposed text for 547.5(G)(4) to correlate with their action on Comment 19-25.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-11 Log #3018 NEC-P19 **Final Action: Accept**
(547.5(G)(1))

Submitter: Monte Ewing, State of Wisconsin

Comment on Proposal No: 19-10a

Recommendation: Dirt confinement areas, delete the reference to 547.10(B).

Substantiation: Dirt confinement areas are either indoors or out. (b) takes care of the outdoor issue so all that is needed is "dirt confinement areas" that will cover the dry and damp locations. NEC 547.10(B) is not needed.

Panel Meeting Action: Accept

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-12 Log #3017 NEC-P19 **Final Action: Accept**
(547.5(G)(2))

Submitter: Monte Ewing, State of Wisconsin

Comment on Proposal No: 19-10a

Recommendation: Delete this section entirely.

Substantiation: Back in 2001 the GFCI requirement was inserted to provide additional protection to the farmer where they may have a convenience receptacle located in a dirt confinement area. Somehow it turned into GFCI protecting all the electrical equipment within that area. This exceeds the requirements for areas with an EQ plane and now applies to all single and three phase equipment located in that area for which there is no 277/480 volt GFCI protective devices available. It needs to return to protecting the farmer using convenience receptacles around the farm.

Panel Meeting Action: Accept

Panel Statement: See the panel action and statement on Comment 19-10.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-13 Log #2930 NEC-P19 **Final Action: Reject**
(547.5(H))

Submitter: Barry Bauman, Alliant Energy / Rep. American Society of Agricultural Engineers

Comment on Proposal No: 7-208

Recommendation: Add text to read as follows:

547.5(H) Section 396.12 does not apply to wiring done according to Article 547.

Substantiation: If Proposal 7-208 is not reversed, the proposed language is needed to keep the 3-wire option available for use in agricultural wiring. I have submitted a comment to Panel 7 requesting that the language accepted in Proposal 7-208 be deleted. Following is the statement I sent to Panel 7.

There was no technical substantiation provided in the proposal to prohibit the use of the messenger as a current carrying conductor for all installations.

The messenger is being used safely and effectively as a current carrying conductor in hundreds of thousands of installations.

In a typical installation, the messenger is a grounded-neutral effectively providing an equipment/system ground and carrying neutral current. When there is an open in the messenger resulting in the loss of grounding, the customer becomes aware of the open due to the change in voltage applied to equipment connected phase-to-neutral.

When the messenger is used as an equipment ground and a separate wire is used as the neutral, the indicator of a lost equipment ground is lost.

The prohibition of the use of the messenger as a current carrying conductor should not be a general rule in Article 396. Any limitations on the use of the messenger as a current carrying conductor should be application specific. An example of an appropriate restriction can be found in 250.32(B)(1).

Panel Meeting Action: Reject

Panel Statement: The panel concludes that the action taken by CMP 7 on Comment 7-208 addresses the concern expressed in the submitter's substantiation. Therefore, it is not necessary to include text regarding the messenger wire in Article 547.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-14 Log #3359 NEC-P19 **Final Action: Reject**
(547.5(H) (New))

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

Comment on Proposal No: 19-11

Recommendation: Accept text.

Substantiation: The installation of CFGIs has eliminated ON FARM stray current. There has been no reported problems. Please reconsider.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its action on Proposal 19-11.

Additionally the submitter has not provided technical substantiation to support his assertion on the elimination of stray currents. The installation of GFCI's is not prohibited and certainly is an option available to users.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-15 Log #2961 NEC-P19 **Final Action: Reject**
(547.7)

Submitter: Melvin K. Sanders, TECo., Inc.

Comment on Proposal No: 19-12

Recommendation: The Panel should reconsider and accept this proposal.
Substantiation: The Panel rejection was based upon 2002 and earlier NEC text of 250.122 and 250.122(D). However, it appears that CMP 5 accepted ROP 5-229 as shown on page 94 of the ROP Draft 250.122(D) to change to this method of sizing motor circuit equipment grounding conductors. Therefore, CMP 19 should reverse their stand and this proposal as originally submitted.

Panel Meeting Action: Reject

Panel Statement: If CMP 5 accepts the proposed change for sizing the equipment grounding conductors for motor circuits in 250.122(D), such a change applies to Article 547 applications per 90.3.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-16 Log #842 NEC-P19 **Final Action: Accept**
(547.9)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 19-12a

Recommendation: It was the action of the Technical Correlating Committee that further consideration be given to the comments expressed in the voting. In addition, 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Revise 547.9(B)(3)(b)(1) to read: (1) The equipment grounding conductor shall be the same size as the largest supply conductor, if of the same material, or adjusted in size in accordance with the equivalent size columns of Table 250.122 if of different materials.

Panel Statement: The panel accepts the comment and has revised the text per the Technical Correlating Committee direction. See the panel action and statement on Comment 19-18.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-17 Log #1848 NEC-P19 **Final Action: Accept**
(547.9)

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

Comment on Proposal No: 19-12a

Recommendation: Accept the proposal in principle; delete the phrase "and meets the requirements of 547.9(A)(7)" from 547.9(A)(9).

Substantiation: This phrase seems to be an error since 547.9(A)(7) is part of the section that earlier language in this paragraph already requires adherence to. In addition, the cited provision is permissive and not mandatory in character, which begs the question of how and why you make a mandatory reference to an optional provision.

Panel Meeting Action: Accept

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-18 Log #2929 NEC-P19 **Final Action: Accept in Principle**
(547.9)

Submitter: Barry Bauman, Alliant Energy / Rep. American Society of Agricultural Engineers

Comment on Proposal No: 19-12a

Recommendation: After section title add:

Overhead electrical supply shall comply with 547.9(A) and 547.9(B).
Underground electrical supply shall comply with 547.9(C) and 547.9(D).

Delete 547.9(C) FPN No. 1.

Substantiation: Grade level service rated transfer switches with adequate fault current rating are not readily available. Consequently, a single service rated disconnect is required when there are more than six disconnects or when a transfer switch is installed that will transfer the entire service.

The added text clarifies the application of 547.9.

Panel Meeting Action: Accept in Principle

Revise the text proposed in the comment to read: "Overhead electrical supply shall comply with 547.9(A) and 547.9(B), or with 547.9(C). Underground electrical supply shall comply with 547.9(C) and 547.9(D)." Delete 547.9(C) FPN No. 1.

Panel Statement: The panel has revised the text proposed in the comment by adding a reference in the first sentence to 547.9(C). This reference was added to permit the use of 547.9(C) for overhead installations.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-19 Log #3344 NEC-P19 **Final Action: Reject**
(547.9)

Submitter: Daniel R. Neeser, Cooper Bussmann

Comment on Proposal No: 19-16

Recommendation: The proposal should be Accept and incorporated into proposal 19-12a.

Substantiation: The panel statement for the proposal indicates that short-circuit current rating is not required for site-isolating switches that are pole mounted. However, proper rating of equipment with regard to the short-circuit current rating does not depend upon location of the device. This rating only has to do with how much current it can withstand before a dangerous safety issue arises. This safety issue is a concern for the site isolation switch, whether it is located on grade level or pole mounted. If the short-circuit current is greater than the short-circuit current rating of the site isolating switch, overcurrent protection should be incorporated to assure proper rating of the device.

Failure to have an adequate short-circuit rating could easily cause the site isolating switch to violently explode, with the result that fires are started at the base of the pole. Without such a rating, grass and brush fires will likely occur. If hay is stored under the pole, it could easily catch on fire. We should be improving safety and reducing fires, not creating additional opportunities to start fires.

Panel Meeting Action: Reject

Panel Statement: The submitter has not provided sufficient technical substantiation to convince the panel that the pole mounted site isolation device must have a short-circuit current rating. It is important to remind the submitter that the site isolation device is a supplemental disconnecting means for use as defined in 547.2.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 7 Negative: 1

Explanation of Negative:

TIPTON: I believe Code-Making Panel 19 has made great strides in improving 547.9. However, I believe we have overlooked the need for overcurrent protection at the pole mounted site isolation device.

I agree with the panel that no substantiation of problems was submitted. Although after giving the situation more thought, I agree with the submitter that the possibility of fire and injury does exist.

19-20 Log #1596 NEC-P19 **Final Action: Reject**
(547.9(A))

Submitter: Alan Manche, Schneider Electric/Square D Co.

Comment on Proposal No: 19-12a

Recommendation: Revise the proposed wording as follows:

547.9(A)(6) Rating.

1) The site-isolating device shall be rated for the calculated load as determined by Part IV of Article 220.

2) The site-isolating device shall have a short circuit rating equal to or greater than the available current at the disconnect.

547.9(A)(7) Overcurrent Protection. The site-isolating device shall not be required to provide overcurrent protection. Overcurrent protection shall be located in accordance with 230.91.

Substantiation: The panel statement for proposal 19-16 was that short circuit current ratings are addressed since it must be pole mounted. The panel's proposal 19-12a unfortunately still permits a double throw switch to be mounted at grade level as is commonly done for a generator connection as noted in proposed 547.9(C) FPN 1 but without any overcurrent protection. When the switch is transferred back to utility power from the generator, the switch operator is placed at risk with the full utility available fault current at his finger tips and no overcurrent protection in the vicinity. Without the appropriate ratings and overcurrent protection, either integral or next to the switch, the ability of the switch to perform safely when subjected to a fault condition becomes questionable.

Similar concerns are shared in Mr. Weakley's affirmative comment.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 19-19.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 7 Negative: 1

Explanation of Negative:

TIPTON: I believe Code-Making Panel 19 has made great strides in improving 547.9. However, I believe we have overlooked the need for overcurrent protection at the pole mounted site isolation device.

I agree with the panel that no substantiation of problems or injuries was submitted. Although after giving the situation more thought, I agree with the submitter that the possibility of fire and injury does exist.

19-21 Log #1910 NEC-P19 **Final Action: Reject**
(547.9(A)(1))

Submitter: Donald R. Offerdahl, North Dakota State Electrical Board
Comment on Proposal No: 19-12a

Recommendation: Revise text to read as follows:

Where required used. A site isolating device shall be permitted to be installed.
Substantiation: I agree with panel member Mr. Weakley on his comments. In discussing with several states at the IAEL Jubilee meeting, this subject was discussed on the floor and a lot of the jurisdictions do not have the authority having jurisdiction on agricultural buildings. This language should be left to the local jurisdictions.

Panel Meeting Action: Reject

Panel Statement: By definition in 547.2, one of the primary purposes of the site isolating device is to provide emergency response units ready access to disconnect the power. The submitter's concerns appear to relate to local practices for underground distribution systems and the need for service rated devices. The panel concludes that service rated devices are needed for grade level equipment for the safety of personnel. See the panel action and statement on Comment 19-18.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-22 Log #3386 NEC-P19 **Final Action: Accept in Principle**
(547.9(A)(7))

Submitter: Bob Fahey Evansville, WI
Comment on Proposal No: 19-12a

Recommendation: Add new Text as follows: 547.9(A)(7) Over current Protection. The site isolating device shall have a short circuit rating equal to or greater than the available short circuit current available from the Utility if the site isolating device is not pole top mounted. The site isolating device shall also have over current protection for any conductors leaving the site isolating device underground. Over current protection shall comply with 240.21 (B)(5) for these underground conductors.

Substantiation: As I stated in my original proposal 19-17, I feel it is important to have over current protection for these conductors before they disappear underground. The farmers/workers typically will not have these customer owned wires located before digging in the earth, therefore, these wires are more likely to be hit by an excavating machine. With the utility wires, these are located by the local Diggers hotline.

Panel Meeting Action: Accept in Principle

Panel Statement: The submitter's concerns are addressed by the panel's action and statement in Comment 19-18. The panel agrees that the requirements in 240.21(B)(5) apply to underground feeder conductors.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-23 Log #918 NEC-P19 **Final Action: Reject**
(547.9(C))

Submitter: Roger O'Neil Sparta, WI
Comment on Proposal No: 19-23

Recommendation: Revise as follows

547.9 Electric Supply to a Building or Structure 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 shall be insulated or covered copper.
Substantiation: Conductors installed underground regardless if in conduit or direct buried are subject to moisture. This could deteriorate the conductor rapidly if exposed to moisture do to damaged insulation or covering and conductor is not copper. The integrity of the grounding system could be lost and not be known. This could create a safety issue if a ground fault would not clear.

Panel Meeting Action: Reject

Panel Statement: The substantiation asserts there are potential problems with underground aluminum conductors in conduit, but does not provide any technical documentation to support the assertion.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-24 Log #1847 NEC-P19 **Final Action: Reject**
(547.10(B))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-10a

Recommendation: Continue to accept the panel action as written.

Substantiation: This comment is in response to the TCC note and the comments in the voting. Heating equipment such as that identified in Proposal 19-25 often relies on a resistive conductor run inside a metallic element, and insulated from the outer element surface by refractory material, typically magnesium oxide. After repeated heating cycles this compound can break down,

resulting in traces of elemental magnesium that eventually cause a ground fault resulting in the failure of the element. This problem is curable by allowing the ends of the elements to breathe slightly; atmospheric oxygen will recombine with the traces of magnesium and restore the insulating qualities of the refractory compound. Unfortunately the air also brings with it some water vapor. Water vapor combines with magnesium oxide to form magnesium hydroxide, which is conductive. When the element is first energized, the heat drives off the water, again restoring the insulating qualities of the refractory material, but not without substantial leakage current during the initial heating process. This current will often trip any Class A GFCI device that is functioning properly. The requirement for GFPE is appropriate and will allow this equipment to function.

Panel Meeting Action: Reject

Panel Statement: After considering the McNeive comment on negative in Proposal 19-10a, the panel agreed that ground fault protection for equipment is not intended to provide protection from electric shock for personnel. See the panel's action and statement on Comment 19-10.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-25 Log #3019 NEC-P19 **Final Action: Accept in Principle**
(547.10(B))

Submitter: Monte Ewing, State of Wisconsin
Comment on Proposal No: 19-10a

Recommendation: Delete the entire paragraph.

Substantiation: This section conflicts with the second and third sentence of 547.10(A). (A) tells us that an FQ plane is required around metal equipment in a feed lot that may become energized. This could be a stock waterer in the middle of a dirt confinement area. Then we read (B) and it says never mind! I feel that the requirements in (A) is all that is required.

Panel Meeting Action: Accept in Principle

Revise the text of 547.10 as proposed in Proposal 19-10a to read: "547.10 Equipotential Planes and Bonding of Equipotential Planes. The installation and bonding of equipotential planes shall comply with 547.10(A) and (B). For the purposes of this section, the term "livestock" shall not include poultry.
(A) Where Required. Equipotential planes shall be installed in all concrete floor confinement areas in livestock buildings, and in all outdoor confinement areas such as feedlots, containing metallic equipment that may become energized and is accessible to livestock. The equipotential plane shall encompass the area where the livestock stands while accessing metallic equipment that may become energized".

Existing 547.10(C) is reidentified as 547.10(B).

Panel Statement: The panel has revised 547.10 to address the concerns expressed in the submitter's substantiation and to clarify the conditions under which an equipotential plane is required.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

ARTICLE 550 — MOBILE HOMES, MANUFACTURED HOMES, AND MOBILE HOME PARKS

19-26 Log #843 NEC-P19 **Final Action: Accept**
(550.3)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 19-28

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Delete 550.3. This will be left as an intentional gap in the numbering sequence.

Panel Statement: The panel accepts the TCC comment and deletes 550.3 from the 2005 NEC.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-27 Log #78 NEC-P19 **Final Action: Reject**
(550.10(C))

Submitter: Dan Leaf Rancho Santa Margarita, CA
Comment on Proposal No: 19-33

Recommendation: Accept proposal.

Substantiation: If this rule is not intended to provide strain relief for the cord, it serves no purpose as configuration of right-angle cord caps are covered by other standards and cannot be controlled by the installer. The cord will hang "freely" with any orientation of cap and receptacle.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its action and statement provided for Proposal 19-33. The submitter has not provided any new technical substantiation that convinces the panel to reverse its original position.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-28 Log #1849 NEC-P19
(550.10(C))

Final Action: Reject

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

Comment on Proposal No: 19-33

Recommendation: Accept the proposal in principle. Revise as follows: "If a right-angle cap is used, the cap shall be configured so the grounding member is furthest from the cord, and the receptacle shall be installed so a right-angle cap so configured will allow the cord to extend directly downward from the cap."
Substantiation: This portion of the rule has never really been intended to address the configuration of the cord cap; it has always been intended to assure that the cord hangs downward. Conventional mobile home service equipment comes with covers that allow right-angle caps to be in use while the cover is closed. This safety feature would be defeated if the receptacle orientation were reversed.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 19-27.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-29 Log #3409 NEC-P19
(550.13(B))

Final Action: Reject

Submitter: Douglas A. Lee, U.S. Consumer Product Safety Commission

Comment on Proposal No: 19-45

Recommendation: This proposal should be rejected.

Substantiation: The panel agrees that the term "GFCI protection for personnel" should be included in the definition since there are various types of GFCI devices. This comment was submitted by a task group of CMP 2.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms that the definition of ground-fault circuit interrupter in Article 100 states that the device is for personnel protection and repeating this throughout the NEC is not necessary.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-30 Log #3410 NEC-P19
(550.13(B))

Final Action: Reject

Submitter: Douglas A. Lee, U.S. Consumer Product Safety Commission

Comment on Proposal No: 19-46

Recommendation: This proposal should be rejected.

Substantiation: See CMP 2 task group recommendation on proposal 19-45. This comment was submitted by a task group of CMP 2.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 19-29.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-31 Log #3421 NEC-P19
(550.25)

Final Action: Reject

Note: It was the action of the Technical Correlating Committee that this comment be reported as "Reject" to correlate with the actions of CMP 2 on Comment 2-107.

Submitter: Joseph A. Ross, Ross Seminars

Comment on Proposal No: 19-57

Recommendation: Revise (B) and add new Exceptions as follows:

All branch circuits that supply ~~±25 120-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).

Exception Nos. 1 and 2: (As accepted by CMP 2 addressing receptacle-type AFCIs, ROP 2-134a) and as accepted by CMP 2 addressing life-support equipment in dwelling unit bedrooms, ROP 2-167).

Exception No. 3: AFCI protection shall not be required for permanently installed alarm systems (fire, smoke, and burglar) in mobile homes and manufactured homes.

