

2014 Code Revision Cycle Massachusetts Electrical Code Preliminary Committee Report on Proposals (ROP)

This preliminary report contains the proposed Massachusetts amendments to the drafted 2014 National Electrical Code (NFPA-70/MEC CMR 527.12.00). The Board of Fire Prevention Regulation's (BFPR) Electrical Code Advisory committee is providing a copy of the report to interested persons. Persons who have comments on the report should submit them to the Board's Executive Director, Richard Fredette [mailto: Richard.Fredette@state.ma.us](mailto:Richard.Fredette@state.ma.us) prior to 5:00 pm, July 29, 2013 for timely consideration by the committee.

NOTE: It is anticipated that the Committee will submit a final report, including a report on comments (ROC) at the regularly scheduled BFPR meeting in September 2013. For comments, questions, information on the new rules, and for up-to-date information on schedules, deadlines for processing BFPR Documents and future meeting and/or hearing dates please check the BFPR website (<http://www.mass.gov/eopss/agencies/dfs/>) or contact Executive Director, Richard Fredette @ Richard.Fredette@state.ma.us

14-01 [Entire Document]

Entire 527 CMR 12.00, first paragraph

Submitter: Frederic P. Hartwell

Proposal: Revise the first paragraph to read as follows:

The ~~2011~~ 2014 Massachusetts Electrical Code (527 CMR 12.00) of the Board of Fire Prevention Regulations shall be the ~~2011~~ 2014 National Electrical Code (National Fire Protection Association) (NFPA 70) modified as follows:

Substantiation: This is the usual housekeeping proposal submitted by the Secretary updating the revision cycle information.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-02 [Rule 3, Mass.]

[Secretary's Note: This proposal was held from the 2011 cycle due to a lack of consensus in the voting.]

Submitter: Leo Martin, Sr.

Proposal: Delete the second sentence of rule #3.

The installation shall not create a violation of this Code, nor shall it increase the magnitude of an existing violation.

Substantiation: If a violation exists then rule #4 would be applicable.

Committee Action: Reject

Committee Statement: The substantiation is incorrect. There are major differences between a code violation that may be cited during an electrical inspection and a Rule 4 finding of an "actual hazard." Relatively few violations rise to that level of concern, which carries with it the requirement for written notification to the owner, and with such notification the threat of further proceedings in court pursuant to c. 166 §33.

The additional sentence was crafted for the 1990 MEC, in part to provide a measure of certainty for the installing contractor as to what his or her exposure would be in terms of needing to address an existing violation. The process is to identify the violation, and then inquire whether the proposed work creates or increases the magnitude of the violation. For example, an existing service panel in a bathroom could remain, but not have circuits added, because the rule applies to overcurrent devices, and adding a circuit would increase the number of devices.

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-03 [Rule 7, Mass.]

Submitter: Frederic P. Hartwell

Proposal: Revise as follows:

527 CMR 12.00 shall be effective on all installations for which a permit has been granted subsequent to December 31, ~~2010~~ 2013. For installations governed by permits issued after November 1, ~~2010~~ 2013 and before January 1, ~~2011~~ 2014, the applicable code shall be the version of 527 CMR 12.00 in effect on November 1, ~~2010~~ 2013.

Substantiation: This is the usual housekeeping proposal submitted by the Secretary updating the revision cycle information.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-04 [110.24 (Mass.)]

Submitter: Leo Martin, Sr.

Proposal: Delete the Massachusetts amendment and accept N.E.C. requirements.

Substantiation: This section addresses an electrical safety issue and should not be deleted.

Committee Action: Reject

Committee Statement: Refer to the action and statement on Proposal 14-05.

Vote on Committee:

Affirmative: 20

Negative: 2

Abstain: none

Number of Eligible to Vote: 22

Explanation of Negative:

Mr. Naughton:

I disagree with the panel's direction with the validity that because the utility may alter the available fault current we refuse the installation of a label that has the actual available Fault current and date of the installation. All Field Marking is for informational safety purposes whether it is plaque cards, panel cards or hazard labels, qualified installers should have no problem in updating the information needed for the requirements in question.

Mr. Roger:

It is correct that the values can and will change upon any changes made by the utility company, however, that is out of the control of the electrician or the property owner. This requirement has not created problems across the country and it certainly doesn't hurt to have this baseline information adequately posted at the time of initial installation. I don't believe there is need for Massachusetts to be different from the remainder of the country on this basic safety requirement.

14-05 [110.24 (Mass.)]

Submitter: William Laidler

Proposal: Delete the Mass. amendment that deletes this section in the NEC.

Substantiation: The NEC section will have an information note that states that the maximum available fault current at the service is intended for application to the interrupting ratings of equipment and not for arc flash hazard analysis. The committee voted to delete this requirement because it was concerned that someone would be confused and used the maximum available fault current when doing a calculation for a arc flash hazard.

Committee Action: Reject

Committee Statement: Although it is true that the potential confusion regarding the function of the marking was a factor in the decision to delete this NEC provision, it was not the principal reason. The principal reason was and still is that the major portion of the available fault current is subject to change at any time due to the activities of the serving electric utility. These activities are entirely beyond the control of the MEC and the Inspector of Wires. Therefore, the marking applied under the terms of the NEC rule should never be relied upon as having any continuing validity. The Advisory Committee believes that a requirement to place a marking that should not be relied upon after it has been placed is not an appropriate requirement to retain in the MEC.

Vote on Committee:

Affirmative: 19

Negative: 3

Abstain: none

Number of Eligible to Vote: 22

Explanation of Negative:

Mr. Fahey:

The label informs that the value exists on the date on the label and electricians doing commercial work should know that values change with utility changes and would obtain the necessary values to provide worker safety.

Mr. Naughton:

I disagree with the panel's direction with the validity that because the utility may alter the available fault current we refuse the installation of a label that has the actual available Fault current and date of the installation. All Field Marking is for informational safety purposes whether it is plaque cards, panel cards or hazard labels, qualified installers should have no problem in updating the information needed for the requirements in question.

Mr. Roger:

It is correct that the values can and will change upon any changes made by the utility company, however, that is out of the control of the electrician or the property owner. This requirement has not created problems across the country and it certainly doesn't hurt to have this baseline information adequately posted at the time of initial installation. I don't believe there is need for Massachusetts to be different from the remainder of the country on this basic safety requirement.

14-06 [200.7(C)(2) (Mass.)]

Submitter: Russ LeBlanc

Proposal: Delete the last sentence which reads “In these applications reidentification of the conductor with white or gray insulation or with three continuous white stripes shall not be required.”

Substantiation: Section 404.2(C) now requires the grounded conductor to be provided at many switch locations. The present wording of the Mass. Amendments could result in a multi-gang switch box with several white wires in which some of those white wires could be grounded conductors and some of them could be UNgrounded conductors. This could result in a very unsafe condition if there is no distinction made between the two different uses of the white wires. Any installer could easily mistake one white wire for another. Reidentification of the ungrounded white (or gray or three continuous white striped) wire should be required in switch applications.

Committee Action: Accept in Principle. Delete the existing MEC amendment to the NEC.

Committee Statement: The Committee agrees with the submitter. Since the sentence to be deleted is the reason for the amendment, the amendment will be withdrawn.

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-07 [210.8(A)(5) Exception (new)]

Submitter: Mark Elsner

Proposal: Exception to (5): A receptacle supplying only a permanently installed fire alarm or burglar alarm system, **and sewerage ejector pump**, shall not be required to have ground-fault circuit-interrupter protection.

Substantiation: False tripping of the GFCI receptacle has been caused by brief power outages, power spikes and surges, a defective device or possible mechanical float switch issues. There is usually no indication that the device is tripped. This false tripping has caused hardships when it overflows.

Committee Action: Reject

Committee Statement: When the exceptions permitting receptacles dedicated for the supply of such pumps (including sump pumps) in basements were withdrawn in the 2008 NEC, it was only after extensive evaluation of the increased reliability of GFCI devices. That evaluation has continued due to proposals such as this, which upon further review have been rejected and the NEC rule still stands. The Advisory Committee chooses not to second guess this process. The Advisory Committee notes that there are ways to achieve the same functionality without compromising GFCI requirements. The pump can be specified for and connected to a 240-volt branch circuit and retain the cord-and-plug-connection, or it can be hard wired.