Substantiation: See substantiation for companion comments for Proposal Nos. 2-127, 2-134a, and 3-236. This is not new material. It certainly has had Public Review in the ROP and it addresses omissions and correlation (See NFPA Committee Regulations 4-4.6.2.1). Regardless of any Action by CMP 2 on new Exception No. 3, the provisions of 90.3 permit Chapter 5 (Article 550) to amend the general rules of Chapter 2 (Article 210). Alarm systems are life-saving systems. After all, isn't it saving lives that it's all about?

Panel Meeting Action: Hold

Panel Statement: The exceptions proposed by the comment introduce new material that CMP 19 has not had the opportunity to act on and request public comment. The panel intends that the requirements of 550.25 correlate

with those in 210.12. For the 2005 NEC cycle, no technical proposals were received that correlate 550.25 with the proposed changes for 210.12 for the 2005 edition.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-32 Log #1850 NEC-P19
(550.32(A))

Final Action: Accept

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

Comment on Proposal No: 19-62

Recommendation: Further modify the panel action on the proposal by inserting the words "use as" after "suitable for."

Substantiation: The standard industry terminology is "suitable for use as service equipment."

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

ARTICLE 551 — RECREATIONAL VEHICLES AND RECREATIONAL VEHICLE PARKS

19-32a Log #CC1900 NEC-P19 **Final Action: Accept**
(551.1)

Note: 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.

In addition, the Technical Correlating Committee Notes that this Comment relates to Proposal 19-69 and not Proposal 19-10a.

Submitter: Code-Making Panel 19

Comment on Proposal No: 19-10a

Recommendation: Revise the Scope of Article 551 to read:551.1 Scope.

The provisions of this article cover the electrical conductors and equipment other than low-voltage and automotive vehicle circuits or extensions thereof, installed within or on recreational vehicles, the conductors that connect recreational vehicles to a supply of electricity, and the installation of equipment and devices related to electrical installations within a recreational vehicle park. **FPN:** See NFPA 1192-2002, Standard for Recreational Vehicles and ANSI/RVIA 12V, Low Voltage Systems in Conversion and Recreational Vehicles, 2002 edition for information on low-voltage systems.

Substantiation: During the discussion on Comment 19-37, the panel concluded that removing the 12 volt requirements from Article 551 could necessitate a change in the scope of the article. The panel understands that scope provisions are under the purview of the Technical Correlating Committee and recommends this change for the TCC's consideration. The addition of the FPN will provide guidance to the user for locating the requirements formerly contained in this article. This recommended change is contingent on the final outcome of Proposal 19-73 and Comment 19-37.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 3

Explanation of Negative:

LA ROCCA: See my Explanation of Negative Vote on Comment 19-37.

TIPTON: NFPA 70 "The National Electrical Code" should be just that the National Electrical Code. I believe if the scope of the NEC Section 90.2 covers the installation then the requirements for that installation should be in the NEC.

If the Recreational Vehicle Industry Association sees a need to change to the low-voltage and automotive vehicle circuits installations, then they should be submitted to the NEC where the full consensus process can be applied.

The ANSI/RVIA 12V uses a canvass list to develop their standard. I would agree that their canvass list includes a lot of honorable people who should get together and discuss needed changes to their vehicles but then should submit them to the NEC committees.

The only other possibility I see is to ask the Technical Correlating Committee to consider dropping recreational vehicles from Section 90.2.

ZIEMAN: See my explanation of negative votes on Comments 19-34 and 19-37.

19-33 Log #845 NEC-P19
(551.3)

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 19-72

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Delete 551.3. This will be left as an intentional gap in the numbering sequence.

Panel Statement: The panel accepts the TCC comment and deletes 551.3 from the 2005 NEC.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-34 Log #844 NEC-P19
(551.4(B))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 19-68a

Recommendation: See **Technical Correlating Committee note on Proposal 19-73. This action will be considered by the panel as a public comment.**

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See the panel action and statement on Comment 19-37.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 11 Negative: 2

Explanation of Negative:

LA ROCCA: See my Explanation of Negative Vote on Comment 19-37.
ZIEMAN: The committee did NOT adequately consider the comments expressed in the ROP voting as directed to do so by the TCC. The comments pointed out clear technical errors in the ANSI/RVIA 12V Standard yet the committee moved ahead with eliminating all low voltage criteria from Article 551 thus leaving the defective 12V Standard as the only guide. See my explanation of negative vote on Comment 19-37.

19-35 Log #97 NEC-P19
(551.10(A))

Final Action: Reject

Submitter: Dan Leaf Rancho Santa Margarita, CA

Comment on Proposal No: 19-31

Recommendation: Accept the proposal.

Substantiation: The Panel did not address the substantiation which should be judged on its merits not whether application in the field is problematic. When the Code is not clear, resolution is usually by the Authority Having Jurisdiction and may vary widely. The above deck limitation for support requirements may be construed as modifying support requirements of Chapters 1-4. Independent of any "conduit", limits the requirement to one type of raceway. Present wording modifies the provisions of 314.23(D) and (F) and requires direct support of conduit bodies and boxes if above deck level, but not if they are below deck level and contain no connections. The present section does not permit enclosure support in accordance with 314.23(E) and (F) per 90.3.

Panel Meeting Action: Reject

Panel Statement: The submitter is correct that the present wording modifies the provisions of 314.23(D), (E), and (F). The original purpose of this section was to address the very real situations where users of boat slips were using boxes, luminaires, or other types of equipment enclosures as cleats to tie off mooring lines. Where these enclosures were supported by conduits, this action resulted in damage to the equipment. By requiring such enclosures to be supported by structural members, damage is eliminated or minimized. The requirement applies to above-deck installations, since that was where the problems were occurring. The panel notes that the comment is on 555.10(A).

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-36 Log #846 NEC-P19
(551.10(A) Thru (H))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 19-73

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

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12 Negative: 1

Explanation of Negative:

ZIEMAN: See my explanation of negative vote on Comments 19-34 and 19-37.

19-37 Log #3638 NEC-P19
(551.10(A) thru (H))

Final Action: Reject

Submitter: Michael L. Ziemann, RADCO

Comment on Proposal No: 19-73

Recommendation: The committee should reconsider its action and reject this proposal.

Substantiation: All electrical requirements for recreational vehicles including low voltage requirements, belong in the NEC where they have historically been found. The fact that NFPA 1192 no longer references NEC 551.10 for low voltage requirements is an error that the 1192 committee should correct. The ANSI/RVIA Low Voltage Standard is an inferior document developed using the highly questionable canvas method. The committee should ask "why does the RVIA want to bypass the NEC with its robust Panel 19 and instead create their own low voltage standard?"

If they are not trying to hide anything there is no reason why the RV industry cannot continue to work with the NEC to secure up to date and truly consensus requirements for low voltage systems.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its action and statement on Proposal 19-73. The panel does not concur with all of the material provided in the substantiation. The development of standards using the ANSI canvass method is recognized by this panel as a valid consensus process. The panel reaffirms its action and statement on Proposal 19-73.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 10 Negative: 3

Explanation of Negative:

LA ROCCA: I do not agree with all of the material provided in the substantiation for Comment 19-37, however, I cannot support the panel's action.

All NEC Article 551 RV low voltage requirements cannot be deleted at this time without jeopardizing the safety of recreational vehicles. 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 currently contained in ANSI/RVIA 12V-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.

A number of changes were proposed to ANSI/RVIA 12V-2002 that would correlate its requirements with those in 551.10(A) through (H) of the NEC. The actions on those proposals through the canvass method has not been completed. Therefore, maintaining the panel's action on Proposal 19-73 would result in lesser requirements and an increase in the risk of fire.

Specific areas that are not equivalent to the current NEC requirements, and were addressed in the proposals for ANSI/RVIA 12V-2002 are:

Paragraph 3-2 of the 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 Authorities Having Jurisdiction 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 ANSI/RVIA 12V-2002.

TIPTON: See my Explanation of Negative Vote on Comment 19-32a.

ZIEMAN: The comment should have been accepted by the panel. Low voltage requirements for recreational vehicles (RVs) should remain in Article 551 for the following reasons.

I. Improper application/installation of low voltage systems in RVs represent a real life safety issue and, therefore, should continue to be addressed in Article 551.

II. Low voltage requirements for RVs cannot be removed from Article 551 without a change in the scope of the Article. The TCC (Technical Correlating Committee) and the NFPA Standards Council must take action on this issue BEFORE low voltage criteria is removed from Article 551 and thus the NEC.

III. I believe the creation of the ANSI/RVIA 12V standard represents a violation of ANSI procedures. Low voltage requirements for RVs are already covered in Article 551 of the NEC which is an ANSI recognized standard. I believe ANSI procedures prohibit the duplication created when two ANSI standards address the same subject matter/product as is clearly the case here. Low voltage requirements for RVs should remain in Article 551 and the ANSI/RVIA 12V standard should be withdrawn as the former is clearly superior to the latter. The TCC and the NFPA Standards Council need to take action on this issue BEFORE low voltage criteria is removed from Article 551 and thus the NEC.

IV. As pointed out in the comments on the ROP votes on this issue, the ANSI/RVIA 12V standard contains technical errors with potential life safety implications. Therefore, this document should not be allowed to replace the low voltage requirements in Article 551 as some desire.

V. Supporters of removing low voltage criteria from Article 551 have not provided persuasive technical arguments. They point to "potential rapid" changes in RVs and the "slow" three year process of updating the NEC. If this argument was valid, which it is not, it could literally be used to eliminate the entire NEC! Manufacturers have methods available for introducing new technology into their products between NEC code cycles should some become available and desirable. The fact is that industry itself, through its trade association, is the primary enforcer of construction codes and standards.

19-38 Log #453 NEC-P19 **Final Action: Reject**
(551.33 (New))

Submitter: Dan Leaf Rancho Santa Margarita, CA

Comment on Proposal No: 19-78

Recommendation: Accept proposal as applied to motor homes.

Substantiation: A motor home could be construed as a habitation essentially also meeting the definition of a dwelling unit in Article 100. Some may be stationary for extended periods in parks. The requirements in 210.70(A) apply whether or not habitation is continuous, seasonal or intermittent and are safety related. Mobile home occupants merit the same requirements.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its action and statement on Proposal 19-78. The submitter has not provided additional substantiation to cause the panel to reverse its action on Proposal 19-78.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-39 Log #449 NEC-P19 **Final Action: Reject**
(551.41(B) and (C))

Submitter: Dan Leaf Rancho Santa Margarita, CA

Comment on Proposal No: 19-81

Recommendation: Add to (B):

(4) at least one readily accessible 125 volts, 15 or 20 amp receptacle outlet shall be installed on the exterior of a mobile home.

Revise (C): Ground Fault Circuit Interrupter Protection. Where provided Each 125 volt single phase 15 or 20 amp receptacle outlet shall have a Ground Fault Circuit Interrupter Protection for personnel in the following locations:

(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, Exception No. 2, Exception No. 3, no change.

(3) No change from the 1992 NEC.

(4) On the exterior of the vehicle.

Exception: Receptacles that are located inside a compartment with an access panel or door on the exterior of the vehicle to supply power for an installed appliance utilization equipment shall not be required to have a Ground Fault Interruption Protection provided there are no unused receptacles when the utilization equipments are plugged in.

A receptacle outlet shall be permitted in a listed luminaire (lighting fixture). A receptacle shall not be installed in a tub or combination tub shower compartment within 750 mm (30 in.) of a shower or bathtub space. For a motor home receptacles 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 cupboard, or located more than 1.7 m (5.5 ft) above the floor.

Substantiation: There are no requirements for an exterior receptacle for a motor home. However, park trailers are required by 552.41(E) to have one. The word "adjacent" (C)(1) is a vague term to be avoided; proposed wording is specific and includes sinks. Proposed (C)(2) specify kitchen countertops and deletes the distance specification and sink requirement which are not required in 210.8(a). What safety consideration justifies a lesser requirement for recreation vehicles:

Present wording of the last sentence of (C) does not cover a shower only compartment.

A motor home could be construed as a habitation essentially also meeting the definition of a dwelling unit in Article 100. Some may be stationary for extended periods. The requirements in 210.70(A) apply whether or not habitation is continuous, seasonal or intermittent and are safety related.

Mobile homes occupants merit the same requirements.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its action and statement on Proposal 19-81. The submitter has not provided additional substantiation to cause the panel to reverse its action on Proposal 19-81.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-40 Log #1851 NEC-P19 **Final Action: Reject**
(551.46(C)(5) (New))

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

Comment on Proposal No: 19-88

Recommendation: Accept the proposal in principle. Revise as follows: "If a right-angle cap is used, the cap shall be configured so the grounding member is furthest from the cord, and the receptacle shall be installed so a right-angle cap so configured will allow the cord to extend directly downward from the cap."

Substantiation: The cap when inserted should allow the cord to hang downward. Conventional RV site receptacles come with covers that allow right-angle caps to be in use while the cover is closed. This safety feature would be defeated if the receptacle orientation were reversed.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its action and statement provided for Proposal 19-88. The submitter has not provided any new technical substantiation that convinces the panel to reverse its original position.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-41 Log #847 NEC-P19 **Final Action: Accept**
(551.47(P)(1))

Submitter: Technical Correlating Committee on National Electrical Code®

Comment on Proposal No: 19-92

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

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See the panel action and statement on Comment 19-42.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-42 Log #215 NEC-P19 **Final Action: Accept in Principle**
(551.47(P)(1))

Submitter: Bruce Hopkins, RVIA

Comment on Proposal No: 19-92

Recommendation: This proposal should be accepted as originally submitted. **Substantiation:** 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)."

Even though 551.47(P)(1) states all provisions of Article 400 apply, the panel did not discuss the balance of the sentence in 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 in. is not a safety concern. The flexible cable is afforded the same protection as nonmetallic sheathed cable. This includes supports within 8 in. 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.

Panel Meeting Action: Accept in Principle

Revise 551.47(P) to read:

(P) Method of Connecting Expandable Units. The method of connecting expandable units to the main body of the vehicle shall comply with 551.47(P)(1) or (2):

(1) Cord-and-Plug Connected. Cord and plug connections shall comply with (a) through (d).

(a) That portion of a branch circuit that is installed in an expandable unit shall be permitted to be connected to the portion of the branch circuit in the main

body of the vehicle by means of an attachment plug and cord listed for hard usage. The cord and its connections shall conform to all provisions of Article 400 and shall be considered as a permitted use under 400.7. Where the attachment plug and cord are located within the vehicle's interior, use of plastic thermoset or elastomer parallel cord Type SPT-3, SP-3, or SPE shall be permitted.

(b) Where the receptacle provided for connection of the cord to the main circuit is located on the outside of the vehicle, it shall be protected with a ground-fault circuit interrupter for personnel and be listed for wet locations. A cord located on the outside of a vehicle shall be identified for outdoor use.

(c) Unless removable or stored within the vehicle interior, the cord assembly shall have permanent provisions for protection against corrosion and mechanical damage while the vehicle is in transit.

(d) The attachment plug and cord shall be installed so as not to permit exposed live attachment plug pins.

(2) Direct Wired. That portion of a branch circuit that is installed in an expandable unit shall be permitted to be connected to the portion of the branch circuit in the main body of the vehicle by means of flexible cord in accordance with 551.47(P)(2)(a) through (d).

(a) The flexible cord shall be listed for hard usage and for use in wet locations.

(b) The flexible cord shall be permitted to pass through the interior of a wall or through a floor in lengths not to exceed 600 mm (24 in.) before terminating at an outlet.

(c) The flexible cord shall be installed in a nonflexible conduit or tubing that runs continuously from the outlet box inside the recreational vehicle to a strain relief connector listed for use in wet locations that is located on the underside of the recreational vehicle.

(d) The outer jacket of the flexible cord shall not be removed for that portion that is installed in the conduit or tubing.

Panel Statement: The panel has accepted in principle the proposed text and modified the requirements for using flexible cord as a direct connect wiring method for expandable sections. These changes reflect the panel's concern regarding installing flexible cord in a wall without any physical protection. In order to provide a reasonable length to reach an outlet within the unit, the provision for physical protection permits the length to be extended to 24 inches. The panel has also made editorial changes to comply with the NEC Style Manual.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-43 Log #848 NEC-P19
(551.60(B))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 19-100

Recommendation: See Technical Correlating Committee Note on Proposal 19-73. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See panel action and statement on Comment 19-37.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 11 Negative: 2

Explanation of Negative:

LA ROCCA: See my Explanation of Negative Vote on Comment 19-37.

ZIEMAN: See my explanation of negative vote on Comments 19-34 and 19-37.

19-44 Log #75 NEC-P19
(551.71)

Final Action: Reject

Submitter: Andrew Schirmacher, Andrews Electric Inc.

Comment on Proposal No: 19-101

Recommendation: Add text to read as follows:

All branch circuits that supply 125 volt, single-phase, 30 ampere receptacles shall be protected by a listed arc-fault interrupter device.

Substantiation: To supplement my proposal for 210.12(C).

Panel Meeting Action: Reject

Panel Statement: The submitter has not provided any technical substantiation to support the new requirement for arc-fault circuit interrupter protection of 125 volt, single-phase, 30 ampere recreational vehicle site-supply receptacles.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-45 Log #849 NEC-P19
(551.73(A))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 19-107

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel notes that the 9500 VA is a typographical error and the correct value is 9600 VA.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

ARTICLE 552 — PARK TRAILERS

19-46 Log #1852 NEC-P19 **Final Action: Reject**
(552.44(C)(2))

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

Comment on Proposal No: 19-120

Recommendation: Accept the proposal in principle. Revise as follows: "If a right-angle cap is used, the cap shall be configured so the grounding member is furthest from the cord, and the receptacle shall be installed so a right-angle cap so configured will allow the cord to extend directly downward from the cap."

Substantiation: The cap when inserted should allow the cord to hang downward. Conventional park trailer site receptacles come with covers that allow right-angle caps to be in use while the cover is closed. This safety feature would be defeated if the receptacle orientation were reversed.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its action and statement provided for Proposal 19-120. The submitter has not provided any new technical substantiation that convinces the panel to reverse its original position. The panel notes that the proposal this comment is based on is 19-120.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-47 Log #850 NEC-P19
(552.45(A))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 19-121a

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Revise the first sentence to read: "A listed and appropriately rated distribution panelboard shall be used."

Panel Statement: The panel action addresses the concern raised by the Technical Correlating Committee. This section does not address any other equipment.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

19-48 Log #851 NEC-P19
(552.59(B))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 19-129

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel notes that the change (150 mm) effected in the 2005 ROP Draft addresses the concern raised by the Technical Correlating Committee.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 13

ARTICLE 555 — MARINAS AND BOATYARDS

19-49 Log #1853 NEC-P19 **Final Action: Accept in Principle**
(555.19(A)(4))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 19-141

Recommendation: Accept the proposal in principle; revise as follows: "Receptacles that provide shore power for boats shall be single and rated not less than 30 amperes."

Substantiation: Editorial. The phrase "single type" at the end of the sentence is awkward.

Panel Meeting Action: Accept in Principle

Revise 555.19(A)(4) to read: "Shore power for boats shall be provided by single receptacles rated not less than 30 amperes."

Panel Statement: The panel has revised the proposed text to address the concern raised in the comment.

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

19-50 Log #852 NEC-P19 **Final Action: Accept**
(555.21)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 19-142

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the Technical Correlating Committee direction to reconsider their action on Proposal 19-142 and reaffirms its action on that proposal.

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

19-51 Log #853 NEC-P19 **Final Action: Accept**
(555.21)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 19-143

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: See the panel action and statement on Comment 19-52.

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

19-52 Log #2429 NEC-P19 **Final Action: Hold**
(555.21)

Submitter: J. Philip Simmons, Simmons Electrical Services / Rep. National Armored Cable Manufacturers Association

Comment on Proposal No: 19-143

Recommendation: Accept the Proposal in Principle with the changes indicated in the Panel Meeting Action.

Substantiation: The proposal brings improvements to the section that are sorely needed for making safe installations of motor fuel dispensing equipment at marinas and boatyards. The indication is that the proposal was accepted in principle but the language does not appear in the 2005 NEC ROP Draft.

Panel Meeting Action: Hold

Panel Statement: The panel notes that this hold action is on Comment 19-52 and Proposal 19-143. The panel agrees that the concept of the proposal (19-143) is valid and the submitter's concerns that current construction techniques for docks and piers need to be addressed in the Code have merit. However, upon reviewing the proposal, the panel concludes that extensive revisions would be necessary in order to adequately cover all requirements. The comment recommends that the proposal be accepted in principle with the changes indicated in the panel action which were to simply change the term "gasoline dispensing" to Motor Fuel Dispensing". If this were to be done, the original substantiation, which speaks only to gasoline liquid and vapor, would have to be restudied and the text would possibly have to be changed to account for

fuels other than gasoline. CNG for example is lighter than air and the language of proposed 555.21(B)(1) and (2) may have to be modified. Additionally, the proposed language in (B)(1)(a) should be modified to set an upper limit. As written, the text reads, "The space above the surface of the deck shall be a Class I, Division 2 location". How far above the deck does the space extend? Five feet, ten feet, one hundred feet?

Both proposed (B)(1) and (2) reference Table 514.3(B)(1) and since this section now applies to motor fuels not just gasoline, a reference to Table 514.3(B)(2) would need to be made. The panel recommends to the TCC that a task group comprised of members from CMP 19, CMP 14 and the NFPA 303 technical committee be established to study this issue.

Number Eligible to Vote: 9

Ballot Results: Affirmative: 9

ARTICLE 600 — ELECTRIC SIGNS AND OUTLINE LIGHTING

18-71 Log #837 NEC-P18 **Final Action: Accept**
(600)

Note: The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee Accepts the Panel Action.

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 18-106

Recommendation: The Technical Correlating Committee advises that Article Scope statements are the responsibility of the Technical Correlating Committee and the Technical Correlating Committee "Rejects" the Panel Action. 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel has revised the scope of Article 600 as follows, as directed by the TC:

600.1 Scope. This article covers the installation of conductors and equipment for electric signs and outline lighting. All installations and equipment using neon tubing, such as signs, decorative elements, skeleton tubing, or art forms, are covered by this article.

Panel Statement: The panel accepts the Technical Correlating Committee's comment and its direction to make appropriate revisions to the scope.

It is the panel's intent in this scope to reaffirm its comments expressed during the 1996 Code cycle when the fine print note was written and make it clear, regardless of the name or identifier attached to a piece of equipment or installation utilizing neon tubing, that Article 600 applies.

Further, it is the panel's intent to reaffirm its comments expressed during the 1996 Code cycle that within Article 600 where the words "electric sign," "sign," "outline lighting," and/or "outline lighting system" are used these words encompass any use of neon tubing. For example, the definition of Field Installed Skeleton Tubing refers to sign and outline lighting. Neon art forms or decorative elements are subsets of electric signs and outline lighting and as such, if installed and not attached to an enclosure or sign body, are to be considered skeleton tubing for the purpose of applying the requirements contained within Article 600. Conversely, if that neon tubing is attached to an enclosure or sign body, which may be a simple support frame, this use of neon tubing is to be considered a sign or outline lighting and is subject to all the provisions of this article applicable to signs and outline lighting, such as 600.3, which requires listing of this product.

The panel considers art forms and decorative elements to be electric signs as defined in Article 100 because they are symbols designed to convey information or attract attention.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-72 Log #838 NEC-P18 **Final Action: Accept**
(600)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 18-107

Recommendation: 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.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the recommendation and guidance of the TCC. The panel deletes 600.9(E) as shown in the panel action to Proposal 18-107.

Panel Statement: The panel concludes that the reference to hazardous locations is not necessary, since it is inherent in the language of 90.3.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-73 Log #1368 NEC-P18 **Final Action: Reject**
(600)

Submitter: James W. Carpenter, International Association of Electrical Inspectors

Comment on Proposal No: 18-107

Recommendation: Revise item #5 of proposal 18-107 by deleting proposed new section 600-12 and making the following change to the title of Article 600 Part II and 600-30 as indicated:

II. Field-Installed Sign Wiring and Skeleton Tubing
600.30 Applicability

Part II of this article shall apply **only** to field-installed sign wiring and skeleton tubing. These requirements are in addition to the requirements of Part I.

Substantiation: Proposal 18-107 only covers part of the problem that inspectors are experiencing with the installation of field wiring associated with signs and sectional signs. Inspectors need to be able to apply all of the provisions of Article 600 Part II to this field wiring. A TIA with this same wording is currently going through the review process.

Panel Meeting Action: **Reject**

Panel Statement: See the panel action and statement on Comment s 18-103 and 18-101.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-74 Log #1412 NEC-P18 **Final Action: Accept**
(600)

Submitter: Lanny G. McMahon Phoenix, AZ

Comment on Proposal No: 18-106

Recommendation: Continue to reject this proposal.

Substantiation: This proposal is offering to reduce the safety requirements for grounding of electric signs that are supplied by Class 2 power source. Electric signs regardless of the voltage rating, present the potential for a shock hazard for persons coming in contact with the sign. Naturally, the shock hazard is greater where signs are installed in damp and wet locations. It is understood that Class 2 power sources have maximum current limitations, but it should also be understood that the source voltage can range from 0 to 150 volts. In addition, sufficient technical substantiation has not been provided to consider the drastic changes proposed. Therefore, continue to reject this proposal.

Panel Meeting Action: **Accept**

Panel Statement: The panel agrees with the submitter that the grounding of signs supplied by a Class 2 power source is necessary and is required.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-75 Log #3030 NEC-P18 **Final Action: Reject**
(600 and 600-30)

Submitter: Timothy S. Owens, City of San Diego

Comment on Proposal No: 18-107

Recommendation: Revise item No. 5 of proposal 18-107 by deleting proposed new Section 600.12 and making the following changes to the title of Part II and Section 600.30 as indicated:

II. Field-Installed Electric Sign Wiring and Skeleton Tubing
600.30 Applicability.

Part II of this article shall apply to field-installed electric sign wiring and skeleton tubing. These requirements are in addition to the requirements of Part I.

Substantiation: Proposal 18-107 only covers part of the problem experienced by inspectors with the installation of electrical signs. Part I applies to listed signs and sign sections. Part II only applies to skeleton tubing. Many sign installations include field-installed wiring that is not covered by any part of Article 600. In many instances, over 600v wiring is improperly installed by the sign contractor and the only recourse that the inspector has to invoke Section 90.4 to require compliance with Part II Section 90.4 should only be used for true alternative methods and installations; not for normal day-to-day installations. Expanding the applicability of Part II to field installed wiring will provide the inspector with specific wording for safe installations.

Panel Meeting Action: **Reject**

Panel Statement: See the panel action and statement on Comment 18-103.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-76 Log #1347 NEC-P18 **Final Action: Accept in Principle**
(600.1)

Submitter: Stephen G. Kieffer, Kieffer & Co., Inc.

Comment on Proposal No: 18-106

Recommendation: Revise 600.1 to read:

600.1 Scope. This article covers the installation of conductors and equipment for electric signs and outline lighting as defined in Article 100 and neon art forms.

Delete the fine print note.

Substantiation: This change would accomplish the intent of the code panel's action on Proposal 18-106, and solve the objection by and comply with the instructions of the Technical Correlating Committee.

Panel Meeting Action: **Accept in Principle**

Panel Statement: See the panel action and statement on Comment 18-71.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-77 Log #1859 NEC-P18 **Final Action: Accept in Principle**
(600.1)

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

Comment on Proposal No: 18-106

Recommendation: Accept Section 1 of the proposal in principle. Revise the scope by deleting the fine print note and rewording as follows:

This article covers the installation of conductors and equipment for electric signs and outline lighting as defined in Article 100. This article also covers the installation of neon tubing used for art forms or for decorative elements.

Substantiation: This wording makes any fine print note unnecessary. With the exception of decorative elements or art forms, the existing note covers material squarely included in the existing Article 100 definitions of electric signs and outline lighting. This comment moves the other two items into the scope itself. Note that LED illumination sources as intended to be used in Article 600 are already included in the existing wording of the Article 100 definition of electric signs, because it is not written in a way that excludes limited energy illumination sources.

Panel Meeting Action: **Accept in Principle**

Panel Statement: See the panel action and statement on Comment 18-71.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-78 Log #3067 NEC-P18 **Final Action: Reject**
(600.1, FPN)

Submitter: Randall K. Wright, RKW Consulting / Rep. United States Sign Council

Comment on Proposal No: 18-106

Recommendation: The proposal should be rejected allowing the Fine Print Note to remain as it exists.

Substantiation: The existing Fine Print Note is clear and descriptive.

Panel Meeting Action: **Reject**

Panel Statement: See the panel action and statement on Comment 18-71.

The panel does not concur that the existing FPN is clear and descriptive. With direction of the TCC, the panel has eliminated the FPN and reworded the scope of Article 600.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-79 Log #772 NEC-P18 **Final Action: Accept in Principle in Part**
(600.2.Section Sign (New))

Note: The Technical Correlating Committee directs that the word "listed" be deleted from the definition. The use of the word "listed" in the definition violates Section 2.2.2 of the NEC Style Manual.

In order to retain the panel's intent on requiring that section signs be listed, the Technical Correlating Committee directs that 600.3 be revised to include "section signs" as follows:

"600.3 Listing, Electric signs, section signs, and outline lighting -- fixed, mobile, or portable -- shall be listed and installed in conformance with that listing, unless otherwise approved by special permission."

Submitter: Michael J. Johnston Plano, TX

Comment on Proposal No: 18-107

Recommendation: This proposal was submitted as a revision to Article 600 but actually includes many new requirements and should be identified as such. I would respectfully encourage the panel to reconsider its action to accept this new definition as proposed. Revise the new proposed definition as follows: Section Sign(s) A sign consisting of preassembled sections (subassemblies) which, when connected in the field, form a complete sign. (Note: This is the current definition of this term that is provided in the Glossary of UL 48)

Substantiation: The proposed definition of the term "section sign" is not consistent with the terms used in the UL White Book or the product standard. The term "Listed sign section" is consistent with the term used in UL 48. Listed sign sections can be shipped to a jobsite and assembled to form a complete sign and then installed as a single unit (assembled sections) and con-

nected to a branch circuit. There are also listed sign sections that are intended to be installed in place as separate sections of the overall sign but also require field installed wiring (usually secondary circuits) from remote power supplies or transformer(s) and also between the sections. The definition should be consistent with currently defined and used terms in the product standard (UL 48 Section 3.27). I do agree that the concept of "listed sign section" should be defined and used in the Code, however there are currently no instances of its use in any rules in Article 600 or elsewhere in the NEC, other than the term used in a proposal. The term "parts" as used in the proposed definition is vague in nature and can mean many different things to different individuals and could lead to enforcement issues. The term section(s) or subassemblies are more appropriate because these terms are used in the UL White Book and in the product standard. The proposed definition indicates that the sections are shipped which is generally the case, but this may not be applicable in all cases. Not all section signs require field-installed wiring as indicated in the proposed definition. Some listed sign sections only require electrical connections between subassemblies after all sections are mechanically fastened together to form a single enclosure. This type of listed sign section requires no field-installed wiring. The definition as proposed indicates that all section signs require field-installed wiring which is not true in all cases.

Panel Meeting Action: Accept in Principle in Part

Revise the definition of "Section Sign" in Proposal 18-107 to read as follows: Section Sign. A listed sign or outline lighting system, shipped as subassemblies, that requires field-installed wiring between the subassemblies to complete the overall sign.

Panel Statement: The submitter has properly identified that the definition should reference "subassemblies" rather than "parts," and the panel revised the definition in accordance with the intent of the submitter.

The panel rejects the recommendation to replicate the UL 48 definition. The UL 48 definition is antiquated and incomplete. The panel's action on this comment will enable appropriate changes in UL 48. To have replicated the old UL 48 definition in the Code would prohibit such changes.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-80 Log #3069 NEC-P18
(600.2.Section Sign)

Final Action: Reject

Submitter: Randall K. Wright, RKW Consulting / Rep. United States Sign Council

Comment on Proposal No: 18-107

Recommendation: I would agree, a definition is needed for a section sign; although, I would encourage the panel to use the existing definition in UL 48 and other publications and websites, which have used the same definition for clarity.

Section Sign: A sign consisting of preassembled sections (for shipping purpose) which, when connected in the field, for a complete sign.

Substantiation: Industry, manufacturers, educators, and inspectors are working very hard to all speak the same language and refer to things with clarity and consistency. I would encourage the panel to be consistent with all the printed documents now in use.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-79.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-81 Log #1411 NEC-P18
(600.2-Section Sign)

Final Action: Reject

Submitter: Lanny G. McMahon Phoenix, AZ

Comment on Proposal No: 18-107

Recommendation: Reject the definition of "Section Sign".

Substantiation: The addition of the term "section sign" solves nothing and simply adds redundancy to the article. Electric signs are required to be "listed and installed in conformance with that listing". The listing requires that the sign be complete before it is shipped from the factory and that it be provided with installation instruction. This requirement applies to all signs regardless of whether they are shipped in sections and/or segments. In addition, the term is currently not used in Article 600. Therefore, this would appear to be an effort to circumvent the "listed and installed in conformance with that listing" requirement. I believe this is an effort to fix something that is not broken. Adding the term "section sign" will only send the message that a list sign is not required to be a complete assembly. If that is the intent of this proposal, instead of adding redundancy to the article, it would seem just as easy to delete the "listing" requirement and "approved by special permission" allowance. This would appear to meet the intent of what is really being proposed here.

Panel Meeting Action: Reject

Panel Statement: The panel concludes that this definition is not redundant. The panel's action on Proposal 18-107 has added the term "section sign" in 600.12. Therefore a definition is required.

See the panel action and statement on Comments 18-79 and 18-97.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-82 Log #3693 NEC-P18
(600.2 Section Sign)

Final Action: Reject

Submitter: Herbert Moulton, Masters Technology Inc.

Comment on Proposal No: 18-107

Recommendation: New test definition as follows: Section sign(s): a sign consisting of preassembled sections (sub-assemblies) which when field assembled form a completed sign. Note: This definition is written in the glossary of UL Standard 48.

Substantiation: The definition, as proposed, relating to "section sign(s)" is in conflict with the terminology used in the UL White Book. The term "listed sign section" is used in UL Standard 48.

Listed sign sections may be shipped to a job site and assembled to form a complete sign and labeled electric sign as per code requirement.

This completed unit would be installed and field wired to meet code requirements and manufacturer's instruction sheets.

The field wiring performed on each labeled sign section is not included with the listing (see letter from UL) to complete the finished sign.

The letter, provided by UL, clarifies their position as to the jurisdiction of the listing.

This policy is concurrent with other recognized NRTLs.

The proposed new text will be in harmony with UL Standard 48 Section 3.27 and the UL White Book.

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

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-79.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-83 Log #839 NEC-P18
(600.3(C) (New))

Final Action: Accept

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 18-110

Recommendation: **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.**

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

The panel accepts the recommendation of the TCC.

Revise 600.24 of Proposal 18-110 to read as follows:

"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 725.41. "

Panel Statement: The panel revised 600.24 to refer to a specific section in Article 725.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-84 Log #3077 NEC-P18
(600.3(C))

Final Action: Reject

Submitter: Randall K. Wright, RKW Consulting / Rep. United States Sign Council

Comment on Proposal No: 18-110

Recommendation: I would suggest the panel reject this proposal.

Substantiation: Unfortunately, the panel was not furnished adequate information on these low voltage products. The products are only recognized as components and can be used in a listed sign without any code change. The code is not a manufacturing standard but an installation guideline. I do agree low voltage (LEDs) may have a place in our industry as the product becomes refined, but would need to be placed in Part II for field installed wiring. The panel may wish to add in the power supply area a section for class two "listed" power supplies if in the future they become available.

Today the products are only a "bag of parts" and require complete field installation. Curiously, I do not see any proposal by the major manufacturers to be included at this time.

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

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-83.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-85 Log #3415 NEC-P18 **Final Action: Reject**
(600.7)

Submitter: Stephen G. Kieffer, Kieffer & Co., Inc.

Comment on Proposal No: 18-106

Recommendation: Revise 600.7 to read as originally proposed:
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.

Substantiation: The panel's action in 18-106 as well as its referenced action in 18-110 does not address the issue of grounding sections of a section sign that only contain Class 2 circuits. Article 725 does not address this product specific issue. The original proposal should be accepted.