Vote on Committee:

Affirmative: 21

Negative: 1

Abstain: none

Number of Eligible to Vote: 22

Explanation of Negative:

Mr. Funderburk:

As a contractor working in the field with firsthand knowledge of potential, and even probable, nuisance tripping of sump pumps in basement locations, thereby allowing flooding to take place, it would seem prudent to allow dedicated non-GFCI receptacles to be installed. While it may be true that equipment coming off the assembly line may well meet the current leakage requirements that would prevent inadvertent tripping of such devices, the problem typically manifests itself several years later, as exposure to a damp environment and natural aging allows seals and gaskets to lose some level of integrity, which, while not affecting the functionality or safety of a properly grounded unit, might in fact trip the protective (GFCI) device upstream, rendering the pump useless at the moment of its greatest need. A good example of the cure being worse than the disease.

14-08 [210.8(A)(7) (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Delete this amendment.

Substantiation: File this amendment under the heading of let no good deed go unpunished. The submitter thought this was a housekeeping amendment that would be easily accepted into the NEC to resolve certain interpretation inconsistencies regarding how the six foot parameter was to be measured. CMP 2 has now stated that the distance should be measured on the diagonal, resulting in a slightly greater distance than one measured horizontally and therefore slightly less safe. However, it is absolutely not worth the effort of maintaining a separately stated amendment just to go after an inch or two. The submitter believes we should just let this go.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-09 [210.8(B)(5) (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Delete this amendment.

Substantiation: File this amendment under the heading of let no good deed go unpunished. The submitter thought this was a housekeeping amendment that would be easily accepted into the NEC to resolve certain interpretation inconsistencies regarding how the six foot parameter was to be measured. CMP 2 has now stated that the distance should be measured on the diagonal, resulting in a slightly greater distance than one measured horizontally and therefore slightly less safe. However, it is absolutely not worth the effort of maintaining a separately stated amendment just to go after an inch or two. The submitter believes we should just let this go.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-10 [210.12(B) (new)]

Submitter: Mark Elsner

Proposal: Branch Circuit Extensions or Modifications – Dwelling Units. In any of the specified areas in 210.12(A) , where branch circuit wiring is modified, replaced, or extended, the branch circuit shall be protected by one of the following:

- (1) A listed combination-type AFCI located at the origin of the branch circuit.
- (2) A listed outlet branch-circuit type AFCI located at the first receptacle, *or within a portion of the branch circuit continued from that extended or modified point.*

Substantiation: Clarification of the intent of the article.

Committee Action: Reject

Committee Statement: The rule in 210.12, as a part of Article 210, is a branch-circuit requirement, and as such applies to the entire branch circuit to the extent feasible. It differs from the rule in 406.4(D)(4) which applies to a replaced device and not to an extended circuit. If the circuit is extended, then the AFCI protection rule applies to the entire circuit, whether by the circuit breaker route or the AFCI receptacle approach, which must be implemented at the first receptacle outlet. Note that in the event the circuit is a multiwire branch circuit, the only practical approach will be a multi-pole AFCI circuit breaker.

Vote on Committee:

Affirmative: 21

Negative: 1

Abstain: none

Number of Eligible to Vote: 22

Explanation of Negative:

Mr. Funderburk:

It seems to me that, aside from this submission allowing a bit of practical latitude when extending a branch circuit, the requirement to provide AFCI protection to the entire circuit, even though only part of the circuit is being modified, is a direct contradiction to Rule 4 of the MEC. One could, by implication, argue that other (all) circuits, since they are all upstream of the additional receptacle being added, be protected in similar fashion, as they are all part of the same distribution system. Why stop with just the existing receptacles on the particular circuit in question?

14-11 [210.21(B)(5) (Mass.) (new)]

Submitter: Frederic P. Hartwell

Proposal: Insert a new Massachusetts amendment as follows:

210.21(B). Insert a new fifth paragraph as follows:

(5) Receptacles on Individual Branch Circuits. A receptacle outlet installed to comply with a requirement for an individual branch circuit shall contain a single receptacle, or a multiple receptacle if, and then only to the extent that, the supplied equipment includes multiple supply cord connections.

Substantiation: This proposal responds to Proposal 2-9 [by Palmieri] in the 2011 NEC cycle. As this submitter noted in his Comment 2-3, a valid concern was raised, but it could not be addressed in a revision to the definition, because a requirement cannot inhabit a definition. Although rejected in the 2014 code cycle, this proposal followed through on that prior public comment.

There are continuing controversies regarding duplex receptacles being installed where individual branch circuits are required. The new requirement in 422.16(B)(4)(5) is a case in point, where a receptacle is to be installed in a kitchen cabinet over a range. Only one utilization equipment would be connected initially, but who knows what use might be made of the additional receptacle. Some inspectors will allow this and others won't. This topic provoked considerable discussion at the 2008 IAEI Eastern Section meeting, resulting in an overwhelming vote that the duplex receptacle was not permitted for this application. This submitter has suggested that the only use of a duplex receptacle that would clearly meet the rules would be one supplying a single utilization equipment equipped with two supply cords, which would be rare but not impossible. Clarification is in order.

This was rejected in the comment stage because CMP 2 felt that a duplex receptacle might be located in such a way as to be reserved for use by a single appliance or other load. This submitter does not agree. Location alone does not prevent the outlet from being used by other than the dedicated load. The panel's position is diametrically opposite to the consensus established at the IAEI section meeting. The question should be clarified in Massachusetts, and subsequently submitted to the IAEI Eastern Section at the 2014 meeting.

Committee Action: Accept

Vote on Committee:

Affirmative: 21

Negative: 1

Abstain: none

Number of Eligible to Vote: 22

Mr. Naughton:

Reject this proposal I do not feel this article needs any further language. If the AHJ grants approval to the installer on a duplex receptacle there is no issue. Otherwise the installer is required to install a single device. I do not see this as a problem of concern.

14-12 [210.52(A)]

[Secretary's Note: This proposal was not submitted in correct form. It was submitted in the form of a letter to the Chair of the BFPR, the internal text of which is reproduced below exactly as

submitted, in lieu of formal substantiation. No specific code text was submitted, but the overall intention is clear. It has been docketed for consideration on its merits in the appropriate location.]

Submitter: Jen Boudrie

Proposal: 210.52(A), reduce the frequency of mandatory receptacle placements.

Substantiation: I understand from Tom Riley in the Department of Public Safety and Attorney Peter Senopoulos that the electric code is within the purview of the Board of Fire Prevention Regulations, so I am directing this letter to you and the BFPR board for review.

As a Massachusetts resident with a basic understanding of building science I want to share with you my opinion regarding one aspect of the current electric code which needs to be updated with energy efficiency, safety, and current building trends in mind.

It recently came to my attention that the current building code requires an excessive number of outlets, switches, wires, etc. in a building, for example, *one electrical outlet per six feet and one outlet per wall*.

I can understand that at one time it might have seemed safer to require people to have an electric outlet every six feet and on every wall to reduce extension cord usage but this solution has clearly increased other problems which now outweigh the original one. To wit:

- 1) The code takes away the right of people to have fewer outlets that are not needed.
- 2) Building envelopes with more holes have more air infiltration that makes them less energy efficient.
- 3) Excessive wiring increases potential mechanical problems behind walls which are unseen and not accessible for repair.
- 4) Excessive wiring in walls creates unwanted room-to-room communication which increases pest and fire hazards.
- 5) Having so many electric outlets increases electric hazards to children.
- 6) Additional outlets require more materials for their installation.
- 7) People are increasingly adopting “wireless” practices and need fewer electrical outlets.

Today we are seeing local and state government trending towards better building stock in our communities with increased energy efficiency and resources management to improve environmental and economic security, and personal safety. I believe this needs to be reflected in our codes.

Committee Action: Reject

Committee Statement: The Advisory Committee takes this opportunity to commend the submitter for pursuing her viewpoint in an orderly way and following the correct process. The Committee disagrees with the conclusions she reached, but believes they merit a careful and comprehensive response. Apparently the submitter significantly misunderstands the actual receptacle placement requirements, so we begin there. In dwelling occupancies contiguous walls uninterrupted at the floor line by doors or fireplaces, etc. are considered one wall space, and therefore there is no requirement to place a receptacle on every wall. Along such uninterrupted wall spaces, the rule is that no point on a wall can be more than 6 feet for a receptacle outlet. This means that the maximum distance between adjacent receptacle outlets is 12 feet, and not 6 feet as suggested in the letter. There are other rules for kitchen countertops and short walls that do not join other walls, as well as special rules for other rooms and spaces, but these were not raised so we do not address them here.

The submitter noted that a requirement for a minimum number of receptacles interfered with her right as a property owner to opt for a lesser number. In so doing, the submitter raises perhaps the most important issue in her letter. The submitter is quite correct. The electrical code does

indeed interfere with the rights of a property owner in this matter, just as surely as the building code interferes with the right to determine the load rating of a living room floor.