Panel Meeting Action: Reject

Panel Statement: The panel concludes that grounding for Class 2 wiring systems is required by the provisions of Article 250, has not been modified by the provisions of Article 725 and, therefore, is required for signs with Class 2 power sources. See panel action and statement on Comment 18-74.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-86 Log #1860 NEC-P18 **Final Action: Accept in Principle in Part**
(600.8)

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

Comment on Proposal No: 18-107

Recommendation: Revise certain panel actions on this proposal as follows:

1. For 600.8, revise to read as follows: "Live parts, including live parts of lamps and neon tubing, shall be enclosed. Transformers or electronic power supplies provided with integral enclosures that include primary and secondary circuit splicing compartments shall be permitted without additional enclosures."

2. Delete 600.9(E).

3. Revise 600.12 to read: "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."

Substantiation: 1. The present language and the panel action text apparently apply the term "live parts" in a manner that is inconsistent with the definition in Article 100. A live part is an energized conductive component. For example, an incandescent lamp has (while in use) a live part (its base) and a much larger portion that is not live, its bulb. Therefore it is incorrect to refer to a lamp as a live part even though a portion of it will be live in use. It is unlikely to be intended that the energized bases of lamps be permitted to be without any enclosure. The proposed language in this comment conforms the usage to common sense and the terms in Article 100. The transformer and electronic power supply equipment has been editorially changed to refer to "compartments". This term is a better descriptor because it does not duplicate the term "enclosure" and therefore avoids confusion because the compartment can be set off as a portion of the integral enclosure.

2. There is no conflict between provisions in Article 600 and hazardous (classified) location wiring requirements in Chapter 5 that require arbitration. This provision is unnecessary.

3. This wording corrects two errors in the original panel action, correctly identified in the voting. The rules need to point to requirements below 1000 volts, and the rule should not be avoidable by using unlisted products.

Panel Meeting Action: Accept in Principle in Part

Panel Statement: The panel does not accept item number 1 of the recommendation since no technical substantiation was provided for the placement of the sources of illumination inside of enclosures.

The panel accepts item number 2 of the recommendation. See the panel action and statement on Comment 18-72.

The panel accepts in principle item number 3 of the recommendation. See panel action and statement on Comment 18-97.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-87 Log #3071 NEC-P18 **Final Action: Accept**
(600.8)

Note: The Technical Correlating Committee directs that a comma be added after "Live Parts" in the first sentence and after "splice enclosure" in the second sentence.

The Technical Correlating Committee has corrected the grammar in the panel action.

Submitter: Randall K. Wright, RKW Consulting / Rep. United States Sign Council

Comment on Proposal No: 18-107

Recommendation: If it is the intention of the panel to remove the exception, but not change the rules, you need to reword the section.

600.8 Enclosures. Live parts other than lamps, and neon tubing shall be enclosed. Transformers and power supplies provided with an integral enclosure, including a primary and secondary circuit splice enclosure shall not require an additional enclosure.

sure, including a primary and secondary circuit splice enclosure shall not require an additional enclosure.

Substantiation: The proposed text would require an additional enclosure that the exception allowed.

Panel Meeting Action: Accept

Revise panel action in Proposal 18-107 for 600.8 to read as follows:

600.8 Enclosures. Live parts other than lamps, and neon tubing shall be enclosed. Transformers and power supplies provided with an integral enclosure, including a primary and secondary circuit splice enclosure shall not require an additional enclosure.

Panel Statement: The panel recognizes that the panel action in Proposal 18-107 did not provide good usability and accepts the submitter's recommendation because it is more usable.

The panel disagrees with the submitter's substantiation that an additional enclosure would be required.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-88 Log #1348 NEC-P18 **Final Action: Reject**
(600.9)

Submitter: Stephen G. Kieffer, Kieffer & Co., Inc.

Comment on Proposal No: 18-107

Recommendation: Regarding the TCC Action: Their statement concerning the panel action creating a new 600.9 (E).

Substantiation: The International Sign Association supports this panel action. This addition to Article 600 is highly important to ensure communications, understanding and compliance with the NEC. Signs and outline lighting are infrequently installed in hazardous locations. Most sign installations are accomplished by specialized technicians. Individuals who would not normally be accustomed to the requirements for hazardous location installations. Notification of those requirements in Article 600 will enhance public safety.

Panel Meeting Action: Reject

Panel Statement: The submitter provided no recommendation or substantiation as required by the Regulations on Committee Projects (4-4.5(c)). Also see the panel action and statement on Comment 18-72.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-89 Log #770 NEC-P18 **Final Action: Reject**
(600.9(E))

Submitter: Michael J. Johnston Plano, TX

Comment on Proposal No: 18-107

Recommendation: Continue to accept this proposal in part. Revise the proposed language of new 600.9(E) as follows:

Hazardous (Classified) Locations. Electric signs and outline lighting installed in hazardous (classified) locations shall conform to the applicable requirements of Articles 500 through 517 in addition to the requirements of this article.

Substantiation: The current wording as proposed addresses the equipment for use in and needs to address the installation of equipment in a hazardous (classified) location. The suggested wording in the comment is generally consistent with references to installations in hazardous (classified) locations that are provided in other Chapter 6, 7, and 8 articles.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-72.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-90 Log #1422 NEC-P18 **Final Action: Accept**
(600.9(E))

Submitter: Lanny G. McMahon Phoenix, AZ

Comment on Proposal No: 18-107

Recommendation: Reject this new section.

Substantiation: The text is unnecessary and redundant. NEC Chapters 5 through 7 supplement or modify chapters 1 through 4. Chapter 5 addresses specific requirements for "Special Occupancies", and Chapter 6 addresses specific requirements for "Special Equipment". Special equipment installed in "special occupancies" must comply with the requirements of Chapter 5. This applies to any special equipment (Chapter 6 articles) installed in special occupancies (Chapter 5 articles). Therefore, this new section is unnecessary and redundant.

Panel Meeting Action: Accept

Panel Statement: See the panel action and statement on Comment 18-72.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-91 Log #3070 NEC-P18
(600.9(E)) **Final Action: Reject**

Submitter: Randall K. Wright, RKW Consulting / Rep. United States Sign Council

Comment on Proposal No: 18-107

Recommendation: I would suggest for this document we refer to “electric signs” and not signs in general.

(E) Hazardous Locations. In addition to the requirements of Article 600, electric signs and outline lighting systems installed in hazardous (classified) locations shall comply with the requirements of Articles 500 through 517.

Substantiation: The code should be clear on exactly what they wish to regulate. Adding the word electric is done for clarity. I believe this does not change the panel’s intent.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-72.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-92 Log #3696 NEC-P18
(600.9(E)) **Final Action: Reject**

Submitter: Herbert Moulton, Masters Technology Inc.

Comment on Proposal No: 18-107

Recommendation: Accept his proposal in part. Revise language 600.9 as follows: Hazardous (classified) locations. Electric signs and outline lighting installed in hazardous locations shall be installed in accordance with articles 500 through 517 in addition to requirements set forth in this article.

Substantiation: The proposal addresses equipment for use and not the installation procedure in a hazardous (classified) location. The proposed wording would be consistent with references to installations in hazardous (classified) locations provided in chapters 6, 7, and 8 articles.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-72.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-93 Log #788 NEC-P18
(600.11 (New)) **Final Action: Accept**

Submitter: Michael J. Johnston Plano, TX

Comment on Proposal No: 18-107

Recommendation: This portion of this proposal (new 600.11 Installation Instructions) should be rejected.

Substantiation: Installation instructions and compliance therewith for listed equipment is a general requirement of the NEC already in Chapter 1 which has general application in Article 600. Section 110.3(B) already provides the rules for installation instructions. Installation instructions for field-installed skeleton tubing and outline lighting are not needed as those installations are generally required to meet the installation rules of the NEC. The requirement for instructions for listed section signs is a requirement of the product standard (UL 48) as well as NEC 110.3(B). This proposed section is not necessary.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-94 Log #1410 NEC-P18
(600.11) **Final Action: Accept**

Submitter: Lanny G. McMahon Phoenix, AZ

Comment on Proposal No: 18-107

Recommendation: Reject new Section “600.11 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.”

Substantiation: This text is unnecessary and redundant. 600.3 requires the sign to be “listed and installed in conformance with that listing”. 110.3(B) Installation and Use, requires “listed or labeled equipment shall be installed and used in accordance with any instructions included in the listing or labeling”. So, this requirement is already covered in the code. In the addition, a listed sign is required to be shipped with the manufacturer’s installation instructions - this is in accordance with the requirement of 600.3. Also, it should be noted that the term “section signs” (plural for some reason?) is not currently used in Article 600. The term “section signs” adds nothing to the article. A section sign is theoretically a sign as it is part of an overall sign assembly or complete sign.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-95 Log #3697 NEC-P18
(600.11 (Installation Instructions) (New)) **Final Action: Accept**

Submitter: Herbert Moulton, Masters Technology Inc.

Comment on Proposal No: 18-107

Recommendation: The following portion of this proposal (new 600.11 installation instructions) should be deleted.

Substantiation: Installation instructions for listed equipment is a general requirement in article 110.3(B). Field installed skeleton tubing and outline lighting require no installation instructions as they are already governed by the code as per Section 600.3(A) and is a requirement of UL Standard 48. This proposed section is unnecessary.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-96 Log #771 NEC-P18
(600.12) **Final Action: Reject**

Submitter: Michael J. Johnston Plano, TX

Comment on Proposal No: 18-107

Recommendation: Reject adding 600.12 (Field-Installed Secondary Wiring) as proposed in Proposal 18-107.

Substantiation: There are proposals in place that address the applicability deficiencies that are not addressed effectively by the last two sentences of proposal 18-107. See proposal 18-116 and 117 for additional information.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-103.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-97 Log #1349 NEC-P18
(600.12) **Final Action: Accept**

Submitter: Stephen G. Kieffer, Kieffer & Co., Inc.

Comment on Proposal No: 18-107

Recommendation: Revise proposed 600.12 to read:

Field Installed Secondary Wiring: The field installed secondary circuit wiring of section signs shall comply with 600.31 if 1000 volts or less, or 600.32 if over 1000 volts.

Substantiation: This change in the panel action will correct the omission of lower voltage requirements identified by several panel members and the TCC in their comments.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-98 Log #3066 NEC-P18
(600.12) **Final Action: Reject**

Submitter: Randall K. Wright, RKW Consulting / Rep. United States Sign Council

Comment on Proposal No: 18-107

Recommendation: Reject the addition off: 600.12-Field-Installed-Secondary-Circuit-Wiring. The field installed secondary wiring of listed section signs shall comply with 600.32.

Substantiation: I would encourage the panel to reject this portion of the proposal. Adding this section does not allow the access to Part II, which is needed by the inspection community to inspect field wiring. This is to include all field wiring, not just Listed Section Signs which UL has confirmed, in writing, that they (UL) are not responsible for the field wired portion. Field wiring includes many parts, all of which are described in Part II. I encourage the panel to endorse a Tentative Interim Amendment, introduced by myself and the United States Sign Council to correct the problem.

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

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-101.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-99 Log #3414 NEC-P18
(600.24) **Final Action: Reject**

Submitter: Stephen G. Kieffer, Kieffer & Co., Inc.

Comment on Proposal No: 18-110

Recommendation: Modify the proposed text to read: Class 2 Power Sources. In addition to the requirements of Article 600, signs and outlines lighting systems supplied by Class 2 transformers, power supplies, and power sources shall comply with Part I and Part III of Article 725.

Substantiation: This change solves the conflict identified by the TCC between the Panel's action and the NEC Style Manual while retaining the intent of the Panel's action. This addition to Article 600 is highly important to ensure communications, understanding and compliance with the NEC. Signs and outline lighting infrequently utilize low voltage lighting. Most sign installations are accomplished by specialized technicians. Individuals who would not normally be accustomed to the requirements for low voltage circuits. Notification of those requirements in Article 600 will enhance public safety.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-83.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-100 Log #1407 NEC-P18 **Final Action: Reject**
(600.24(G))

Submitter: Lanny G. McMahon Phoenix, AZ

Comment on Proposal No: 18-110

Recommendation: Reject this new section.

Substantiation: The text is unnecessary and redundant. NEC Chapters 5 through 7 supplement or modify Chapters 1 through 4. Chapter 7 addresses specific requirements for "Special Conditions", and Chapter 6 addresses specific requirements for "Special Equipment". Special equipment installed under "special conditions" must comply with the requirements of Chapter 7. This applies to any special equipment (Chapter 6 articles) installed under special conditions (Chapter 7 articles). Therefore, this new section is unnecessary and redundant.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-83.

The panel modified 600.24 to refer to a specific section in Article 725, in keeping with the NEC Style Manual.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-101 Log #3072 NEC-P18 **Final Action: Reject**
(600.30)

Submitter: Randall K. Wright, RKW Consulting / Rep. United States Sign Council

Comment on Proposal No: 18-116

Recommendation: The panel should accept this Proposal in Principle, reject their actions in 18-107 and revise the wording of Part II as follows:

II. Field-Installed Sign Wiring and Skeleton Tubing

600.30 Applicability. Part II of this article shall apply only to field-installed sign wiring and skeleton tubing. Those requirements are in addition to the requirements of Part 1.

Substantiation: Since UL has presented in writing their position that all field wiring will be the responsibility of the local Authority Having Jurisdiction, Part II of the article is needed in its entirety for the inspection of electric signs requiring any field wiring. The panel should support this action as well as the current Tentative Interim Amendment presented to accomplish the same.

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

Panel Meeting Action: Reject

Panel Statement: The submitter failed to provide complete information regarding the requirements of UL 48. The submitter failed to provide the UL bulletin dated 4/11/03, which clearly states those requirements and disproves the claims in the comment and the TIA. The documents provided with the referenced TIA do not provide technical substantiation for this change.

In addition, see panel action and statement in Comment 18-103.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-102 Log #3076 NEC-P18 **Final Action: Reject**
(600.30)

Submitter: Randall K. Wright, RKW Consulting / Rep. United States Sign Council

Comment on Proposal No: 18-117

Recommendation: The panel should accept this Proposal in Principle, reject their actions in 18-107 and revise the wording of Part II as follows:

II. Field-Installed Sign Wiring and Skeleton Tubing.

600.30 Applicability. Part II of this article shall apply only to field-installed sign wiring and skeleton tubing. These requirements are in addition to the requirements of Part 1.

Substantiation: Since UL has presented in writing their position that all field wiring will be the responsibility of the local Authority Having Jurisdiction, Part II of the article is needed in its entirety for the inspection of electric signs requiring any field wiring. The panel should support this action as well as the current Tentative Interim Amendment presented to accomplish the same.

I agree with the electrical inspector's request and the panel should reconsider their actions based on the current facts presented.

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

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-101

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-103 Log #3692 NEC-P18 **Final Action: Reject**
(600 Part II)

Submitter: Herbert Moulton, Masters Technology Inc.

Comment on Proposal No: 18-107

Recommendation: Present wording: ~~H-field-installed skeleton tubing.~~ New text: Field installed secondary circuit wiring.

Substantiation: This verbiage clarifies the applicability of Section 600.31 thru Section 600.42 for all field wiring of signs listed or not. The panel is to be commended in their action to correct this problem in the code. I believe the suggested text will resolve any concerns in field wiring of signs.

Panel Meeting Action: Reject

Panel Statement: Part II of Article 600 does not apply to listed signs or outline lighting nor does the panel intend for this to occur. Part II of Article 600 only contains requirements for unlisted field-installed skeleton tubing, as clearly stated in 600.30. This was the specific intent of the panel during the 1996 Code cycle.

Listed signs and outline lighting which require field connection of subassemblies are required by UL 48, the standard for signs and outline lighting, to include installation instructions. UL has reaffirmed this in their bulletin dated 4/11/03. These instructions contain the necessary information for completion of the listed product, including the connection and wiring of subassemblies. These instructions are required by UL 48 to be supplied with the listed product. Section 110.3(B) of the Code requires installation in accordance with those instructions. This provides all the information necessary in addition to the Code for the installer and AHJ to ensure compliance with UL 48 and the Code.

Failure to provide or comply with the required installation instructions is a violation of the listing and the Code. In such an instance, this means that the signs or outline lighting is not listed. It is not the panel's intent to provide information in the Code which would enable installation or inspection of unlisted signs or outline lighting that are not field installed skeleton tubing.

In addition, see panel action and statement in Comment 18-71 which modifies the scope of Article 600 to clearly indicate the inclusion of art forms and decorative elements as types of signs. When these types of signs are skeleton tubing and not listed, Part II of Article 600 applies.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-104 Log #3694 NEC-P18 **Final Action: Reject**
(600 Part II)

Submitter: Herbert Moulton, Masters Technology Inc.

Comment on Proposal No: 18-107

Recommendation: Reject adding 600.12 (field installed secondary wiring) as proposed in proposal 18-107.

Substantiation: There are other proposals submitted which address the problem which industry has identified. The problem, as identified, has not been addressed adequately in the last two sentences of this proposal. See proposals 18-116 and 18-117 for additional information.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-103.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-105 Log #3695 NEC-P18 **Final Action: Reject**
(600.30)

Submitter: Herbert Moulton, Masters Technology Inc.

Comment on Proposal No: 18-107

Recommendation: 600.30 Applicability: Part II of this article shall apply only to field installed skeleton tubing. Revised Text: Part II of this article shall apply to all field wiring of signs.

Substantiation: The proposed revised text will solve the problem as outlined by the code panel. This permits the AHJ to administer Sections 600.31 thru 600.42 to all signs. Signs which require field wiring of secondary circuitry (i.e., window signs, unlisted signs, outline lighting etc.) would be subject to the requirements of the above sections.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-103.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-106 Log #3689 NEC-P18 **Final Action: Reject**
(600 Part II)

Submitter: Herbert Moulton, Masters Technology Inc.

Comment on Proposal No: 18-110

Recommendation: 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.

I respectfully request the panel consider the following revised text: 600.24 low voltage power sources, Class 1, Class 2 and Class 3 power sources and wiring used in signs and outline lighting shall comply with Article 725.