Construction codes do this, whether plumbing, or fire, or building, or electrical, or mechanical, they do this in untold thousands of ways for the built environment. They do so in the interest of public safety, because there are innocent third party consequences to system failures that are not restricted in their impact to the owner. In general, buildings survive their current owner, and construction codes strive to protect future occupants as well as the current ones. The next owner of the submitter's house may lament the absence of a receptacle outlet in the exact location the submitter has determined there is no need for one, and respond with an extension cord to the detriment of safety. Furthermore, many studies have shown the influence diligent code enforcement has on insurance loss experience.

The submitter also fails to appreciate that there are usually wiring design alternatives that allow the code rules to be met in ways that accommodate the owner's objectives. For example, if an owner desires to eliminate infiltration effects entirely, he or she may do so by specifying a surface metal raceway or other similar wiring method that does not create a membrane penetration.

Construction codes are dynamic in their content, incorporating advances in technology, and continually learning from prior loss experience. The submitter objected to the hazards of additional receptacle outlets with respect to juvenile access. However, that exposure exists for even a single receptacle, which is why receptacle covers were invented. Further, current electrical requirements, ever part of this learning experience, now mandate the use of receptacle designs that are tamper resistant to children.

If this proposal were accepted the result, on a statistical basis looking at the many thousands of dwellings that would be affected over time, would be an increase in the usage of extension cords and the loss experience that would go with it. The proposal fails to make the case that the certain reduction in safety would somehow be balanced by its purported "energy efficiency," or improvements to "environmental and economic security," or "personal safety."

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-13 [210.52(A) (new)]

Submitter: Frederic P. Hartwell

Proposal: Insert two Massachusetts amendments into 210.52(A) as follows:

I. Revise 210.52(A)(2)(1) as follows:

Any space 600 mm (2 ft) or more in width (including space measured around corners) and unbroken along the floor line by doorways and similar openings, and fireplaces, ~~and fixed cabinets.~~

II. Delete 210.52(A)(4) in its entirety.

Substantiation: This proposal will return this part of the Code to the 2008 NEC wording. The new (2008 NEC) wording has created a monster and accomplishes nothing in terms of safety. Countertop receptacles had been used to comply with the perimeter spacing rules for generations before this new wording entered the Code. Remember that any receptacle placement not exceeding 5½ feet above a floor qualifies as a perimeter receptacle per 210.52(4). At one time, there were no prescriptive rules for receptacle placements on countertops and the only requirements that applied were the customary 6- and 2-foot rules. The receptacles so installed met the perimeter spacing rules due to their height. When the 2- and 1-foot limits entered the NEC, kitchen counters became much more heavily populated with receptacles (and justifiably so), but the perimeter spacing rules never failed to apply. In the case cited in the substantiation for the original proposal that prompted this change (Proposal 2-228, 2008 NEC), the counter receptacle does now and should continue to count as the required receptacle. Before prohibiting this long-standing practice, CMP 2 should have considered that the absence of an additional receptacle in the three-foot area adjacent to the counter could be legally cured by installing a receptacle in that space 5 feet above the floor. Imagine explaining to ordinary people that the counter receptacle some 3 feet above the floor doesn't count, but the other one would.

There are many other problems with this new concept. For example, a receptacle placement adjacent to a refrigerator cut-out for the use of that appliance (as some users prefer for convenience instead of within the cut-out) becomes a code violation unless an additional receptacle is placed within the cut-out, since this will now be wall space over two feet wide. The same could be said for stove locations. Peninsular and island counters would be required to have additional receptacles below those installed to service the countertop above in instances where the support for the island or peninsula does not qualify as a cabinet. CMP 2 rejected this submitter's public comment (2-118, 2011 NEC) with the argument that countertop receptacles "are dedicated for appliances utilized in that countertop space and are not intended to serve other loads." This statement is patently absurd. If one is vacuuming a kitchen, where does the vacuum cleaner get plugged in? If one is doing a homework project requiring additional lighting intensity, where does the additional floor or portable light get plugged in? It is true that the spacing, branch-circuit, and placement rules for countertop receptacles support kitchen appliances, but not only such equipment.

The larger problem, however, is the extraordinary efforts that will be required to accommodate a change that had absolutely zero loss experience to support it. The NEC has started down the road of turning 210.52(A) into a Rube Goldberg contraption. The first step occurred when CMP 2 realized that the literal wording of (4) would have required toe space receptacles under every cabinet in accordance with the usual 210.52(A) requirements, a preposterous outcome, and so "fixed cabinets" were excluded. True to the spirit of Rube Goldberg this has created a hazard in all other rooms because now the mere presence of a cabinet excludes the space from a placement measurement. There are many rooms with extensive fixed

cabinetry, in some cases surrounding the entire room. Are we to conclude that the entirety of such rooms must be serviced with extension cords? There is plenty of actual loss experience to support an objection to this outcome. Although this submitter could certainly formulate additional wording that could cure this problem in other rooms, doing so for refrigerator and stove cut-outs adjacent to cabinets is more difficult, and frankly not worth the effort.

It is time to recognize that this entire exercise was flawed from the start. As the Advisory Committee is well aware, proposals crop up from time to time requesting increasing the minimum number of small-appliance branch circuits. These proposals are routinely rejected, as they should be, because there is no loss experience to support a finding that additional circuits are required. The two-circuit rule has been in place since the 1959 NEC, and until the 2011 NEC version of 210.52(A) it was generally understood that kitchen counter receptacles were adequately served, even though the same circuits that supplied the counter receptacles also could and usually did supply perimeter receptacles in other parts of the kitchen, along with the dining room and other such rooms covered in 210.52(B)(1). Somehow, during the entire fifty two years prior to the 2011 NEC, there seems never to have been a problem with connecting non-appliance loads to these receptacles. In fact, for a user with arthritic knees, even if a baseboard-height receptacle were placed adjacent (but below and to one side) to a countertop receptacle servicing the end counter in a multipurpose space, the countertop receptacle will still get the floor lamp plug, every time. The adequacy of receptacle placements reflects the amount of load to some degree, and more importantly the likelihood of extension cord usage for routine appliance placements. There does not seem to be any statistical or even any logical basis to assert that an occasional non-appliance connection either encourages the use of extension cords on kitchen counters, or causes counter circuits to be overloaded.

There is another unintended outcome of this change that must also be addressed. Now a peninsula or an island countertop, where constructed over cabinets, can be of indefinite length as long as there is at least one qualifying receptacle outlet serving the space. Before the 2011 NEC, an inspector could control this by citing the fixed room divider rule in 210.52(A)(2)(3) and generally limit the length of such areas to about six feet before an additional outlet would be required to serve the countertop. Now that space is exempt from this rule, and a single receptacle outlet suffices, per 210.52(C)(2&3), for a counter of any length. Of course, this contraction might be cured by additional provisions inserted into 210.52(C), but with the likely outcome of even additional unintended consequences.

This has never been a problem before the 2011 code cycle. If the NEC continues with this foolishness this submitter predicts that we will spend this and the next few code cycles building an elaborate editorial artifice in order to sort out all the unintended consequences of this rule change. Such an effort to implement what is a very far reaching change is only justified in the context of actual loss experience or compelling substantiation establishing a strong likelihood of loss. This burden has not been met.

The panel statement rejecting the comment supporting this proposal on the national level failed to respond to any of the arguments presented in the substantiation. The plethora of issues presented in the 2011 NEC changes to this section must be resolved in Massachusetts before another cycle goes by. This submitter also hereby gives notice of his intent to present this as an IAEI floor proposal for the 2014 Eastern Section meeting.

Committee Action: Accept

Vote on Committee:

Affirmative: 21

Negative: 1

Abstain: none

Number of Eligible to Vote: 22

Explanation of Negative:

Mr. Cox:

Abstain: Although I agree with the intent of this proposal and the committee action, I do not agree with all of the statements made in the substantiation.

14-14 [210.52(E) (Mass)]

Submitter: Frederic P. Hartwell

Proposal: Delete this amendment.

Substantiation: This proposal is submitted the Secretary to respond to developments in the NEC that bear on the continuing validity of existing Massachusetts amendments to the NEC. The wording has been entirely or substantially incorporated into the NEC and need no longer be published as a separately stated Massachusetts amendment.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-15 [225.36 (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Delete this amendment.

Substantiation: This proposal is submitted the Secretary to respond to developments in the NEC that bear on the continuing validity of existing Massachusetts amendments to the NEC. The wording has been entirely or substantially incorporated into the NEC and need no longer be published as a separately stated Massachusetts amendment.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-16 [225.38 (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Delete this amendment.

Substantiation: This proposal is submitted the Secretary to respond to developments in the NEC that bear on the continuing validity of existing Massachusetts amendments to the NEC. The wording has been entirely or substantially incorporated into the NEC and need no longer be published as a separately stated Massachusetts amendment.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-17 [220.6(5) (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Delete this amendment.

Substantiation: This proposal is submitted the Secretary to respond to developments in the NEC that bear on the continuing validity of existing Massachusetts amendments to the NEC. The wording has been entirely or substantially incorporated into the NEC and need no longer be published as a separately stated Massachusetts amendment

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-18 [220.82 (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Delete this amendment.

Substantiation: This proposal is submitted the Secretary to respond to developments in the NEC that bear on the continuing validity of existing Massachusetts amendments to the NEC. The wording has been entirely or substantially incorporated into the NEC and need no longer be published as a separately stated Massachusetts amendment.

The only substantive difference is the absence of the informational note, which was not part of the original proposal. That difference alone presumably does not justify the continuation of an amendment at this location.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-19 [220.82(A)(5) (Mass.)]

Submitter: Peter C. Diamond

Organizational Representation: Municipal Inspectors Association of Massachusetts and Rhode Island

Proposal: Solar photovoltaic systems, fuel cell systems, small wind electric systems, or interconnected power production systems, if provided with service equipment and installed in accordance with the requirements for service entrance conductors.

Substantiation: Currently as worded, there is confusion for Supply-Side Connections of these systems to the supply-side the normal service disconnecting means. The new added wording will give clear guidance for the industry for Supply-Side Connections of these systems.

Committee Action: Accept in Principle and in Part. Accept the principle of including systems covered in Article 694, but do so as “wind electric systems” as a new Massachusetts amendment, written directly to what will be 220.82(6) in the NEC. Reject the proposed final clause.

Committee Statement: The Committee agrees that these provisions need to be correlated with 220.82. Although the proposal was correctly written to address MEC 220.82(A)(5), the submitter could not have anticipated that that amendment was to be withdrawn (See Proposal 14-18.) The Committee rejects the final clause because it is unnecessary. This section addresses connections on the supply side of the service disconnect, and as such the connections are to be made in the same way as those made from Article 690 and 692 systems. These connections cannot be specified in greater detail at this location because they are subject to the policies of the serving utility. In addition, the wires on the premises side of the connection are service conductors and must necessarily meet those requirements. The Committee deleted the word “small” because the scope and title of Article 694 will no longer include that limitation on the size of these systems.

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

Explanation of Affirmative:

Mr.Roger:

Comment on Affirmative: I agree with the committee action on this as the inclusion was placed in the correct area. These conductors for alternative power systems have their own respective installation requirements and should not be treated the same as service conductors as they are not service conductors and do not pose the same fault current capabilities as do service conductors. Many inspectors consider these alternative energy power sources as being similar to services but they are dramatically different.

14-20 [250.52(A)(3) (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Delete this amendment

Substantiation: This proposal is submitted the Secretary to respond to developments in the NEC that bear on the continuing validity of existing Massachusetts amendments to the NEC. This informational note first appeared in the 1990 MEC as a result of Proposal 25 in that cycle, which amended a prior revision. The prior revision was unsuitable for Code text because it did not contain mandatory language, but did call attention to concrete encased electrodes. The Committee elected to completely rewrite the prior requirement as an informational note. The Committee Statement for this action read: "These electrodes are so preferable to made electrodes that the state should call specific attention to them, while recognizing that a mandatory rule is not workable in many jurisdictions." Although that action was better, it still contained a recommendation which was incorrect form for a note, and in the 1993 NEC (Proposal 41) the wording took its present form.

Now that the NEC (as of the 2005 NEC) has effectively made these electrodes mandatory in all new construction where the electrodes exist, a note extolling their virtues seems out of place. In addition, the literal wording of the note is at variance with the NEC with respect to new construction. For new construction, connection to concrete encased electrodes is mandatory if they will be included in the building design. They cannot be ignored simply because the electrical contractor arrived after the concrete had been poured. This note served a valid purpose for many years, but it is now time to remove it.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-21 [250.97 (new) (Mass.)]

Submitter: Peter C. Diamond

Organizational Representation: Municipal Inspectors Association of Massachusetts and Rhode Island

Proposal: **250.97 Bonding for Over 250 Volts.** For circuits of over 250 volts ~~to ground~~, the electrical continuity of metal raceways and cables with metal sheaths that contain any conductor other than service conductors shall be ensured by one or more of the methods specified for services in 250.92(B), except for (B)(1).

Exception: Where oversized, concentric, or eccentric knockouts are not encountered, or where a box or enclosure with concentric or eccentric knockouts is listed to provide a reliable bonding connection, the following methods shall be permitted:

(1) Threadless couplings and connectors for cables with metal sheaths

(2) Two locknuts, on rigid metal conduit or intermediate metal conduit, one inside and one outside of boxes and cabinets

(3) Fittings with shoulders that seat firmly against the box or cabinet, such as electrical metallic tubing connectors, flexible metal conduit connectors, and cable connectors, with one locknut on the inside of boxes and cabinets

(4) Listed fittings

Substantiation: Currently as worded, ungrounded DC systems allowed by 690.35 that use transformer-less inverters are not required to follow the bonding requirements of 250.97. With voltages of up to 600 volts residential and up to 1000 volts in other applications, a proper ground fault path must be insured for activation of the system GFDI and Arc-Fault protection that will be implemented under the 2014 NEC. The removal of the wording “to ground” will include these systems.

Committee Action: Reject

Committee Statement: The amendment is unnecessary. The voltage to ground of an ungrounded system is defined in Article 100 as the voltage between conductors.

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-22 [300.5(D)(3) (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Revise this amendment to read as follows:

300.5(D). Revise to read as follows:

(D) Protection from Damage. Direct-buried conductors and cables shall be protected from damage in accordance with 300.5(D)(1) through 300.5(D)(4). Buried raceways enclosing service conductors shall additionally meet the requirement in 300.5(D)(3).

Substantiation: This wording fully resolves the seeming conflict between the parent text, which does not cover raceways, and (3) which we always though did cover raceways as well as direct burial applications. This rule originated in the 1996 MEC, and plainly covered all underground service wiring. When this went to the NEC from Massachusetts, the original submittal (Proposal 4-89 and Comment 3-3 for the 1999 NEC cycle), it was always intended to apply whether or not a raceway protected the conductors, unless concrete encasement were applied to the raceway. The original submittal was in Article 220, where this sort of confusion could not have happened. In fact, it did apply generally in that code cycle because it was a simple paragraph in a section entitled “Protection from Damage.” Direct buried conductors are not encased in concrete, and this rule makes no sense unless the direct-burial criterion is removed. The burial depth limitation of 18 inches was originally chosen because that is the minimum cover depth of rigid nonmetallic conduit used in service applications. The intent was for this to apply to these raceways.

In the 2002 cycle, the section was supposedly editorially reorganized with numbered paragraphs under what became parent language in 300.5, using a direct-burial criterion. CMP 3 at the comment stage of this revision cycle now claims that what was intended to be editorial is actually what the panel intends to be the actual requirement, which differs very substantively from the text approved by CMP 4 in Article 220. CMP 3 claims there should now be no protection requirement for underground service raceways beyond the burial depth table. This turns the intended Massachusetts revision on its head. It is plainly unacceptable. In view of the current position of CMP 3, Massachusetts has no choice but to recapture this requirement in its own amendments until CMP 3 sees fit to restore the original intent. This may very well be a suitable proposal for the 2014 Eastern Section meeting.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-22A [310.10(H)(6) (new) (Mass.)]

Submitter: Massachusetts Electrical Code Advisory Committee

Proposal: Insert a new MEC amendment as follows:

310.10(H)(6). Add an exception as follows:

Exception: Underground isolated phase installations performed in accordance with 300.5(I)

Exception No. 2 shall be permitted.

Substantiation: The 2014 NEC will include new provisions at this location that will directly conflict with underground isolated phase installations. If done properly, with no ferrous raceways segments and run in close proximity, these installations are safe and have been recognized in the NEC since the 1984 edition. They provide practical assistance in terminating large parallel conductor runs entering concrete pits under switchgear, and they are used by engineers to introduce enough impedance to reduce the available fault current on large services.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-22 [310.15(B)(3)(a) (Mass.)]

Submitter: Leo Martin, Sr.

Proposal: Delete the Massachusetts amendment and follow the NEC 310.15(B)(3)(a).