Substantiation: The proposed submitted refers to Class 2 power sources only in various sections of Article 600. This is very confusing to understand and interpret. The proposed text will allow easy reference to the requirements of all low voltage systems. The inclusion of the additional Classes, 1 and 3, may in the near future, be used by manufacturers in the development of new lighting systems.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-83.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-107 Log #790 NEC-P18 **Final Action: Reject**
(600 Part II and 600-30)

Submitter: Michael J. Johnston Plano, TX

Comment on Proposal No: 18-117

Recommendation: Continue to accept in principle and revise test as follows:

II. Field-Installed Sign Wiring and Skeleton Tubing

600.30 Applicability. Part II of this article shall apply ~~only~~ to field-installed sign wiring and skeleton tubing. These

requirements are in addition to the requirements of Part I.

Substantiation: As currently provided in the NEC, the requirements of Part II can only be applied to "field-installed skeleton tubing" installations. This is a limitation and does not allow the Part II to be used for installations other than "field-installed skeleton tubing". The requirements for field-installed secondary wiring, electrode connections, and neon tubing need to apply to all installations that include field-installed secondary circuits and wiring as part of a sign or others. Also from an enforcement standpoint, the inspector needs to be able to apply the rules of Part II where installations require approval(s) under "special permission". Inspectors are currently using the requirements of Part II in this manner as a common practice because it is the only location in Article 600 where the rules are found. There are many unique field-installed neon installations that require application of the requirements in Part II of Article 600, and as it is currently structured, these rules are limited in application. This revision is needed to resolve enforcement and applicability limitations and is the cleanest way to revise this section in the interest of users from an understandability standpoint.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement on Comment 18-103.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-108 Log #3075 NEC-P18 **Final Action: Reject**
(600.31(B))

Submitter: Randall K. Wright, RKW Consulting / Rep. United States Sign Council

Comment on Proposal No: 18-117a

Recommendation: Panel proposal should be rejected. Wording "for the purpose" should not be deleted.

Substantiation: The panel should reconsider their actions to remove the wording "for the purpose". Products used in the electric sign industry need to be parts and products manufactured and tested for use in the industry. Many years of work went into changing the past requirements to an acceptable level, which included adding this language to caution inspection and follow up to look at the products conditions of acceptability. Removing this language will again allow the misuse of listed products. Many products are listed and can substitute for use when the conditions of acceptability are not considered.

Panel Meeting Action: Reject

Panel Statement: In accordance with the TCC Usability Task Force Guidelines, the term "for the purpose" must include a specific definition of the purpose or should not be used. The panel concludes that the intent of "listed" is clear in this section and therefore this term is not necessary.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-109 Log #3584 NEC-P18 **Final Action: Reject**
(600.31(B))

Submitter: Herbert Moulton, Masters Technology Inc.

Comment on Proposal No: 18-117a

Recommendation: Reject panel proposal. The wording "for the purpose" should remain and not be deleted.

Substantiation: The panel's action to delete the wording "for the purpose" will remove the requirement that a product must be used in accordance with its listing. By this action, the misuse of listed products and conditions of acceptability will be ignored. The deleted verbiage was put in the NEC 1996 Edition specially to control the proper use of products in accordance with their listing.

Panel Meeting Action: Reject

Panel Statement: In accordance with the TCC Usability Task Force Guidelines, the term "for the purpose" must include a specific definition of the purpose or should not be used. The panel concludes that the intent of "listed" is clear in this section and therefore this term is not necessary.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-110 Log #789 NEC-P18 **Final Action: Reject**
(600.32(G))

Submitter: Michael J. Johnston Plano, TX

Comment on Proposal No: 18-107

Recommendation: The revisions to Section 600.32(G) under proposal 18-107 should be rejected.

Substantiation: The revision to this section as proposed removes a requirement for a minimum of 100 mm (4 in.) of length of conductor insulation on where conductors extend from conduits or other raceways in wet locations without technical substantiation. The substantiation provided is directed to improvements in a product (GTO cable) and not to how it is installed. How it is installed is directly related to high voltage tracking issues. This section should remain because it deals with minimum requirements for GTO cable installations. Tracking events associated with GTO insulation and spacing are a principle cause of fire from these types of installations. This revision would also cause an inconsistency between the minimum spacing specified in UL 48 Section 20.2.5 and Table 20.2 and the NEC which are currently the same in both standards.

Panel Meeting Action: Reject

Panel Statement: In 2001, UL 814, Gas-Tube-Sign and Ignition Cable, was extensively changed and now includes a "Surface Leakage Test" which assures that there are no arc-tracking issues in wet locations with GTO cable. Therefore, the reduction to 2-1/2 inches is justified.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-111 Log #1408 NEC-P18 **Final Action: Reject**
(600.32(G))

Submitter: Lanny G. McMahon Phoenix, AZ

Comment on Proposal No: 18-107

Recommendation: Reject the change of deleting the 100 mm (4 in.) requirement in damp or wet locations.

Substantiation: This change reduces the length that the insulated conductor shall extend beyond the metal conduit or tubing from 100 mm (4 in.) to 65 mm (2-1/2 in.) in damp and wet locations. This is less restrictive. Minimum spacing requirements are critical for the installation of GTO cable due to corona and tracking concerns. For obvious reasons, spacing is much more critical in damp and wet locations. This less restrictive change should be rejected, as I see no technical substantiation to support it at this time. The substantiation simply states, "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". This major change was based on this minimum substantiation? At least provide sufficient technical substantiation to justify this drastic change and provide it for the public to see and evaluate. Reject this change.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement in comment 18-110.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-112 Log #3068 NEC-P18 **Final Action: Reject**
(600.32(G))

Submitter: Randall K. Wright, RKW Consulting / Rep. United States Sign Council

Comment on Proposal No: 18-107

Recommendation: I would encourage the panel to reject this proposal.

Substantiation: High voltage installations react differently in dry locations as opposed to damp and wet. Changing clearances without some testing and

substantiation is not prudent. I have tested the new integral sleeve wire based on this proposal and find that it will fail when moisture is introduced to the test. The photos I provided show arc tracked wire when it is located within 2-1/2 in. from some ground plane. Also in the photo is a 4 in. piece of the same wire that is not arc tracked during the same test. Changing the requirements that exist will only increase the number of fires. Secondary circuit ground fault transformers will not detect an open circuit arc or arc in a circuit where the ground plane is different from the case of the transformer. I strongly encourage the panel to reject this proposal.

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

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement in comment 18-110.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-113 Log #3691 NEC-P18
(600.32(G))

Final Action: Reject

Submitter: Herbert Moulton, Masters Technology Inc.

Comment on Proposal No: 18-107

Recommendation: Revisions to 600.32(G) be rejected.

Substantiation: As submitted, this proposal deletes the requirement in a (wet location) for a minimum of 100 MM (4 in.) of conductor insulation extension from the termination of a conduit or other raceways in a wet location. The substantiation provided by the applicant refers to improvements in (GTO Cable) insulation and not how it is installed in the field.

This is the only conductor, that I am aware of, that produces corona which is present to the touch when energized.

As a member of the S.T.P. panel Standard UL 814, I have brought this matter to the attention of UL's personnel. There is no requirement in the Standard 814 for any testing related to corona discharge problem.

This problem still exists with this conductor, including the newest group being manufactured. The tracking issue is directly related to how GTO Cable is installed and not an insulation issue.

These minimum spacing requirements are especially needed in a wet location, due to environmental conditions. Heat and cold may result in the creation of moisture within the wiring system, which leads to arcing at the point of egress into an enclosure for termination.

Additionally, UL Standard 48 requires these spacings under Section 20.2.5 and table 20.2.

Panel Meeting Action: Reject

Panel Statement: See the panel action and statement in comment 18-110.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-114 Log #1861 NEC-P18
(600.32(H))

Final Action: Reject

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

Comment on Proposal No: 18-118a

Recommendation: The proposal should be accepted in principle. Revise as follows: "Conductors shall be permitted to run between the ends of neon tubing, or to the secondary circuit midpoint return of transformers or listed electronic power supplies. The transformer or electronic power supply used for this connection shall be listed and shall be provided by their manufacturer with terminals or leads at the midpoint."

Substantiation: Editorial. The panel action literally requires midpoint conductors to be provided with terminals or leads. The concepts are more clearly conveyed as two sentences.

Panel Meeting Action: Reject

Panel Statement: The panel action in Proposal 18-118a did not change the words in 600.32(H), which refer to terminals and leads. The panel action deleted "for the purpose" and made no other change. Therefore, the comment did not address the panel action and is rejected.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-115 Log #3073 NEC-P18
(600.32(H))

Final Action: Reject

Submitter: Randall K. Wright, RKW Consulting / Rep. United States Sign Council

Comment on Proposal No: 18-118a

Recommendation: Panel proposal should be rejected. Wording "for the purpose" should not be deleted.

Substantiation: The panel should reconsider their actions to remove the wording "for the purpose". Products used in the electric sign industry need to be parts and products manufactured and tested for use in the industry. Many years of work went into changing the past requirements to an acceptable level, which included adding this language to caution inspection and follow up to look at the

products conditions of acceptability. Removing this language will again allow the misuse of listed products. Many products are listed and can substitute for use when the conditions of acceptability are not considered.

Panel Meeting Action: Reject

Panel Statement: In accordance with the TCC Usability Task Force Guidelines, the term "for the purpose" must include a specific definition of the purpose or should not be used. The panel concludes that the intent of "listed" is clear in this section and therefore this term is not necessary.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-116 Log #3586 NEC-P18
(600.32(H))

Final Action: Reject

Submitter: Herbert Moulton, Masters Technology Inc.

Comment on Proposal No: 18-118a

Recommendation: Reject panel proposal. The wording "for the purpose" should remain and not be deleted.

Substantiation: The panel's action to delete the wording "for the purpose" will remove the requirement that a product must be used in accordance with its listing. By this action, the misuse of listed products and conditions of acceptability will be ignored. The deleted verbiage was put in the NEC 1996 Edition specifically to control the proper use of products in accordance with their listing.

Panel Meeting Action: Reject

Panel Statement: In accordance with the TCC Usability Task Force Guidelines, the term "for the purpose" must include a specific definition of the purpose or should not be used. The panel concludes that the intent of "listed" is clear in this section and therefore this term is not necessary.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-117 Log #3074 NEC-P18
(600-42(D)(g))

Final Action: Reject

Submitter: Randall K. Wright, RKW Consulting / Rep. United States Sign Council

Comment on Proposal No: 18-119a

Recommendation: Panel proposal should be rejected. Wording "for the purpose" should not be deleted.

Substantiation: The panel should reconsider their actions to remove the wording "for the purpose". Products used in the electric sign industry need to be parts and products manufactured and tested for use in the industry. Many years of work went into changing the past requirements to an acceptable level, which included adding this language to caution inspection and follow up to look at the products conditions of acceptability. Removing this language will again allow the misuse of listed products. Many products are listed and can substitute for use when the conditions of acceptability are not considered.

Panel Meeting Action: Reject

Panel Statement: In accordance with the TCC Usability Task Force Guidelines, the term "for the purpose" must include a specific definition of the purpose or should not be used. The panel concludes that the intent of "listed" is clear in this section and therefore this term is not necessary.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

18-118 Log #3585 NEC-P18
(600-42(D)(g))

Final Action: Reject

Submitter: Herbert Moulton, Masters Technology Inc.

Comment on Proposal No: 18-119a

Recommendation: Reject panel proposal. The wording "for the purpose" should remain and not be deleted.

Substantiation: The panel's action to delete the wording "for the purpose" will remove the requirement that a product must be used in accordance with its listing. By this action, the misuse of listed products and conditions of acceptability will be ignored. The deleted verbiage was put in the NEC 1996 Edition specifically to control the proper use of products in accordance with their listing.

Panel Meeting Action: Reject

Panel Statement: In accordance with the TCC Usability Task Force Guidelines, the term "for the purpose" must include a specific definition of the purpose or should not be used. The panel concludes that the intent of "listed" is clear in this section and therefore this term is not necessary.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

ARTICLE 604 — MANUFACTURED WIRING SYSTEMS

19-53 Log #2424 NEC-P19 **Final Action: Reject**
(604.4)

Submitter: J. Philip Simmons, Simmons Electrical Services / Rep. National Armored Cable Manufacturers Association

Comment on Proposal No: 19-148

Recommendation: Locate the following text from the existing 604.6(A)(3) on flexible cord as a new Exception No. 3 and delete the text from 604.6(A)(3):

Exception No. 3: Flexible cord supplied as part of the manufactured wiring system shall be permitted when making a transition between components of a manufactured wiring system and utilization equipment, other than luminaires (fixtures), that are 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.

Substantiation: The existing Section 604.6(A)(3) is under 604.6 with a bold face title "Construction." However, the existing section includes installation requirements that are not appropriate there.

This Comment simply moves the portion of the requirement here where installation requirements are located.

A companion Comment is made to delete appropriate text from Section 604.6(A)(3).

Since this is existing text, moving it to this appropriate location should not be considered a new concept.

Panel Meeting Action: Reject

Panel Statement: The text proposed in the comment permits the use of flexible cord in unrestricted lengths as a manufactured wiring system component. There was no technical substantiation provided to support expanding the use of flexible cord. Additionally, the panel does not concur with the submitter's substantiation that it is necessary to relocate this material.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-54 Log #3016 NEC-P19 **Final Action: Reject**
(604.6(A)(1))

Submitter: Thomas E. Trainor, City of San Diego

Comment on Proposal No: 19-151

Recommendation: Reconsider and accept this proposal.

Substantiation: I respectfully request the panel to reconsider its action on this proposal and vote to accept. As a former codemaking panel member, I know that the TCC continuously advises panels not to write code which mandates a particular type of construction. The code should clearly identify the required result and electrical equipment that meets those results should be permitted regardless of how it is constructed.

In this case, the requirement is simply to provide an acceptable equipment grounding conductor. There are no special requirements or unusual needs in this application. There are metal clad cables with an armor that provides an acceptable equipment grounding conductor. These tested and listed cables are recognized in 250.118. Rather than mandating a specific type of equipment grounding conductor, 604 should accept all recognized equipment grounding conductors. In response to the comments in the panel statement:

1) There is a grounding terminal in each fitting of a manufactured wiring system. If the equipment grounding conductor is a wire, it will be connected to this terminal. If the equipment grounding conductor is the metal armor of a cable, it will be connected to this terminal. Frequent relocation, unplugging and plugging back in, will have absolutely no impact on this connection. Regardless of the type of construction when the fitting is connected, the equipment grounding conductor will be connected.

2) The fact that Manufactured wiring Systems were originally constructed with a separate equipment grounding conductor simply relates to the wiring methods available when these systems were developed. It is only one method of meeting the basic requirement to provide an equipment grounding conductor in the circuit. When other methods are available, they should also be acceptable and not prohibited simply because they are new or different. The code requirements in 604 should be consistent with 250.118 and permit any acceptable method of providing an equipment grounding conductor. Your favorable reconsideration of this proposal is appreciated.

Panel Meeting Action: Reject

Panel Statement: The fact that the manufactured wiring system is designed to be relocated more often than a permanently installed system requires a higher level of equipment grounding integrity. These systems are frequently moved around as part of a building renovation project. This requirement helps ensure that the equipment grounding connection is maintained under those conditions where the armor of a cable assembly or the connections of the cable assembly to manufactured wiring system components are damaged.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

19-55 Log #2425 NEC-P19 **Final Action: Reject**
(604.6(A)(3))

Submitter: J. Philip Simmons, Simmons Electrical Services / Rep. National Armored Cable Manufacturers Association

Comment on Proposal No: 19-154

Recommendation: Delete the indicated text from the existing 604.6(A)(3): 604.6(A)(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.~~ [ROP 19-154]

Substantiation: The existing Section 604.6(A)(3) is under 604.6 with a bold face title "Construction." However, the existing section includes installation requirements that are not appropriate there.

A companion Comment is made to locate the deleted text to Section 604.4 which covers "Uses Permitted" where installation requirements are located.

Since this is existing text, moving it to the appropriate location should not be considered a new concept.

Panel Meeting Action: Reject

Panel Statement: The current requirement enhances usability by providing all of the requirements for flexible cord use in one requirement.

Number Eligible to Vote: 8

Ballot Results: Affirmative: 8

ARTICLE 605 — OFFICE FURNISHINGS (CONSISTING OF LIGHTING ACCESSORIES AND WIRED PARTITIONS)

18-119 Log #1862 NEC-P18 **Final Action: Accept**
(605.6)

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

Comment on Proposal No: 18-120a

Recommendation: Correct the tense of the verb "originated" to the present tense "originates".

Substantiation: Editorial; this is grammatically correct and in accord with the Style Manual preference.

Panel Meeting Action: Accept

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-120 Log #1863 NEC-P18 **Final Action: Accept**
(605.7)

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

Comment on Proposal No: 18-121

Recommendation: Correct the tense of the verb "originated" to the present tense "originates".

Substantiation: Editorial; this is grammatically correct and in accord with the Style Manual preference.

Panel Meeting Action: Accept

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-121 Log #96 NEC-P18 **Final Action: Reject**
(605.8(C))

Submitter: Dan Leaf Rancho Santa Margarita, CA

Comment on Proposal No: 18-123

Recommendation: Accept the proposal.