Substantiation: Section 310.15(B)(3)(a) has been in the N.E.C dating back to the 2002 Edition and remained unchanged in the 2005, 2008, and 2011 editions. I have not heard of any issues resulting from the language stated in the N.E.C.

Committee Action: Reject

Committee Statement: This amendment has been in the Massachusetts Electrical Code since the 1990 edition. The amendment continues the NEC mutual conductor heating ampacity derating cut points that were unchanged for all prior editions going back to the 1959 edition. The Committee is also aware of a large building project in Colorado for which the construction timing happened to straddle the timing of the NEC change, with the engineered design completed on the old cut points. As a compromise, the building was permitted to proceed to completion with sophisticated temperature monitoring employed after occupancy to monitor the performance of the system as engineered. No problems were observed. No loss experience has been reported in Massachusetts over the intervening quarter century since the original amendment was voted on.

This should not be surprising. As noted in the substantiation for the 1990 MEC on this point (Proposal 36), the NEC neglects the effects of intermittent loading and minor values of current on some conductors. Because of the I^2R relationship to heating, if half the conductors in a raceway are energized at full current and the other half are turned off, there will be twice as much heat developed compared to that developed in the same raceway with all of the conductors turned on and carrying one half of full current. It is true that the old cut points still survive in NEC Annex B, Table B.310-15(B)(2)(11), but these are only available under engineering supervision. Routine enforcement of the NEC cut points will impose significant cost with no observable benefit. In the rare event, yet unseen, of an actual problem the inspector always has 310.15(A)(3) at his or her disposal, as covered in the Informational Note.

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-24 [Table 310.15(B)(3)(a) (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Revise the note to the table to read as follows:

¹Number of conductors is the total number of conductors in the raceway or cable, including spare conductors. The count shall be adjusted in accordance with 310.15(B)(5) and (6), and shall not include conductors that are connected to electrical components but that cannot be simultaneously energized.

Substantiation: This proposal is submitted the Secretary to respond to developments in the NEC that bear on the continuing validity of existing Massachusetts amendments to the NEC. This note has been revised exactly as shown in the proposal and the MEC should follow suit. This particular change is crucial because it addresses significant unintended consequences stemming from the 2011 NEC change that produced the current text of the note, which used to only capture actual current carrying conductors. The panel wanted to capture spare conductors as well, due to instances of uninspected subsequent usage of the spare wires. However, in the process the literal wording of the 2011 NEC also captured wires that were not spares, but subject to noncoincident loading. A classic example would be the travelers in a three-way switch configuration. Since we will continue to maintain this table in amended form as a state amendment, the associated note that governs the table heading will remain in the MEC, and must be technically correct.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-25 [314.15 (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Delete this amendment

Substantiation: This proposal is submitted the Secretary to respond to developments in the NEC that bear on the continuing validity of existing Massachusetts amendments to the NEC. The wording has been entirely or substantially incorporated into the NEC and need no longer be published as a separately stated Massachusetts amendment.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-26

[Secretary's Note: This sequence number was not used.]

14-27 [314.15 (Mass.)]

Submitter: William Laidler

Proposal: Delete the Mass. amendment to this section.

Substantiation: The National language is very close to the original Mass. amendment.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-28 [334.10(3) (Mass.)]

Submitter: Russ LeBlanc

Proposal: In 334.10(3), change the word "concealed" to "installed", as follows:

Other structures permitted to be of Types III, IV, and V construction except as prohibited in 334.12. Cables shall be ~~concealed~~ installed within walls, floors, or ceilings that provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies.

Substantiation: This is an overly restrictive requirement especially considering all of the different types of building systems used in today's construction. Many components have interlocking panels or bolted, screwed, or hinged panels or hatches that may be removable and thus would not permit NM to be used since the cable would no longer be considered concealed. For example: I believe that NM cables can be safely installed behind a solid gypsum board type ceiling even if that ceiling happens to have a small metal hatch (2 ft X 2 ft for example) type of an access panel. The ceiling would still be able to provide the required 15 minute thermal barrier, and would also provide all the protection needed for the cables. Yet, this is NOT permitted by the NEC since the

cable in this instance would not be considered concealed. Also this will eliminate a conflict with 334.12(A)(2) of the MEC which is intended to permit the use of NM above a suspended ceiling with removable tiles, but since the MEC does not modify the word “concealed” in 334.10(3), NM could not be used in the suspended ceiling unless it was a suspended ceiling without removable tiles such as a suspended gypsum board. Please see copy of my request for a formal interpretation on this matter. [Secretary’s Note: This is available to the public upon request to the BFPR Office.]

Committee Action: Accept. Amend the existing MEC amendment to read as follows:

334.10. Amend (3) and insert an exception to read as follows:

(3) Other structures permitted to be of Types III, IV, and V construction. Cables shall be installed within walls, floors, or ceilings that provide a thermal barrier of material that has at least a 15-minute finish rating as identified in listings of fire-rated assemblies.

[Exception text unchanged from present wording.]

Committee Statement: The Committee does not necessarily agree with all of the substantiation.

The focus of the acceptance is to correlate the main text with the MEC amendment to 334.12(A)(2), which inadvertently becomes almost unusable without this change.

Vote on Committee:

Affirmative: 21

Negative: 1

Abstain: none

Number of Eligible to Vote: 22

Explanation of Negative: 1

Mr. Naughton:

Reject : The recent action of panel 7 statement clarifies the language of this installation that has been in effect since 2002. Maintaining the installer and the Authority Having Jurisdiction consider each installation in question. This should meet the submitter’s needs.

14-29 [334.40(B) (new) (Mass.)]

Submitter: Charles Palmieri

Proposal: Delete the language in the 2014 NEC as indicated.

(B) Devices of Insulating Material. Self-contained switches, self-contained receptacles, and nonmetallic sheathed cable interconnector devices of insulating material that are listed shall be permitted to be used without boxes in exposed cable wiring ~~and for repair wiring in existing buildings where the cable is concealed~~. Openings in such devices shall form a close fit around the outer covering of the cable, and the device shall fully enclose the part of the cable from which any part of the covering has been removed. Where connections to conductors are by binding-screw terminals, there shall be available as many terminals as conductors.

Note existing 2011 Language: **(B) Devices of Insulating Material.** Switch, outlet, and tap devices of insulating material shall be permitted to be used without boxes in exposed cable wiring and for rewiring in existing buildings where the cable is concealed and fished. Openings in such devices shall form a close fit around the outer covering of the cable, and the device shall fully enclose the part of the cable from which any part of the covering has been removed. Where connections to conductors are by binding-screw terminals, there shall be available as many terminals as conductors.

Substantiation: CMP-7 has adopted new language to this section recognizing listed self-contained interconnector devices for Type NM (nonmetallic cable). I am submitting this proposal to generate discussion. This is a somewhat expansive change whereas the previous text referred to tap devices. I do not believe this committee has addressed the merits of allowing such devices to be concealed for repair wiring.

Committee Action: Reject

Committee Statement: The focus of the Committee discussion was on the application of these devices to concealed work. The connectors must be listed under the terms of the new NEC language. The NEC language is not a dramatic departure, and perhaps even somewhat more limiting, than the existing allowance for “rewiring” generally. They have been permitted to be concealed in Article 545 for manufactured buildings (545.13) since that article made its first appearance in the 1975 Code. The proposal raised the issue but did not present adequate substantiation to challenge the suitability of these connections.

Vote on Committee:

Affirmative: 21

Negative: 1

Abstain: none

Number of Eligible to Vote: 22

Explanation of Negative:

Mr. Bedard:

I agree with the submitter’s concerns but do standby and agree with the Committee action.

14-30 [338.10(B)(4)(a) (Mass.)

Submitter: Frederic P. Hartwell

Proposal: Revise the lead-in text for this amendment as follows:

338.10(B)(4)(a). ~~Identify the existing informational note as Informational Note No. 1, and add a second~~ Add a third informational note as follows:

Substantiation: This proposal is submitted the Secretary to respond to developments in the NEC that bear on the continuing validity of existing Massachusetts amendments to the NEC. Since the 2011 NEC, there have been two notes at this location, and the Massachusetts revision adds what is now a third note.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-31 [400.14 (Mass.)]

Submitter: Leo Martin, Sr.

Proposal: Delete the Massachusetts amendment to 400.14 and follow the N.E.C. 400.14 requirements.

Substantiation: Section 400.14 has been in the N.E.C. without change dating back to the 2005 edition. I have not heard of any issues resulting from the language stated in the N.E.C.

Committee Action: Reject

Committee Statement: This amendment (in several forms due to reorganizations of Article 400 over the years) has been in the MEC since the 1996 edition. The substantiation failed to make any case for inserting the NEC limitation of this provision to industrial occupancies, which is what would happen for users if this amendment were removed. The reason for the additional ampacity limitation was fully covered in the substantiation for the supporting proposal (96-65), as follows, and no substantiation was presented to undermine its validity:

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

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

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

[Secretary’s Note: The table reference in the body of the amendment will be revised from “Table 400.5” to “Table 400.5(A)(3)” to correlate with existing NEC numbering.]

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-32 [404.2(C) (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Delete this amendment.

Substantiation: This proposal is submitted the Secretary to respond to developments in the NEC that bear on the continuing validity of existing Massachusetts amendments to the NEC. The wording has been entirely or substantially incorporated into the NEC and need no longer be published as a separately stated Massachusetts amendment.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-32A [406.4(D)(3) (new) (Mass.)]

Submitter: Massachusetts Electrical Code Advisory Committee

Proposal: Insert a new MEC amendment as follows:

406.4(D)(3). Delete the exception.

Substantiation: The 2014 NEC will include an exception to permit conventional receptacles to be used for replacements if the existing outlet box will not accommodate a GFCI receptacle and further provided that GFCI protection is arranged ahead of the new receptacle. This will create the erroneous impression that 406.4(D)(3) requires the use of a GFCI receptacle. It does not. It requires the use of a “ground-fault circuit-interrupter protected receptacle.” A conventional receptacle on the load side of a GFCI circuit breaker complies with this rule. The new NEC exception is completely unnecessary.

It is also technically incorrect because it requires the use of labeling indicating “GFCI protected” and “no equipment ground.” The latter label should not be used if an equipment ground is present, and yet would be required. There are many applications of small outlet boxes containing old wiring that nevertheless do provide an equipment grounding return path.

This new exception, which is permissive and therefore does not vary the rule it follows, can technically be safely ignored. However, it is very likely to cause confusion and should be deleted until this error can be corrected in the 2017 NEC.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-33 [409.100]

Submitter: Paul Asselin

Proposal: Proposal is to add language in 409.100 for the addition of a 15amp 125volt GFCI Receptacle on the outside of the enclosure door along with a communications link to any PLC equipment inside of the enclosure. This exterior power and data would need to be rated for the environmental conditions that it would be subjected to. An exception for Hazardous (classified locations) would be needed.

Substantiation: The purpose of this change would allow for program changes and troubleshooting this equipment with the door closed. Engineers, technicians, and electricians are put in harms way and subject to voltage and arc flash/arc blast hazards to perform a simple task such as plugging into a plc to change, monitor, or troubleshoot a plc. These products are readily available such as Grace Engineering's "Grace Port" solution (see attached). [Secretary's Note: This supplemental information is available upon request to the public; contact BFPR staff.]

Committee Action: Reject. The proposed equipment can be installed under current Code requirements. The Advisory Committee declines to mandate it for all industrial control panels because it is a matter of design. The need varies significantly based on the size and complexity of the control panel, the available fault current, and the applied voltage. Many control panels include only control circuit components, as covered in 409.110(4) Exception, and this requirement would be inappropriate in such cases because the hazards addressed in the substantiation would not exist.

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-34 [525.22 (Mass.) (new)]

Submitter: Frederic P. Hartwell

Proposal: Insert a new Massachusetts amendment as follows:

525.22. Insert parent text after the section title and before 525.22(A) as follows:

Where GFCI protection is provided through the use of GFCI receptacles, and the branch-circuits supplying the receptacles are wired using flexible cord, the receptacles shall be identified for portable use.

Substantiation: This is admittedly enforceable through 110.3(B) because of the guide card restrictions on the product (category KCXS) in that they are "flush receptacles and are intended to be installed in an outlet box for fixed installation on a branch circuit similar to a conventional receptacle." Therefore it is at least implied that these devices are prohibited to be installed at the end of a flexible cord. Nevertheless, the lack of black-letter Code rule on this topic in conjunction with the somewhat vague guide card restriction has routinely resulted in extensive application of these temporary GFCI set-ups at fairs and carnivals. This submitter was recently overruled when he objected to approximately 40 of these at an actual event. Note that the rule in 590.6 is limited to construction sites and similar venues, and cannot be applied to carnivals and fairs. These devices are a recognized hazard when connected to temporary wiring because the neutral continuity can and has opened in the field. If this happens, the device loses its brains because it no longer sees 120 volts, and it fails closed. This has resulted in a number of

documented fatalities on construction sites, which is why there is a comparable restriction [590.6(A)(2)] to that proposed here. The overwhelming majority of temporary wiring for fairs and carnivals uses flexible cord, and the listing restriction is widely overlooked. This proposal will provide the necessary awareness.

This proposal was accepted by CMP 15 during the proposal stage, but rejected during the comment stage over the vehement objections of both NEMA and UL. The UL objection is particularly on point: “Open neutral protection is an important GFCI feature, especially in applications dealing with abuse and wear. Sam Sampson, in his IAEI Article entitled ‘Electrical Inspections for Carnivals, Fairs and Traveling Shows’, points out that plug and socket connections in those venues are subject to damage and wear. Quoting from this article, ‘Cords are often damaged by exposure to oils, gasoline, direct sunlight, foot and vehicular traffic, arriving on site worse for the wear. Distribution boxes and cords are unloaded at each stop in various stages of disrepair.’ The article goes on to state, ‘With the safety of the carnival workers and the public at stake, it is important to check the entire distribution system for properly sized over-current devices, grounding and bonding continuity and GFCI functionality.’ Portable GFCIs with open neutral protection provide the protection needed to deal with worn cord and plug connections.”

The gravamen of the panel rejection centered on the impracticality of providing portable GFCI protection for what could be all receptacle outlets at a carnival, because all wiring at some point runs in flexible cord. This proposal has been modified from that submitted to CMP 15 to clarify that it only applies to the actual branch circuit supplying one or more receptacles; if a feeder runs in flexible cord to some sort of distribution point, it would be permitted to install conventional GFCI receptacles at that point. The panel made a comparable change during the proposal stage, but the adverse public comments erroneously stated that all receptacles would be covered by this requirement anyway. The arrangement permitted by this wording is frequently done using so-called spider boxes and can be done safely. However, placing a conventional GFCI on the end of a flexible cord violates 110.3(B) and should not continue in Massachusetts to the extent it is now practiced.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-35 [547.1 (new) (Mass.)]

Submitter: Robert C. Delucia

Proposal: Revise article 547.1 as follows:

547.1 The provisions of this article shall apply to the following agricultural buildings *residential grow rooms* , *greenhouses* , or that part of a building or adjacent areas of similar or like nature as specified in 547.1 [A] or [B].

Substantiation: With the passage of the medical marijuana bill for Mass. I feel the need for a Mass. amendment to article 547.1 to include residential grow rooms or greenhouses. The safety problems I foresee is that these rooms or greenhouses will be wired by an unqualified person with the use of extension cords and multiple surge protectors due to the lack of electricity in

these areas. Another concern is the presence of water , heat, or UV light coupled with other equipment will create problems that can be addressed in article 547 such as wiring methods , derating of conductors , and GFCI placement . These rooms or greenhouses consists of water , humidifiers , or dehumidifiers , Co2 [by tank or propane] , and other equipment used. The time to act is now before these rooms , or greenhouses have a three year start on all of us.

Committee Action: Reject.

Committee Statement: The Committee agrees that many of the problems cited in the substantiation are likely to occur. The Committee also agrees that a marijuana cultivation enterprise is agricultural in nature. In the event that such activities crossed the scope boundaries in 547.1, then they are subject to the requirements in Article 547 without the necessity of amending the NEC. The Committee believes that the problems cited can be addressed by careful enforcement of existing requirements. The MEC does not regulate unlicensed practice in the Commonwealth.

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-36 [553.4 (new) and 555.3 (new) (Mass.)

Submitter: Frederic P. Hartwell

Proposal: Insert new amendments as follows:

553.4. Delete the last sentence.

555.3. Delete this section. Insert new amendments as follows:

Substantiation: This proposal returns these sections to the 2008 NEC wording and removes the new (2011 NEC) ground fault provisions. There are obvious major issues with these requirements. What does the equipment described in the 2011 NEC substantiation actually do? It would appear to be a residual current device set to trip at 100 mA. This is higher than the usual setting for low-level GFPE used to protect heat tape and snow-melting cables, and far higher than usual GFCI settings, so it would be ineffectual at actually preventing an electrocution, or more to the point, a drowning. There is no documentation to support the arbitrary setting that has been included.