Substantiation: The panel statement that the building load calculations are in accordance with the requirements for the separate circuit does not clarify how the load is to be calculated. What are the requirements? If not based on the number of partition receptacles, on the supply receptacle outlet at 180 va? Is the calculation to be 2400 va for a 20-ampere circuit and 1800 va for a 15-ampere circuit? Thirteen receptacle outlets are permitted with no distinction whether single or quadripex receptacles are used. 220.3(B)(9) indicates a different computed load for such receptacles, which applies for other office installations. The 13 outlets are permitted whether the supply circuit is 15 or 20 ampere rated. What is the justification for the limitation to 15 ampere rated receptacles if the supply circuit 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) is plugged. The number of receptacles in the partitions does not enter into the load calculation.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

18-122 Log #388 NEC-P18 **Final Action: Reject**
(605.8(C))

Submitter: Dan Leaf Rancho Santa Margarita, CA
Comment on Proposal No: 16-23
Recommendation: Accept proposal.
Substantiation: See original substantiation. The panel statement indicated a building load is in accordance with the separate circuit supplying the receptacle. If not in accordance with 220.3, what requirements? Statement did not address load calculation to be applied where not plug-connected (permanently connected).
Panel Meeting Action: Reject
Panel Statement: The submitter's substantiation refers to permanently connected partitions, while the referenced proposal deals with cord and plug connected partitions.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

18-123 Log #2864 NEC-P18 **Final Action: Reject**
(605.8(C))

Submitter: Charles M. Trout, Maron Electric Co. Inc.
Comment on Proposal No: 18-123
Recommendation: This proposal should be accepted.
Substantiation: The panel should visit the substantiation again. The panel statement that "The number of receptacles in the partitions does not enter into the load calculation" further substantiates the submitter's substantiation that this section is virtually meaningless. Each receptacle outlet could have 4 or more receptacles totaling 52 or more receptacles on this circuit.
Panel Meeting Action: Reject
Panel Statement: The submitter has submitted no substantiation to support this change.
Number Eligible to Vote: 10
Ballot Results: Affirmative: 10

ARTICLE 610 — CRANES AND HOISTS

12-5 Log #2398 NEC-P12 **Final Action: Accept**
(610.11(E)(2))

Submitter: James M. Daly, General Cable
Comment on Proposal No: 12-8
Recommendation: The Proposal should be Rejected.
Substantiation: I concur with the Panel Action and Statement.
Panel Meeting Action: Accept
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-6 Log #1973 NEC-P12 **Final Action: Reject**
(610.12(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-9
Recommendation: The proposal should be rejected.
Substantiation: In this instance, an actual wiring method transition is being recognized, as opposed to the subject of Proposal 12-7 where the term "exposed" is more appropriate. The existing text should be retained.
Panel Meeting Action: Reject
Panel Statement: The panel agrees with the submitter that an actual wiring method transition is being recognized; however, the term "exposed" is more appropriate as substantiated in Proposal 12-9.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-7 Log #1975 NEC-P12 **Final Action: Reject**
(610.12(A))

Submitter: Frederic P. Hartwell, Hartwell Electrical Services, Inc.
Comment on Proposal No: 12-10
Recommendation: The proposal should be rejected.
Substantiation: In this instance, an actual wiring method transition is being recognized, as opposed to the subject of Proposal 12-7 where the term "exposed" is more appropriate. The existing text should be retained.
Panel Meeting Action: Reject
Panel Statement: The panel agrees with the submitter that an actual wiring method transition is being recognized; however, the term "exposed" is more appropriate, as substantiated in Proposal 12-10.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-8 Log #446 NEC-P12 **Final Action: Reject**
(610.14(A))

Submitter: Dan Leaf Rancho Santa Margarita, CA
Comment on Proposal No: 12-11
Recommendation: Accept the proposal.
Substantiation: 310.15(B)(4) indicates a neutral shall not be required to be counted when applying Table 310.15(B)(2)(a). The heading for Table 610.14(A) requires the neutral if present to be counted. There doesn't appear to be a reason to count a neutral in a crane and hoist application.
Panel Meeting Action: Reject
Panel Statement: The intent of the heading of the table is to indicate that there are two conditions shown in the table.
One condition is up to 3 (simultaneously energized) ac conductors, with Note 2 being applicable for from 4 to 6 simultaneously energized 125°C (257°F) ac power conductors, and the second condition is up to 4 (simultaneously energized) dc conductors, with Note 1 being applicable for from 5 to 8 simultaneously energized power conductors. This table relates to short-time rated crane and hoist motors and a neutral conductor is not present. The table uses the term "simultaneously energized" rather than "current-carrying".
Number Eligible to Vote: 13
Ballot Results: Affirmative: 13

12-9 Log #926 NEC-P12 **Final Action: Reject**
(610.61)

Submitter: Dorothy Kellogg, American Chemistry Council
Comment on Proposal No: 12-15
Recommendation: The **Final Action** should be reject.
Substantiation: The submitter has not provided that a problem exists with the existing language. The existing language allows the installer to use metal to metal contact via the wheels etc. to provide an acceptable ground. By going to the new wording, the code would require an additional conductor to be installed. This would be an unnecessary expense.
Panel Meeting Action: Reject
Panel Statement: The current text recognizes the ever present possibility for paint or other insulating materials to prevent reliable metal to metal contact between the bridge and trolley wheels and their respective tracks and provides a requirement for a separate bonding conductor to be installed if reliable metal to metal contact is not assured. The submitter of Proposal 12-15, a participant in the crane and hoist industry, proposed that the only way to assure this necessary bonding is by requiring the use of a separate grounding conductor in lieu of reliance on metal to metal contact between the bridge and trolley wheels and their respective tracks.
The panel agrees with the substantiation for this requirement.
Number Eligible to Vote: 13
Ballot Results: Affirmative: 12 Negative: 1
Explanation of Negative:

JONES: This comment should have been accepted because the submitter of Proposal 12-15 did not provide any substantiation to document a problem with the current code language. 610.61 presently requires the entire crane to be grounded in accordance with Article 250. This section also states that if local conditions prevent reliable metal-to-metal contact, a separate bonding conductor shall be provided.

The panel statement that "The submitter of Proposal 12-15, a participant in the crane and hoist industry..." is not documentation of a problem with current code requirements. This is the weakest substantiation for a code change I have ever seen Panel 12 accept.

12-10 Log #3275 NEC-P12 **Final Action: Accept in Part**
(610.61)

Submitter: Thomas M. Burke, Underwriters Laboratories Inc.
Comment on Proposal No: 12-15
Recommendation: The original wording in Proposal 12-15 should be revised as follows to reflect both the CMP 12 and TCC actions:
610-61 Grounding. All exposed noncurrent-carrying metal parts of cranes, monorail hoists, hoists, and accessories, including pendant controls, shall be metallically joined together into a continuous electrical conductor so that the entire crane or hoist will be grounded in accordance with Article 250. Moving parts, other than removable accessories or attachments that have metal-to-metal bearing surfaces shall not be considered to be electrically connected to each other through bearing surfaces for grounding purposes. The trolley frame and bridge frame shall not be considered as electrically grounded through the bridge and trolley wheels and its respective tracks. ~~unless local conditions, such as paint or other insulating material, prevent reliable metal to metal contact. In this case, a separate bonding conductor shall be provided. A separate grounding conductor shall be provided.~~
Substantiation: When the TCC rejected 12-15 in accordance with the reasons outlined under 12-1, it was apparently rejected based solely on the fact that the originally proposed word "grounding" in the last sentence was changed by

CMP 12 to the words “equipment bonding” without consideration that CMP 12 also had accepted another part of the proposal in Principle in Part. After taking into account the TCC instruction to change the wording in the last sentence back to “grounding conductor,” we believe it was the intent of CMP 12 to accept the original proposal as presented above.

Panel Meeting Action: Accept in Part

In the last sentence of the proposed wording of the comment, the panel does not accept the word “grounding”.

The last sentence will now read:

“A separate bonding conductor shall be provided.”

The panel accepts the remainder of the comment.

Panel Statement: The term “bonding conductor” is the proper term for this conductor.

Number Eligible to Vote: 13

Ballot Results: Affirmative: 12 Negative: 1

Explanation of Negative:

WHITE: The ACC is recommending that the proposal be Rejected because the existing language allows a fourth wire, if the situation is such that the wheels are not properly maintained. The presenter did not offer sufficient substantiation that a problem exists with the existing language. Why make this mandatory?

**ARTICLE 620 — ELEVATORS, DUMBWAITERS, ESCALATORS,
MOVING WALKS, WHEELCHAIR LIFTS,
AND STAIRWAY CHAIR LIFTS**

12-10a Log #CC1200 NEC-P12 **Final Action: Accept**
(620.2)

Note: The Technical Correlating Committee understands that the panel action is accepting the proposal text with the revision of the Title and the text of the definition by deleting “material lift”.

Submitter: Code-Making Panel 12

Comment on Proposal No: 12-19

Recommendation: Delete “material lift”.

Substantiation: Material lift does not fall within the scope of Article 620. To comply with Section 2.2 of the NEC Style Manual, the panel has removed “material lift” from the definition in Proposal 12-19.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

12-11 Log #429 NEC-P12 **Final Action: Accept in Principle**
(620.2.-Control Room, Elevator, Dumbwaiter)

Note: The Technical Correlating Committee understands that the panel action is accepting the proposal text with the revision of the Title and the text of the definition by deleting “material lift”.

Submitter: Michael V. Glenn, Longview Fibre Co.

Comment on Proposal No: 12-16

Recommendation: Reject this proposal.

Substantiation: I request the panel reconsider and reject this proposal. The proposed definition expands the scope of this article to include material lifts. At the very least, materials lifts should be removed from the definition. In our industrial facility, we have many different kinds of materials lifts that do not fall into the category of elevators, dumbwaiters, escalator, moving walks, wheelchair lifts, and stairway chair lifts. These installations fall under other sections of the code. The submitter’s substantiation does not support such a broad change in the scope of this article and does not reference any existing safety hazards or problems that would support such a change.

Panel Meeting Action: Accept in Principle

Revise the definition to read as follows:

“Control Room (for Elevator, Dumbwaiter).”

Panel Statement: The submitter is correct. The panel’s acceptance of the new definitio, which includes material lifts, does not correlate with 620.1.

Material lifts are not included in the scope of Article 620. Proposal 12-16 did not include any substantiation that would support the inclusion of material lifts into the scope of Article 620.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

12-12 Log #635 NEC-P12 **Final Action: Accept**
(620.2.Control Room, Elevator, Dumbwaiter, Material Lift)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 12-16

Recommendation: The Technical Correlating Committee understands that the Panel’s intent was to only modify the term being defined and to accept the remainder of the proposal. The Technical Correlating Committee directs the panel to rewrite the definition to eliminate the contained requirement not permitted by 2.2.2 of the NEC Style Manual. This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the Technical Correlating Committee to rewrite the definition.

See panel action and statement on Comment 12-11.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

12-13 Log #430 NEC-P12 **Final Action: Accept**
(620.2.-Control Space, Elevator, Dumbwaiter)

Note: The Technical Correlating Committee understands that the panel action is accepting the proposal text with the revision of the Title and the text of the definition by deleting “material lift”.

Submitter: Michael V. Glenn, Longview Fibre Co.

Comment on Proposal No: 12-17

Recommendation: Delete “Material Lift”.

Substantiation: I request the panel reconsider and delete “material lift” from this proposal. The proposed definition in 12-17 expands the scope of this article to include material lifts. At the very least, material lifts should be removed from the definition. In our industrial facility we have many different kinds of materials lifts that do not fall into the category of elevators, dumbwaiters, escalators, moving walks, wheelchair lifts, and stairway chair lifts. These installations fall under other sections of the code. The submitter’s substantiation does not support such a broad change in the scope of this article and does not reference any existing safety hazards or problems that would support such a change.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

12-14 Log #634 NEC-P12 **Final Action: Accept**
(620.2.Control Space, Elevator, Dumbwaiter, Material Lift)

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 12-17

Recommendation: The Technical Correlating Committee understands that the Panel’s intent was to only modify the term being defined and to accept the remainder of the proposal. The Technical Correlating Committee directs the panel to rewrite the definition to eliminate the contained requirement not permitted by 2.2.2 of the NEC Style Manual.

This action will be considered by the panel as a public comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the Technical Correlating Committee to rewrite the definition.

See panel action on Comment 12-13.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

12-15 Log #431 NEC-P12 **Final Action: Accept**
(620.2.-Machinery Space, Elevator)

Note: The Technical Correlating Committee understands that the panel action is accepting the proposal text with the revision of the Title and the text of the definition by deleting “material lift”.

Submitter: Michael V. Glenn, Longview Fibre Co.

Comment on Proposal No: 12-18

Recommendation: Delete “Material Lift”.

Substantiation: I request the panel reconsider and delete “material lift” from this proposal. The proposed definition in 12-17 expands the scope of this article to include material lifts. At the very least, material lifts should be removed from the definition. In our industrial facility we have many different kinds of materials lifts that do not fall into the category of elevators, dumbwaiters, escalators, moving walks, wheelchair lifts, and stairway chair lifts. These installations fall under other sections of the code. The submitter’s substantiation does not support such a broad change in the scope of this article and does not reference any existing safety hazards or problems that would support such a change.

Panel Meeting Action: Accept

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

12-16 Log #703 NEC-P12 **Final Action: Reject**
(620.5)

Submitter: Andy Juhasz, KONE Inc.

Comment on Proposal No: 12-20

Recommendation: It is requested that the panel reconsider its action and accept Proposal 12-20.

Substantiation: The panel statement for rejection stated that “Electrical equipment will not be raised beyond the reach of the maintenance personnel.” But strict adherence to the requirements of 110.26(E) do indeed create situations

wherein electrical equipment is placed needlessly out of the reach of the maintenance personnel, and then would require them to use ladders to gain access to the equipment. The drawings I have provided depict such situations.

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

Panel Meeting Action: Reject

Panel Statement: The panel does not agree that the requirements of 110.26(E) apply to electrical equipment, other than the equipment listed in 110.26(E).

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

12-17 Log #121 NEC-P12 **Final Action: Reject**
(620.22(A))

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

Comment on Proposal No: 12-23

Recommendation: Accept in Principle but with the addition, after "...interrupter" of "that also serves any other loads."

Substantiation: So long as the GFCI serves no other loads, if it trips it probably is protecting the users of the required lighting. Uninterrupted operation of that lighting is not as critical as, for example, fire pumps, nor even as critical as general required egress passageway lighting.

Panel Meeting Action: Reject

Panel Statement: The intent of Proposal 12-23 was that car lights and car top lighting will not be supplied from a GFCI protected circuit. The panel action addressed the concerns of the submitter.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

12-18 Log #2952 NEC-P12 **Final Action: Reject**
(620.37(D))

Submitter: Thomas F. Norton, Norel Service Co. Inc.

Comment on Proposal No: 12-26

Recommendation: Add a new 620.37(D) to read as follows:

"Wiring connecting The Fire Alarm Recall Outputs to The Elevator Control System shall be kept within The Elevator Machine Room, The Elevator Control Room or The Elevator Control Space."

Substantiation: I have included revised text proposed by some members of the ASME A-17 Emergency Operations Committee. The Panel 12 committee in their substantiation stated that "this issue is already covered in NFPA 72-2003 and therefore does not need to be included in the NEC." The fact is that the NEC is adopted throughout the country, while NFPA 72 is adopted only in some jurisdictions. Wiring requirements are the jurisdiction of the NEC. Having enforceable text in the NEC permits the AHJ to ensure a proper installation, which is important for protection of property and life safety.

Panel Meeting Action: Reject

Panel Statement: The panel reaffirms its position that this issue is already covered in the 2002 edition of NFPA 72, National Fire Alarm Code. The panel does not see the necessity of including this material in the NEC. This is an issue of supervision and training.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

ARTICLE 625 — ELECTRIC VEHICLE CHARGING SYSTEM EQUIPMENT

12-19 Log #1929 NEC-P12 **Final Action: Accept in Principle**
(625.25)

Submitter: James M. Imlah, City of Hillsboro

Comment on Proposal No: 12-34

Recommendation: Revise text to read as follows:

Panel Meeting Action: Accept in Principle
Revise the wording of the current code text to read as follows:
"625.25 Loss of Primary Source.

Means shall be provided such that, upon loss of voltage from the utility or other electric system(s), energy cannot be back fed through the electric vehicle and the supply equipment to the premises wiring system, unless permitted by 625.26."

Substantiation: This is an editorial correction for words where the intent is unclear and the style manual. Please remove the words "such that" to help clarify the intended article change.

Panel Meeting Action: Accept in Principle

Revise the wording of the recommended wording in the comment to read as follows:

"625.25 Loss of Primary Source.

Means shall be provided that upon loss of voltage from the utility or other electric system(s), energy cannot be back fed through the electric vehicle and the supply equipment to the premises wiring system unless permitted by 625.26."

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

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

12-20 Log #636 NEC-P12 **Final Action: Accept**
(625.26 (New))

Submitter: Technical Correlating Committee on National Electrical Code®
Comment on Proposal No: 12-35

Recommendation: The Technical Correlating Committee directs that the Action on this Proposal be rewritten to comply with 4.1.1 of the NEC Style Manual that references shall not be made to an entire article unless additional conditions are specified. References to parts or sections of an Article are permitted. In addition, the panel is directed to address the use of the term "and/or". This action will be considered by the Panel as a Public Comment.

Substantiation: This is a direction from the National Electrical Code Technical Correlating Committee in accordance with 3-4.2 and 3-4.3 of the Regulations Governing Committee Projects.

Panel Meeting Action: Accept

Panel Statement: The panel accepts the direction of the Technical Correlating Committee to reconsider their action on Proposal 12-35 as it relates to the Style Manual and takes the following action:

Revise the wording in the panel action on Proposal 12-35 to read as follows:
"625.26 Interactive Systems. Electric vehicle supply equipment and other parts of a system, either on-board or off-board the vehicle, which are identified for and intended to be interconnected to a vehicle and also serve as an optional standby system or an electric power production source or provide for bi-directional power feed shall be listed as suitable for that purpose. When used as an optional standby system, the requirements of Article 702 shall apply and when used as an electric power production source the requirements of Article 705 shall apply."

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

ARTICLE 630 — ELECTRIC WELDERS

12-21 Log #511 NEC-P12 **Final Action: Reject**
(630.3)

Submitter: Wayne Hoffman, ESAB Welding & Cutting Products

Comment on Proposal No: 12-37

Recommendation: Revise the proposal to read:

630.3 Classification of Location. Equipment constituting a welding or cutting system that, under normal operation, would contain flammable gases or gas mixtures shall be considered to be an unclassified location as defined in 500.2. A welding or cutting system that requires flammable gases or gas mixtures for normal or recommended operation shall not change the classification, as defined in Article 500, of the location in which it has been placed.

Substantiation: There is a huge base of welding and cutting systems using flammable gases installed in industrial facilities throughout the country. While these systems, which are approved, recognized and/or listed with safety certification agencies, have an excellent record of safety, there is a risk that an inspector may consider the area in which a system is installed to be a hazardous location. In such a case, the inspector would mandate that the facility follow the restrictive provisions of Chapter 5. This may lead the facility to remove these systems, possibly replacing them with other non-optimal systems that might compromise safety. Proposal 12-37 will, therefore, allow safe welding/cutting systems to be used without obstacles imposed by inspection authorities. If this proposal is not accepted, there is a risk of broader confusion in the field wherein facilities, when faced with installation decisions, may make incorrect evaluations of system application and use. In such cases, a safe, optimal welding/cutting system might not be specified and installed for an application requiring it.