Note that this issue is far more important in fresh water exposures. Fresh water has a much higher resistance than salt water, and as a consequence the voltage gradient in the vicinity of a fault is much steeper, to the point of being many volts across the width of a human body. A very few volts, especially with water in the ears, can bring on enough disorientation to cause drowning. This was the basis for the Faraday cage bonding requirements for swimming pools going back to the earliest days of Article 680. Salt water has such low resistance that such a steep gradient across the width of a body is almost unheard of. The Code language makes no such distinction, however.

At best these devices would function more as a “maintenance required” annunciator, hopefully tripping before someone was in the wrong place at the wrong time and got injured or worse. If it tripped, one supposes it would motivate major maintenance to be performed in order to reduce the leakage below the trip setting. This will frequently not be practicable.

There are many large floating buildings with services running over 1000 A and occupying considerable ocean front in major harbors, how can this be applied in those locations? Could every feeder and branch circuit be wired with the GFCI alternative? This requirement is many years away from prime time incorporation in the NEC, and should either be removed entirely at this time, or an extended delayed effective date incorporated, perhaps two code cycles.

The panel statement in the comment rejecting these proposals period actually in many ways supports a delay in implementing these requirements. It reads as follows:

“Since the adoption of the “not to exceed 100 mA” leakage limit for residual current devices at marinas and boatyards in the 2011 Code, it is the understanding of CMP-19 that 30 mA ground-fault protection of equipment (GFPE) industrial circuit breakers have been employed. While it is recognized that the optimal level of protection for personnel is 5 mA, CMP-19 recognizes that only part of the solution to electrocutions at these locations can be solved on the docks and marinas. A large contributor to the safety issue comes from the watercraft and any measures taken at the services at the marinas cannot solve the problem. Constant nuisance tripping caused by expected wide disparities between the levels of the stray currents and optimal personnel protection can be expected to meet with strong resistance by the marina and boatyard owner/operators.

“The panel has proposed an NFPA Research Foundation Code Fund Project to review the American Boat and Yacht Council (ABYC) study on the subject, titled “Research on the Mitigation of Residual Current/Voltage Detection in Marinas, Boatyards to a Level Below Muscular Tentanization Level”. CMP-19 hopes that results from such a study will provide necessary stimulus for development of life saving technologies. In the meantime, CMP-19 has concluded that elimination of the present requirement would be regressive at this time and lead to no required protection at all.

“CMP-19 recognizes the critical nature and immediacy of the safety issue and, if this above-mentioned code fund project is approved, intends to address the findings of the project when any recommendations become available.”

So the panel recognizes there are major technical issues with the requirements. Now review the negative votes (that would support this proposal) from the IAEI member and the UL member on the panel, respectively:

[IAEI]: “Although information was submitted during the Proposal meeting that reflected a need for better protection at marinas, the Action is based on a study that contains obvious flaws. The 100 MA setting claimed by some to eliminate this hazard far exceeds the 4-6 MA Standard set for GFCI, the limit considered maximum to protect personnel. With electrocutions growing in number each summer, and the recent July 2012 tragic events providing an emotional reaction to public demands for more regulations this simply does not help. The known responses to current imposed on the human body just will not stop with the 100 MA level and the public is being convinced this will. As experienced laymen of the Electrical Industry, with all facets represented on this Code Making Panel, we have become part of the charade that we’re protecting the Public by this requirement. The real protection would incorporate GFCI protection on each feeder and branch circuit.”

[UL]: “The panel should have accepted the comment and proposal [19-96]. The 100mA recommendation by the Coast Guard research far exceeds the level of 5mA which is the level that should not be exceeded to prevent muscle tetanization of children in water. See definition of “Ground-Fault Circuit Interrupter” in Article 100. Muscle tetanization is a state of muscle contraction that results in the inability of a person to control their muscles. When the muscles

tetanus the ability to control breathing and to swim or climb out of the water is lost which results in swimmers sinking to the bottom of the water and drowning. Ground fault protection of equipment (GFPE) circuit breakers that trip at the 30mA level will not provide ground fault protection for personnel and will only serve to provide a false sense of protection.

“The intent of the Coast Guard research to address a known problem has merit, however, implementing the 100mA limit alone may not have an impact on solving this problem, and may even increase the hazard by giving those in or near the water a false sense of protection. As the panel statement indicated ‘A large contributor to the safety issue comes from the watercraft and any measures taken at the services at the marinas cannot solve the problem.’ A comprehensive solution including ground fault protection, wiring methods, wiring devices, grounding, system design and enforcement must be developed to alleviate this hazard.”

The NEC now requires that a 100 mA residual current device be installed that is capable of shutting down the service at a major marina or the New England Aquarium (a floating building), even though the facility may not even be the source of objectionable voltage (reference the panel statement). The idea that this be a mandated part of the electrical installation is clearly not ready for prime time. The Advisory Committee should step on this until a comprehensive solution is at hand.

[Secretary’s Note: The Committee decided to divide the question. This Proposal is considered to be two proposals with identical substantiation, designated Proposals 14-36A and 14-36B.]

Committee Action, Proposal 14-36A (to 553.4): Accept in Principle. Delete the final two sentences of Section 553.4

Committee Statement, Proposal 14-36A: The two final sentences need to be deleted in order to accomplish the objectives of the proposal.

Committee Action, Proposal 14-36B (to 555.3): Accept

Vote on Committee:

Affirmative: 21

Negative: 1

Abstain: none

Number of Eligible to Vote: 22

Explanation of Negative:

Mr. Roger:

The inclusion of the feeder leakage current devices came about as a result of many years of testing and it has been endorsed by the NFPA 303 Committee on Boatyard and Marinas. There are many documented cases of drowning due to leakage currents in the area of boatyards and marinas. This technology does add some element of additional warning and subsequent safety in these areas. I have not seen any documentation from the marina industry and the public that we should remove this requirement in Massachusetts and this is a self generated proposal from the committee, shouldn’t a relaxation of a safety requirement be initiated by the public and not the committee?

14-37 [690.7(D) (new) (Mass.)]

Submitter: Peter C. Diamond

Organizational Representation: Municipal Inspectors Association of Massachusetts and Rhode Island

Proposal: **(D) Circuits over 150 Volts to Ground.** In one- and two-family dwellings, live parts in photovoltaic source circuits and photovoltaic output circuits over 150 volts ~~to ground~~ shall not be accessible to other than qualified persons while energized.

Substantiation: Currently as worded, this code rule doesn't apply to ungrounded systems with circuit conductors that are over 150 volts between the ungrounded conductors, but have no voltage to ground. The removal of the wording "to ground" is necessary now with the expanded use of ungrounded systems permitted by 690.35.

Committee Action: Reject

Committee Statement: The amendment is unnecessary. The voltage to ground of an ungrounded system is defined in Article 100 as the voltage between conductors.

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-38 [690.11 (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Delete this amendment

Substantiation: This proposal is submitted the Secretary to respond to developments in the NEC that bear on the continuing validity of existing Massachusetts amendments to the NEC. The requisite technical consensus behind what these devices should do and where they should be located has coalesced to the point that the 2014 NEC will not require a delayed effective date. The equipment is beginning to penetrate the market.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-39 [690.14 (new) (Mass.)]

[Secretary's Note: The submitter is an electrical inspector in Bedford. This proposal, on a NFPA proposal form and dated March 30, 2012, was accompanied in communications from the BFPR office by a letter to another individual in the same inspection department from the BFPR dated July 18, 2012. This letter was in reference to a request to amend the MEC dated Feb. 20, 2012. That letter notes that some proposal was submitted to the NEC, CMP 4, and requests that the NEC process be allowed to unfold in the comment period, together with a recommendation that if it were rejected by the NEC it could be submitted under the Massachusetts procedures for a state amendment. However, a quick review of submitted NEC proposals does not show such a

proposal or a related comment on the docket of CMP 4. The proposal also violates various NFPA requirements, and would have been difficult, but not impossible, for CMP 4 to have acted on it even if it were timely submitted. Nevertheless, because this material arrived from the BFPR office following communications to and from the BFPR office, the Secretary has docketed the NFPA proposal as if it were a Massachusetts proposal.]

Submitter: Raymond J. Landers, Jr.

Proposal: Article 690 Solar Photovoltaic. A disconnecting means shall be provided in the location where the conductors enter the combiner or where they leave the array or module. It shall be accessible and it shall be identified and listed for the application. A reflective label shall be installed as to its purpose.

Substantiation: To protect a firefighter in the event of an emergency.

To protect qualified persons from an electrical accident when servicing or repairing solar equipment that may be energized.