Proposal 12-37 does not in any way call for changes to Chapter 5. It merely refers to Article 500 which contains the definition of a hazardous location. In addition, the proposal is worded to address only welding/cutting systems using flammable gases and not to impact any other installed equipment in a given location.

Panel Meeting Action: Reject

Panel Statement: Classification of locations relating to flammable gases or gas mixtures is covered in 500.5. The submitter has offered no definitive substantiation that there is a need for a classification of location section in Article 630 to modify the rules in 500.5.

The proposal offers no substantiation relating to greater safety, but instead the change would relax existing rules which the panel contends would be counterproductive to the purpose of the Code.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-22 Log #517 NEC-P12 **Final Action: Reject**
(630.3)

Submitter: Gregory Baeten, Miller Electric Mfg. Co.

Comment on Proposal No: 12-37

Recommendation: Revise the proposal to read:
630.3 Classification of Location. Equipment constituting a welding or cutting system that, under normal operation, would contain flammable gases or gas mixtures shall be considered to be an unclassified location as defined in 500.2. A welding or cutting system that requires flammable gases or gas mixture for normal or recommended operation shall not change the classification, as defined in Article 500, of the location in which it has been placed.

Substantiation: There is a huge base of welding and cutting systems using flammable gases installed in industrial facilities throughout the country. While these systems, which are approved, recognized and/or listed with safety certification agencies, have an excellent record of safety, there is a risk that an inspector may consider the area in which a system is installed to be a hazardous location. In such a case, the inspector would mandate that the facility follow the restrictive provisions of Chapter 5. This may lead the facility to remove these systems, possibly replacing them with other non-optimal systems that might compromise safety. Proposal 12-37 will, therefore, allow safe welding/cutting systems to be used without obstacles imposed by inspection authorities. If this proposal is not accepted, there is a risk of broader confusion in the field wherein facilities, when faced with installation decisions, may make incorrect evaluations of system application and use. In such cases, a safe, optimal welding/cutting system might not be specified and installed for an application requiring it.

Proposal 12-37 does not in any way call for changes to Chapter 5. It merely refers to Article 500 which contains the definition of a hazardous location. In addition, the proposal is worded to address only welding/cutting systems using flammable gases and not to impact any other installed equipment in a given location.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 12-21.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-23 Log #2998 NEC-P12 **Final Action: Reject**
(630.3)

Submitter: Frank Stupczy, Lincoln Electric Co.

Comment on Proposal No: 12-37

Recommendation: Revise the proposal to read:
630.3 Classification of Location. Equipment constituting a welding or cutting system that, under normal operation, would contain flammable gases or gas mixtures shall be considered to be an unclassified location as defined in 500.2. A welding or cutting system that requires flammable gases or gas mixtures for normal or recommended operation shall not change the classification, as defined in Article 500, of the location in which it as been placed.

Substantiation: There is a huge base of welding and cutting systems using flammable gases installed in industrial facilities throughout the country. While these systems, which are approved, recognized and/or listed with safety certification agencies, have an excellent record of safety, there is the risk that an inspector may consider the area in which a system is installed to be a hazardous location. In such a case, the inspector would mandate that the facility follow the restrictive provisions of Chapter 5. This may lead the facility to remove these systems, possibly replacing them with other non-optimal systems that might compromise safety. Proposal 12-37 will, therefore, allow safe welding/cutting systems to be used without obstacles imposed by inspection authorities. IF this proposal is not accepted, there is a risk of broader confusion in the field wherein facilities, when faced with installation decisions, may make incorrect evaluations of system application and use. In such cases, a safe optimal welding/cutting system might not be specified and installed for an application requiring it.

Proposal 12-37 does not in a any way call for changes to Chapter 5. It merely refers to Article 500 which contains the definition of a hazardous location. In addition, the proposal is worded to address only welding/cutting systems using flammable gases and not to impact another installed equipment in a given location.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 12-21.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-24 Log #3441 NEC-P12 **Final Action: Reject**
(630.3)

Submitter: Tak Ming Liu, Hypertherm, Inc.

Comment on Proposal No: 12-37

Recommendation: Revise the proposal to read:
630.3 Classification of Location. Equipment constituting a welding or cutting system that, under normal operation, would contain flammable gases or gas mixtures shall be considered to be an unclassified location as defined in 500.2. A welding or cutting system that requires flammable gases or gas mixtures for normal or recommended operation shall not change the classification, as defined in Article 500, of the location in which it has been placed.

Substantiation: There is a huge base of welding and cutting systems using flammable gases installed in industrial facilities throughout the country. While these systems, which are approved, recognized and/or listed with safety certification agencies, have an excellent record of safety, there is the risk that an inspector may consider the area in which a system is installed to be a hazardous location. In such a case, the inspector would mandate that the facility follow the restrictive provisions of Chapter 5. This may lead the facility to remove these systems, possibly replacing them with other non-optimal systems that might compromise safety. Proposal 12-37 will therefore allow safe welding/cutting systems to be used without obstacles imposed by inspection authorities. If this proposal is not accepted, there is a risk of broader confusion in the field wherein facilities, when faced with installation decisions, may make incorrect evaluations of system application and use. In such cases, a safe, optimal welding/cutting system might not be specified and installed for an application requiring it.

Proposal 12-37 does not in any way call for changes to Chapter 5. It merely refers to Article 500 which contains the definition of a hazardous location. In addition, the proposal is worded to address only welding/cutting systems using flammable gases and not to impact any other installed equipment in a given location.

Panel Meeting Action: Reject
Panel Statement: See panel action and statement on Comment 12-21.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

ARTICLE 640 — AUDIO SIGNAL PROCESSING, AMPLIFICATION, AND REPRODUCTION EQUIPMENT

12-25 Log #1703 NEC-P12 **Final Action: Accept**
(640.3)

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 12-43

Recommendation: Continue to reject.
Substantiation: I agree with both the panel action and panel statement to reject proposal 12-43. No technical substantiation has been provided that a change to the 2002 NEC language is needed or required. This comment represents the official position of the International Brotherhood of Electrical Workers Code and Standards Committee.

Panel Meeting Action: Accept
Panel Statement: The present wording of 640.3 and the fine print note are consistent with the current requirements of 300.22.
Number Eligible to Vote: 12
Ballot Results: Affirmative: 12

12-26 Log #3733 NEC-P12 **Final Action: Reject**
(640.3)

Submitter: Marcelo M. Hirschler, GBH International / Rep. Fire Retardant Chemicals Association

Comment on Proposal No: 12-43

Recommendation: *Accept the proposal in part by making the following change in the Fine Print Note. Continue rejecting the change to section 640.3 (B)*
640.3 Locations and Other Articles. Circuits and equipment shall comply with 640.3(A) through (L), as applicable.

(A) Spread of Fire or Products of Combustion. The accessible portion of abandoned audio distribution cables shall not be permitted to remain. See 300.21.

(B) Ducts, Plenums, and Other Air-Handling Spaces. See 300.22 for circuits and equipment installed in ducts or plenums or other space used for environmental air.

FPN: NFPA 90A-1999, Standard for the Installation of Air Conditioning and Ventilation Systems, 2-3.10.2(a), Exception No. 3, permits loudspeakers, loudspeaker assemblies, and their accessories listed in accordance with UL 2043-1996, Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces, to be installed in other spaces used for environmental air (ceiling cavity plenums).

FPN: One method of defining that loudspeakers, loudspeaker assemblies, and their accessories, are suitable for use in ducts, plenums, and other air-handling spaces is if the product exhibits a maximum peak optical density of 0.5 or less, an average optical density of 0.15 or less, and a peak heat release rate of 100 kW or less when tested in accordance with UL 2043, Standard for Safety Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces.

No change for 640.3 (C) through 640.3 (L).

Substantiation: This comment recommends a slight change in wording for the existing Fine Print Note, by recognizing that listing of loudspeakers, loudspeaker assemblies and their accessories is by UL 2024, which represents listing to both low smoke and low heat release and that the products cannot be listed separately to either property. This is basically an editorial change, as a clarification, to the existing Fine Print Note.

This comment also recommends a rejection of the concept of a reference to NFPA 90A, which would mean that requirements for these cables could change without the knowledge and assent of NEC CMP members.

It has become clear now that the expertise needed for choosing the type of wiring systems permitted in any space should be the prerogative of the NEC, which (through its various panels and its Technical Correlating Committee) has greater expertise and a broader view than the Technical Committee on Air Conditioning (responsible for NFPA 90A). Therefore, the NEC panels should continue making their own choices regarding wiring methods. The issue of correlation (or even reference) to either NFPA 90A or the categories of plenums used in NFPA 90A should continue to be rejected by CMP 3. As stated by Mr. Harold Ohde in his negative on CMP 16 action on proposal 16-9: "Other codes should not be deciding on the typed of wiring methods to be used in these spaces. The electrical experts are capable of doing this and it is covered quite well in 300.22. The more we let those outside of the NEC make these decisions the more we weaken adoption of the NEC. In addition, we could make the change and there is nothing that requires a jurisdiction to even adopt 90A."

Also see comments from the chairman of the Technical Correlating Committee.

Panel Meeting Action: Reject

Panel Statement: The proposed change in the wording of the fine print note in Comment 12-26 does little other than supply information that is contained in the UL Standard that is referenced in the existing fine print note. It is not the intent of the Fine Print Note to display the contents of the standards referenced.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-27 Log #3860 NEC-P12
(640.3(A))

Final Action: Reject

Submitter: Marcelo M. Hirschler, GBH International / Rep. Fire Retardant Chemicals Association

Comment on Proposal No: 12-44

Recommendation: *There is no consistency in the NEC on the removal of abandoned cables. This is primarily an issue with cables in Articles 645, 725, 760, 770, 800, 820 and 830. The wording should be as follows consistently: "Abandoned [cable type] cables shall be removed." It should also be contained in the section on applications of cables.*

640.3 Locations and Other Articles. Circuits and equipment shall comply with 640.3(A) through (L), as applicable.

(A) Spread of Fire or Products of Combustion. ~~The accessible portion of abandoned~~ Abandoned audio distribution cables shall be removed. See 300.21.

Substantiation: The issue here is the interpretation of the action required with respect to what is accessible. The issue of "accessible" cables creates confusion that makes the enforcement of the removal of abandoned cable "dicey" because it is unclear what "accessible" means. The NEC defines the following terms in Article 100:

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

Accessible (as applied to wiring methods). Capable of being removed or exposed without damaging the building structure or finish or not permanently closed in by the structure or finish of the building.

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

The phrase "the accessible portion of abandoned cables" is much vaguer than the definitions in the code, because the term "accessible portion" is not defined. Therefore, accessible portion is probably considered that length of cable that is within a few feet of the opening, and that can be cut off by reaching in. That is clearly not the intent of the code provision: the entire length of cable that can be pulled out should be removed.

Another possible interpretation is that this refers to excluding from removal those cables installed in the areas that CMP 16 calls "inaccessible ceiling cavity plenums and inaccessible raised floor plenums". The concept of those "inaccessible areas" was rejected by CMP 3 as inappropriate because there is no known fire safety problem with the present type of wiring methods, but it was approved by CMP 16. If this concept is approved, and the wording of

"abandoned cables" includes the "accessible portion" concept, it would clearly mean that the NEC would permit some cables to be left permanently in place once abandoned. This was soundly rejected by the membership several times, in a concept upheld by Standards Council.

It is pretty obvious that the concept of removal of abandoned cable is not one where someone should try to tear down a building or cause structural damage to it just to remove cables "permanently closed in by the structure or finish of the building". I believe that we must trust in the intelligence of our code officials and electrical inspectors that they will not demand such actions. If there is a feeling that this is a possibility (which I cannot believe), it might be worth adding a Fine Print Note to the effect that removal of abandoned cables should not cause structural damage to the building. An example follows:

FPN: Removal of abandoned cables is not intended to cause structural damage to buildings.

Clearly, "the accessible portion of abandoned cables" is a misleading phrase which can lead to abundant misinterpretation. It should be eliminated in favor of the simpler "abandoned cables".

Panel Meeting Action: Reject

Panel Statement: The submitter of Comment 12-27 is addressing issues not contained in Proposal 12-44. Proposal 12-44 contains an editorial change and not a change in requirements.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-28 Log #3137 NEC-P12
(640.5)

Final Action: Accept

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 12-46

Recommendation: Continue to reject.

Substantiation: We agree with both the panel action and the panel statement to reject proposal 12-46. This comment represents the official position of the International Brotherhood of Electrical Workers Codes and Standards Committee.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-29 Log #3130 NEC-P12
(640.6)

Final Action: Accept in Principle

Submitter: Michael I. Callanan, IBEW

Comment on Proposal No: 12-47

Recommendation: This proposal should have accepted in principle and revised as follows:

640.6 Mechanical Execution of Work. Equipment and cabling shall installed in a neat workmanlike manner. Cables and conductors installed exposed on the surface of ceilings and sidewalls shall be supported by the building structure in such a manner that the cable will not be damaged to normal building use. Such cables shall be supported by straps, staples, hangers, or similar fittings designed and installed so as not to damage the cable. The installation shall conform with 300.4(D) and 300.11.

FPN: Accepted industry practices are described in ANSI/NECA/BICSI 568-2001, Standard for Installing Commercial Building Telecommunications Cabling, and other ANSI-approved installation standards.

Substantiation: The above revised language will meet the intent of the submitter to show consistency with the language of 770.8, 800.6, 820.6 and 830.6.

Panel Meeting Action: Accept in Principle

Revise the wording in the Recommendation of the Comment to read as follows:

"640.6 Mechanical Execution of Work. Equipment and cables shall be installed in a neat workmanlike manner. Cables installed exposed on the surface of ceilings and sidewalls shall be supported in such a manner that the cable will not be damaged by normal building use. Such cables shall be supported by straps, staples, hangers, or similar fittings designed and installed so as not to damage the cable. The installation shall conform with 300.4(D) and 300.11.

FPN: Accepted industry practices are described in ANSI/NECA/BICSI 568-2001, Standard for Installing Commercial Building Telecommunications Cabling, and other ANSI-approved installation standards."

Panel Statement: The panel removed the words "by the building structure" because they were not part of the original panel action on Proposal 12-47.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 11 Negative: 1

Explanation of Negative:

JONES: This comment should have been Accepted in Principle in Part. The revised wording in the panel action should remain, however, the Fine Print Note should be deleted. Code-Making Panel 12 was not provided a copy of ANSI/NECA/BICSI 568-2001 and could not have possibly known if this standard is accepted industry practice for installing commercial building telecommunication cables.

The Fine Print Note is not necessary and during the 2002 ROP and ROC, Panel 16 deleted the Fine Print Note to Section 640.6. Panel 16 submitted Proposal 16-2a for the 2002 ROP and the substantiation for removing the FPN was "Since there are additional jurisdictions, the Fine Print Note is not necessary." Article 640 came under the jurisdiction of Panel 12 for the 2005 code cycle.

ARTICLE 645 — INFORMATION TECHNOLOGY EQUIPMENT

12-30 Log #3577 NEC-P12 **Final Action: Accept**
(645.2)

Note: The Technical Correlating Committee directs that 645.2 be moved to 645.4 as recommended by CMP 12.

Submitter: Todd Lottmann Washington, MO

Comment on Proposal No: N/A

Recommendation: Move entire section to new 645.X

Substantiation: This change was made to comply with the 2001 NEC Manual of Style Section 2.2.2.2 reserving 645.2 for definitions.

Panel Meeting Action: Accept

Panel Statement: The panel suggests that this material be moved to 645.4.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-31 Log #195 NEC-P12 **Final Action: Accept in Principle**
(645.5(c).)

Submitter: Stanley Kaufman, CableSafe, Inc.

Comment on Proposal No: 12-50

Recommendation: Accept the proposal as submitted.

Substantiation: Panel 16 eliminated multipurpose cables in its action on Proposal 16-104.

The current text of this section explicitly mentions general-purpose cables, CL2, CL3, NPLF, FPL, OFC, OFN, CM and CATV cables as acceptable. Is it the intent of Panel 12 that cables with superior fire resistance, i.e., riser, plenum and air duct cables, not be permitted to substitute for cables with inferior fire resistance? Refer to Table 725.61 and Figure 725.61.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 12-38.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-32 Log #196 NEC-P12 **Final Action: Accept in Principle**
(645.5(c).)

Submitter: Stanley Kaufman, CableSafe, Inc.

Comment on Proposal No: 12-51

Recommendation: Accept the proposal as submitted.

Substantiation: Panel 16 eliminated multipurpose cables in its action on Proposal 16-104.

Panel Meeting Action: Accept in Principle

Panel Statement: See panel action and statement on Comment 12-38.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-33 Log #3709 NEC-P12 **Final Action: Accept**
(645.5(c).)

Submitter: Marcelo M. Hirschler, GBH International / Rep. Fire Retardant Chemicals Association

Comment on Proposal No: 12-52

Recommendation: Continue rejecting this proposal.

Substantiation: Note: State the problem that will be resolved by your recommendation. Give the specific reason for your comment including copies of tests, research papers, fire experience, etc. If more than 200 words, it may be abstracted for publication.

The G designation of cables should be retained because it serves as a way for the Canadian manufacturers to be able to sell their products which have been listed to CSA FT4. The CSA FT4 test is similar to the UL 1581 vertical cable tray test, but is somewhat more severe.

While CMP 3 and CMP 12 have rejected this concept, CMP 16 has accepted this proposal (in part). All three of the proposals (3-172, 12-52 and 16-28) should be rejected.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-34 Log #1043 NEC-P12
(645.5(D)(5))

Final Action: Reject

Note: The Technical Correlating Committee directs that this Comment and Proposal 12-61 be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

Submitter: Noel Williams, Noel Williams Consulting

Comment on Proposal No: 12-61

Recommendation: The proposal should remain accepted in principle as modified by panel action.