Committee Action: Accept in Principle. Take no action to amend the MEC.

Committee Statement: The Committee believes that the comprehensive attention and positive changes achieved within this article during the 2014 NEC cycle have met the objectives of the proposal submitter.

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

Explanation of Affirmative:

Mr. Roger:

Comment on Affirmative: The Committee Secretary is correct on this and it may even warrant a TIA from NFPA. I don't want to make excuses for CMP4 but in light of the number of dramatic changes that were reviewed in this cycle I believe this one simply slipped through the cracks. I intend to discuss with the Chair of CMP 4 as well as the submitter for possible further action.

14-39A [690.41(2) (new) (Mass.)]

Submitter: Massachusetts Electrical Code Advisory Committee

Proposal: Insert a new MEC amendment as follows:

690.41(2). Revise to read as follows: Grounded 2-wire systems shall have one conductor grounded or be resistively grounded, and the system shall comply with 690.5

Substantiation: This provision will be going into the 2014 NEC calling for a dc system to be "impedance grounded." This is clearly inconsistent with the physics of dc systems. The terminology "resistively grounded" will appear in 408.3(F)(4).

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-40 [690.80 (new) (Mass.)

[Secretary's Note: This is rejected NEC Proposal 4-329, which received no public comments either for or against, and therefore remains rejected for inclusion in the NEC. It arrived with other MEC proposals from the BFPR office. The Secretary has therefore docketed it as a proposal for the 2014 MEC.]

Submitter: John Wiles

Proposal: Revise as shown below and add the Informational Note:

690.80 General

Solar photovoltaic systems with a maximum system voltage over 600 volts but not exceeding 1000 volts dc shall comply with the requirements in Article 690 for systems operating at 600 volts or less where the following conditions are met:

- (a) All modules, conductors, and equipment assemblies shall be listed and identified for use at the applicable voltage.
- (b) Doors and other access points that would provide unqualified persons access to energized dc parts shall be locked.

Informational Note: These requirements will generally apply to the calculations of the maximum system voltage and the sizing and application of overcurrent devices to circuits and equipment. Systems with a maximum system voltage over 1000 volts dc shall comply with all the applicable provisions of the preceding sections of this article, and shall comply with Article 490 and other requirements applicable to installations rated over 600 volts.

Substantiation: PV systems rated for 1000 volts dc are common worldwide and an increasing number are being installed in the U.S., categorized rightly or wrongly as "behind-the-fence" installations. Modules, inverters and other BOS equipment certified internationally are mostly being used in these installations. However, domestic manufacturers are beginning to list 1000 volt products to UL Standards 1741 and UL 1703. Additionally, significant efforts are being made in the U.S. to harmonize these standards with equivalent IEC standards, which define low voltage at 1000V.

Meanwhile, the NEC is a source of confusion and ambiguity in its treatment of 1000 volt dc PV systems. Reference to "Article 490 and other requirements applicable to installations rated over 600 volts" is well-intentioned but some of these requirements are clearly written in the context of equipment and switchgear operating at voltages much greater than 1000V and with fault currents far greater than available from PV systems. Overcurrent protection requirements for MV equipment is also overly relaxed relative to the requirements in 690 and should be avoided. Some requirements are well founded and are addressed in the conditions above.

Committee Action: **Reject**

Committee Statement: The Committee declines to move forward on a rejected NEC proposal on which no one, including its submitter, chose to offer a rebutting comment.

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-41 [695.3 (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Revise the NFPA 20 revision cycle date in the informational note to read “2013”.

Substantiation: This proposal is submitted the Secretary to respond to developments in the NEC that bear on the continuing validity of existing Massachusetts amendments to the NEC. The 2013 edition of NFPA 20 will be official before the time the 2014 NEC takes effect in Massachusetts.

Committee Action: Accept

Vote on Committee:

Affirmative: 21

Negative:

Abstain: 1

Number of Eligible to Vote: 22

Explanation of Abstention:

Mr. Bedard

I agree with the Committee action. However I could not wholly commit myself to an affirmative vote as I believe the MEC has long been a leader in the concern of Emergency feeder survivability. The NEC has come a long way since the inception of this amendment and as indicated in the panel statement I do believe the citizens should be allowed to accrue the benefits of this proposal.

14-42 [700.10 (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Delete the amendment.

Substantiation: The NEC has come even closer to the MEC, by removing all references to occupancy classes from 700.10(D). Now the requirements will only depend on high rise construction or on large occupancy loads. This is a more than acceptable trade-off for the enhanced protection requirements for these feeders, recognized throughout the country. In addition, the prescriptive concrete thickness has been generally increased to 4 inches, unless part of a listed 2-hour design that has been otherwise evaluated. It is time to remove this amendment to the NEC and allow the benefits to accrue to the citizens of Massachusetts. It is now clear that the financial impact of regulatory processes, notably including the content of the MEC, will be examined in this cycle to a degree never before undergone.

The current MEC limitation was imposed over the unanimous vote of the Advisory Committee based on a successful, last minute attempt by a special interest to protect its market share in a blatant example of rent seeking. These shenanigans, if successful this cycle, could imperil the orderly and timely adoption of the next edition of the Massachusetts Electrical Code.

Committee Action: Accept

Vote on Committee:

Affirmative: 21

Negative: 1

Abstain: none

Number of Eligible to Vote: 22

Explanation of Negative:

Mr. Dempsey:

I believe that Tim Franco and company will be back before the BFPR at the last moment once again to get this put in if we take it out. I don't **necessarily** see the harm in leaving it in for one more cycle as Massachusetts is use to conforming to the requirement currently in place.

14-42A [702.11 (Mass.)]

Submitter: Massachusetts Electrical Code Advisory Committee

Proposal: Delete this amendment.

Substantiation: There are now commercially available neutral transfer kits on the market that fit in panelboard gutter spaces. These allow for wiring portable standby generators with bonded neutral constructions as separately derived systems without disrupting the implementation of conventional panelboard transfer arrangements that only transfer the ungrounded conductors. The relief that was granted in the 2011 MEC is no longer needed.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22

14-43 [705.12(C)(4) (new) (Mass.)]

Submitter: Frederic P. Hartwell

Proposal: Insert a fourth condition in 705.12(C) as follows:

(4) If the interconnection occurs in a switchboard or a panelboard that is fed simultaneously by a primary source(s) of electricity, and where this distribution equipment is capable of supplying multiple branch circuits or feeders or both, the interconnecting provisions for the interconnected electric power production source shall comply with 705.12(D)(1) through (D)(7) with the term “interconnected power production source” assumed to replace the term “inverter” as applicable.

Substantiation: These source connections have never been correlated with (D) with respect to the size limitation and the connection location limitations that apply where utility-interactive inverters connect to conventional panelboards. A non-inverter connection is presently not limited in those ways, even though the potential current injection is far higher, which makes the problem potentially far worse. This proposal places these sources of current injection on the same footing as those from inverters. Note that 705.12(C) downstream connections are emphatically not limited to medium voltage, or to very large interconnections; just 100 kW is enough. This submitter has wired a number of these projects into whatever panel was closest through a breaker positioned at random, fat dumb and happy when he was blissfully unaware of the potential consequences to busbar loading and equipment heating burdens. It was only after serving on CMP 9 and dealing with NEMA concerns on this topic that it became apparent in retrospect that there was a significant opportunity to create a hazard. This issue must be addressed.

CMP 4 seems to finally be responding to this issue, inviting a proposal (see the panel statement on Comment 4-200) as written here for the 2017 cycle. Note that the 700.12(D) location for the original NEC proposal was only made because CMP 4 didn't want to disturb 705.12(C) in the 2008 cycle. We should address it in Massachusetts now, and then send it forward as a Massachusetts proposal for the 2017 cycle.

Committee Action: Accept

Vote on Committee:

Affirmative: 21

Negative: 1

Abstain: none

Number of Eligible to Vote: 22

Explanation of Negative:

Mr. Dempsey:

We still need the information requiring 521 CMR AAB as Mass does not go by the ADA regulations. I agree the pictures can be removed from the amendments as that's what is in Annex J. Please realize that the pictures are only a partial listing.

14-43A [Appendix A (Mass.)]

Submitter: Massachusetts Electrical Code Advisory Committee

Proposal: Delete 521 CMR ARCHITECTURAL ACCESS BOARD.

Substantiation. This material will now appear as Annex J in the 2014 NEC, and need not be continued in the MEC. Although there are minor differences, the Advisory Committee has been told they are compatible with each other.

Committee Action: Accept

Vote on Committee:

Affirmative: 22

Negative: none

Abstain: none

Number of Eligible to Vote: 22