Substantiation: This proposal incorporates my Proposal 12-59, which was, and should be accepted. The addition of a new 6(d) will help resolve yet another issue with this section. In order for the underfloor space and wiring to be useful, power cords of listed equipment must be allowed to run into the floor to connect to receptacles. These cords are often questioned. However, the requirement that the supply cord be part of listed information technology equipment requires that the cord be fire-resistant. UL 1950 requires nearly all components of listed ITE equipment to meet one of three fire resistance tests. Some items are excluded from this requirement, but the power cord is not excluded and is required to be fire resistant. As noted by the submitter, such cords are relatively short anyway, and do not represent a significant fuel load, especially in comparison to the other wiring that is permitted in the under floor spaces.

Panel Meeting Action: Accept

Panel Statement: The panel does not agree with the submitter's substantiation regarding UL 1950, which is now UL 60950.

Power supply cords are subject to the flammability requirements in the power supply cord standard, UL 817.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 5 Negative: 7

Explanation of Negative:

JANIKOWSKI: In light of new substantiating data, I feel we are sacrificing safety by allowing a potential large amount of fuel under a raised floor. The problem is easily rectified by installing the power supply receptacle above the floor or having the power supply cords listed to meet the fire-resistant characteristics suitable for use under raised floors of information technology rooms.

LOTTMANN: NEMA does not agree with the action taken on this comment as no technical substantiation was provided to support the addition of this new item as it is written. The new wording is too loose and provides an option for the use of "Power supply cords of listed information technology equipment" without any design parameters, length limitations, or listing requirements for the power supply cord. Verification that it meets the appropriate level of safety required for this type of installation, such as flammability testing for flame spread in areas of high volume air movement, as provided by the requirements contained in existing items 645.5(a) - (c), does not exist. Finally, it is important to note that the existing requirements currently allow for the installation of "listed information technology equipment" using their associated power cords with the existing requirements in 645.5(a) - (c) without sacrificing safety.

MARCOVICI: Upon further review of the substantiation, I have decided to change my vote to negative.

PRICHARD: Power supply cords on listed information technology equipment are not listed as having adequate fire-resistant characteristics suitable for use under raised floors of an information technology room and may only be used above the raised floor.

PURVIS: As I have studied this situation, it appears that there are not sufficient details in the proposed change to control the amount of cables under the floor. I would not want to go backwards in what we have accomplished over many years and then have to revisit all the issues of having toxic cable under the floor during the next code cycle.

QUAVE: The original proposal should have been Accept in Principle in part. 645.5(D)(5) should read: "Cables other than those covered in (2) and those complying with (a), (b), or (c) shall be listed as type DP cable having adequate fire resistant characteristics suitable for use under raised floors of an Information Technology Equipment room."

By changing the word "and" in between (b) and (c) to "or" does clarify the wording that meeting only one of the conditions is sufficient rather than having to comply with all conditions.

"(d) Power supply cord of listed Information Technology Equipment" should have been deleted. There is a concern of the amount of information technology equipment requiring power supply cords that could be located in one information technology equipment room. Therefore, creating a large amount of fuel under the raised floor.

TROUT: This comment should have been "rejected". The substantiation included erroneous information regarding the flammability requirements for power supply cords used with ITE equipment. The substantiation also included the unsubstantiated information that power supply cords are "relatively short anyway, and do not represent a significant fuel load, especially in comparison to other wiring that is permitted in under floor spaces." Section 645.5(B)(1) permits the power supply cord to be 4.5 m (15 ft) in length and Article 645 does not limit the number of power supply cords that may be installed under any one raised floor. This, I believe represents a very significant fuel load.

This substantiation demonstrates a complete disregard for the safety requirements put in place by a Panel 12 Task Group and a unanimous vote by Panel 12 to support these requirements.

Panel 12 members should recognize this comment and the proposal it refers to as an orchestrated attempt to circumvent the existing requirements, in a manner that will seriously degrade the safety requirements of Section 645.5(D)(5), in an effort to avoid securing the listing of power supply cords as having adequate fire-resistant characteristics suitable for use under raised floors of an information technology room or by using the suitable alternative of installing the power supply receptacles above the raised floor.

Power supply cords on listed information technology equipment are not listed as having adequate fire-resistant characteristics suitable for use under raised floors of an information technology room and may only be used above the raised floor.

12-35 Log #666 NEC-P12
(645.5(D)(5), 645.5(D)(5)(d)(New))

Final Action: Reject

Note: The Technical Correlating Committee directs that this Comment and Proposal 12-61 be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

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

Comment on Proposal No: 12-61

Recommendation: Accept proposal "in part" to revise 645.5(D)(5) to read:

"Cables other than those covered in (2) and or those complying with (a), (b) and (c) shall be listed as Type DP cable..."

"Reject" that portion of proposal to add a new part 645.5(D)(5)(d) to read:

"(d) Power supply cord of listed information Technology Equipment."

Substantiation: This proposal will seriously degrade the safety requirements put in place by a Panel 12 Task Group as part of a relaxation of the existing plenum requirements in 300.22(C)(1). This relaxation resulted in a new 300.22(D) relating to Information Technology Rooms. The requirements placed in 645.5(D)(5) were accepted unanimously by the Task Group and subsequently were accepted unanimously by Panel 12 as a safeguard against the propagation of fire and the hazards related thereto. This proposal does nothing to enhance the purpose of the National Electrical Code and demonstrates a complete disregard for the "practical safeguarding of persons and property from the hazards arising from the use of electricity." For further substantiation, see the negative comments expressed by Mr. Trout in the Report on Proposals as shown on pages 1533 and 1534. Copies available from the National Fire Protection Association.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 12-35.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 7 Negative: 5

Explanation of Negative:

LOTTMANN: See my explanation of negative vote on Comment 12-34.

MARCOVICI: Upon further review of the substantiation, I have decided to change my vote to negative.

PRICHARD: See my explanation of negative vote on Comment 12-34.

QUAVE: This comment should be Accepted. See my Explanation of Negative Vote on Comment 12-34.

TROUT: This comment should have been "accepted." This substantiation for this comment represents an effort to save the safety requirements put in place by Panel 12 for the 1993 Edition of the National Electrical Code. Considerable time and effort was spent by the Panel 12 members and by a Panel 12 task group to study and subsequently permit relaxation of some of the more stringent requirements found in 300.22(C). This was accomplished with the addition of a new 645.5(D)(5) permitting the use of cables that are listed as Type DP cable having adequate fire-resistant characteristics suitable for use under raised floors of an information technology room.

Power cables are the first item to be mentioned in 645.5(D)(5) and any attempt to suggest that the inclusion of power cables was not the intent of Panel 12 is definitely in error. Panel 12 members should remember that the intent of Panel 12 was to relax the requirements shown in 300.22(C)(1) where cables and conductors must be installed in electrical metallic tubing, flexible metal tubing, intermediate metal conduit, rigid metal conduit, flexible metal conduit or certain metal surface raceways or metal wireways and instead permit Type DP cables having adequate fire-resistant characteristics suitable for use under raised floors of an information technology room. Panel members should recognize that these attempts to eat away piece by piece the safety requirements put in place by panel members must be identified and properly rejected.

Power supply cords on listed information technology equipment are not listed as having adequate fire-resistant characteristics suitable for use under raised floors of an information technology room and may only be used above the raised floor.

12-36 Log #3307 NEC-P12
(645.5(D)(5) and New 645.5(D)(5)(d))

Final Action: Reject

Note: The Technical Correlating Committee directs that this Comment and Proposal 12-61 be reported as "Reject" because less than two-thirds of the members eligible to vote have voted in the affirmative.

Submitter: Gary W. Victorine San Jose, CA

Comment on Proposal No: 12-61

Recommendation: Please continue to support the Panel Action for this proposal.

Substantiation: The Panel Action on this proposal should be retained. The following is a response to the comments from the negative ballot from Mr. Trout:

I am somewhat confused over Mr. Trout's account of the history of Article 645, as well as with his statement that there's been a relaxation in the rules. Prior to the 1993 NEC, there were no requirements whatsoever covering the fire resistance characteristics of cables used in the under-the-raised-floor area, other than from the listing requirements. Proposals to introduce the DP cable requirement into the 1993 NEC were submitted first by CBEMA (now ITIC), as well as from CMP-12. I was a member of a committee that drafted the CBEMA proposal. Please refer to proposals 12-119 and 12-126, respectively from the NFPA 70 A92 TCR. The addition of the DP cable requirement in the 1993 NEC introduced a substantial improvement over the existing requirements at that time. I am not aware of any rewrite of Article 645, at least in recent history, that relaxes any such rules.

Further, both proposals submitted for the 1993 NEC mentioned only computer interconnecting cables as the fuel load issue being addressed. There was no mention in the substantiation of either proposal that the power cord of listed information technology equipment should be included in the requirement.

I also disagree that the area-under-a-raised-floor in Article 645 computer room is a plenum. This statement from Mr. Trout is not supported by any definition that I'm aware of from the NEC, including any references to Article 300-22. This claim is also not supported by the current cabling requirements in Article 645. The "P" in DP does not indicate "plenum".

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 6 Negative: 6

Explanation of Negative:

JANIKOWSKI: See my explanation of negative vote on Comment 12-34.

LOTTMANN: See my explanation of negative vote on Comment 12-34.

MARCOVICI: Upon further review of the substantiation, I have decided to change my vote to negative.

PRICHARD: See my explanation of negative vote on Comment 12-34.

QUAVE: This comment should be Rejected. See my Explanation of Negative Vote on Comment 12-34.

TROUT: This comment should have been "rejected". The submitter of this comment as well as the submitter of Proposal 12-1 states in his substantiation that he was a member of a committee formed by a manufacturing group CBEMA to introduce the Type DP cable requirement into the 1993 NEC.

The acceptance of Type DP cable into the 1993 NEC permitted cables having adequate fire-resistant characteristics suitable for use under raised floors of an information technology room to be used instead of requiring cables to be enclosed in a metal raceway. This was a significant relaxation of the requirements of 300.22(C). The submitter in his substantiation considers this a "substantial improvement over existing requirements at that time." The existing requirements at that time of course were to enclose cables installed under a raised floor in metal raceways. The submitter in his substantiation states "There were no requirements whatsoever covering the fire resistance characteristics of cables used in the under-the-raised-floor area. That's true. The cables were required to be enclosed in metal raceways.

The substantiation disagrees that the area under a raised floor is a plenum. The definition of a plenum as shown in Article 100 states: "A compartment or chamber to which one or more air ducts are connected and that forms part of the air distribution system." Prior to the 1978 NEC, 300.22(C) was titled "Hollow Spaces Used as Ducts or Plenums for Environmental Air." In the 1978 NEC the title was changed to "Other Space Used for Environmental Air" and it remains that way now. You can change the name but if it walks like a duck and quacks like a duck it still serves as a plenum.

Power supply cords on listed information technology equipment are not listed as having adequate fire-resistant characteristics suitable for use under raised floors of an information technology room and may only be used above the raised floor.

12-37 Log #198 NEC-P12
(645.5(D)(5)(c))

Final Action: Accept

Submitter: Gerald Lee Dorna, Belden Wire & Cable

Comment on Proposal No: 12-51

Recommendation: There was an error in the original proposal due to the fact of so many subheadings that the "(D)" was omitted. There is no "645.5(5)(C)", it should have been "645.5(D)(5)(c)". Accept Proposal 12-51 which falls under CMP-12's jurisdiction and delete the reference to MP cables in 645.5(D)(5)(c).

Substantiation: Panel 12 rejected my original Proposal 12-51 with the fact that "The submitter has not provided any technical substantiation for the removal of Type MP cable." My technical substantiation is the fact that CMP-16 has Accepted in Part Proposal 16-104 (that part which CMP-16 has jurisdiction over Article 800) the deletion of all references to Type MP cables. The panel accepted this proposal for the reason that the requirement for listing of multipurpose cables (MP) expired on July 1, 2003. Article 800 is the defining article for the requirements of MP cable. If MP does not exist in Article 800, then it should be removed from other locations in the code.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-38 Log #535 NEC-P12 **Final Action: Accept in Principle**
(645.5(D)(5)(c).)

Submitter: National Electrical Code Panel 16

Comment on Proposal No: 12-50

Recommendation: Accept the proposal as submitted

Substantiation: Panel 16 eliminated multipurpose cables in its action on proposal 16-104.

The current text of this section explicitly mentions general-purpose cables, CL2, CL3, NPLF, FPL, OFC, OFN, CM and CATV cables as acceptable. Is it the intent of Panel 12 that cables with superior fire resistance, i.e., riser, plenum and air duct cables, not be permitted to substitute for cables with inferior fire resistance? Refer to Table 820.53 and Figure 820.53 that allow higher fire resistant cables to substitute for cables with lower fire resistance.

The proposal was referred to Code-Making Panel 16 for information and this Comment is in response to our review. It has been submitted to ballot by the panel.

Panel Meeting Action: Accept in Principle

In the wording as shown in the 2002 Code, 645.5(D)(5)(c), move "(Article 800)" to appear after "CM".

Panel Statement: The panel recognizes that although multi-purpose cables are no longer being manufactured, stock is still in existence and still can be used.

The panel also recognizes that Panel 16 has deleted reference to Type MP cables, and Panel 12 has moved the reference accordingly.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-39 Log #1977 NEC-P12 **Final Action: Accept**
(645-5(D)(5)(c))

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

Comment on Proposal No: 12-62

Recommendation: Accept the proposal in principle. Correct the punctuation, as follows:

"Green, or green with one or more yellow stripes, insulated single conductor cables ...".

Substantiation: The word "green" and the phrase "green with one or more yellow stripes" are two descriptors of the word "cables"; "green or green" and "with one or more yellow stripes" are not. The comma needs to be moved.

Panel Meeting Action: Accept

Number Eligible to Vote: 12

Ballot Results: Affirmative: 12

12-40 Log #3285 NEC-P12 **Final Action: Reject**
(645-5(D)(5)(d))

Submitter: Richard E. Loyd Sun Lakes, AZ

Comment on Proposal No: 12-61

Recommendation: Reject the Section and delete 645.5(D)(5)(d) "Power supply cords of listed information technology equipment."

Substantiation: This issue is similar to the issue last cycle regarding the unlimited use of LFMC and LFNC in 300.22(B) and (C) areas. There is no length limitation and there is no limit on the number of pieces of equipment setting on a raised floor. CMP-3 deleted this safety hazard, and CMP-12 should not accept this allowance. It allows potentially hundreds of feet of cord that has not been tested for this application to be placed under raised floors just for appearance reasons. It compromises safety in these special areas without life safety issues being considered.

Panel Meeting Action: Reject

Panel Statement: See panel action and statement on Comment 12-34.

Number Eligible to Vote: 12

Ballot Results: Affirmative: 10 Negative: 2

Explanation of Negative:

LOTTMANN: See my explanation of negative vote on Comment 12-34.

QUAVE: This comment should be Accepted. See my Explanation of Negative Vote on Comment 12-34.

ARTICLE 647 — SENSITIVE ELECTRONIC EQUIPMENT

12-41 Log #1979 NEC-P12 **Final Action: Reject**
(647.7(A))

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

Comment on Proposal No: 12-65

Recommendation: Reject the proposal.

Substantiation: This article originated as Part G of Article 530, having taken form after a Code Forum analysis during the submitter's tenure at EC&M

Magazine. One of the issues identified at the outset was the fact that 120V circuits are usually assumed to be de-energized when an overcurrent device opens, because there is only one pole (or fuse) and the other conductor would normally be grounded. However, these 120V circuits will still run 60V to ground if a single pole device operates. The intent of this and other comparable provisions in this article has always been to minimize this exposure. This is particularly the case now, because in spite of the clear preference for a unique plug and receptacle configuration expressed in 647.7(A)(4), NEMA has yet to develop such devices. This means that conventionally configured plugs and receptacles are the only game in town for the usual separable connections involved with this equipment. The proposal increases the hazards involved in operating these systems, and should be rejected until unique configurations are available and there is far greater familiarity in the field with how these systems work.

Panel Meeting Action: Reject

Panel Statement: While the panel agrees that the use of receptacles with a unique configuration as required by 647.7(A)(4) would decrease the risk of hazards, the intent of Proposal 12-65 is based on the use of overcurrent devices. The panel believes its action on Proposal 12-65 is correct.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

12-42 Log #3576 NEC-P12 **Final Action: Accept**
(650.2)

Submitter: Todd Lottmann Washington, MO

Recommendation: Move entire section to new 650.X.

Substantiation: This change was made to comply with the 2001 NEC Manual of Style section 2.2.2.2 reserving 650.2 for definitions.

Panel Meeting Action: Accept

Panel Statement: Move the entire section to become 650.3, and since 650.2 is now empty, leave it in reserve for potential definitions.

Number Eligible to Vote: 11

Ballot Results: Affirmative: 11

ARTICLE 670 — INDUSTRIAL MACHINERY

12-43 Log #1141 NEC-P12 **Final Action: Accept**
(670.3)

Submitter: Paul Dobrowsky Holley, NY

Comment on Proposal No: 12-77

Recommendation: Accept the proposal in Part and add the words", from the motor nameplate" after ampere rating of the largest motor.

Substantiation: Presently various different methods are being used for determining the equipment ratings. I still believe that the machine builder is in the best position to provide all of the information requested to be added by the proposal. At a minimum this section needs to specify whether the motor information is obtained from the motor nameplate or from the appropriate NEC tables. Presently the requirement is not specific.

Panel Meeting Action: Accept

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10

12-44 Log #737 NEC-P12 **Final Action: Reject**
(670.3(A))

Submitter: Melvin K. Sanders, TECo., Inc.

Comment on Proposal No: 12-80

Recommendation: This proposal should be rejected in its entirety, and the existing text in 670.3(A) NEC 2002 Edition should be retained.

Substantiation: The existing text in 670.3(A) was not correctly presented and was modified without attribution in bulleted item (6). The new bulleted item (6) requires a short circuit rating of equipment even where an overcurrent protective device is not involved, which is not practicable and even be impossible to determine by the machinery manufacturer.

Panel Meeting Action: Reject

Panel Statement: The submitter has provided no technical substantiation to justify this recommendation.

The panel does not agree with the submitter's claim that bullet item (6) was added without substantiation and refers the submitter to the substantiation in Proposal 12-80.

In addition, the panel feels the addition of the fine print note in 670.3(A) provides guidance for determination of the short circuit rating required in bullet Item 6.

Number Eligible to Vote: 10

Ballot Results: Affirmative: 10