NFPA

Standards Council Meeting

NFPA Headquarters

Batterymarch Park

Quincy, MA 02169

August 3, 2010

8:00 a.m.

Morning Session

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THE CHAIR: Good morning. Welcome everybody. I am going to call this session of the Standards Council to order. Jim Pauley, chairman of the Standards Council. In a moment I am going to go around the room and ask everyone in the room to introduce themselves for the record. For the record, I do want to draw your attention, we do have a stenotypist here today that will be recording the session. So for those of you speaking today it is important to remember to preface your remarks with your name so we can insure that we capture it appropriately for the record.

So let me go ahead and start. Amy we'll start here around the table and then we'll go around the room.

MS. CRONIN: Amy Beasley Cronin, Secretary of the Standards Council.

MS. FULLER: Linda Fuller, recording secretary to the Council.

MR. BELL: Kerry Bell, member of Council.

MR. HARRINGTON: J. C. Harrington, Member of Council.

MR. SNYDER: Mike Snyder, Member of Council.

MR. McDANIEL: Dan McDaniel, Member of Council.

MR. HUGGINS: Roland Huggins, Member of Council.

MR. JARDIN: Joe Jardin, Member of Council.

MR. MILKE: James Milke, Member of Council.

MR. CARPENTER: James Carpenter, Member of Council.

MR. LEBER: Fred Leber, Member of Council.

MR. GERDES: Ralph Gerdes, Council Member.

MR. CLARY: Shane M. Clary, Member of Council.

MR. FARR: Ron Farr, Member of Council.

MS. BRODOFF: Maureen Brodoff, NFPA staff and legal counsel to the staff.

MR. HITTINGER: David Hittinger, Independent Electrical Contractors the.

MR. DOLLARD: Jim Dollard, International Brotherhood of Electrical Workers.

MR. AYER: Larry Ayer, Independent Electrical Contractors.

MR. BURKE: Bill Burke NFPA staff.

MR. BRUNSSEN: Jim Brunssen, Telcordia, member of the TCC.

MR. GALLO: Ernie Gallo, Telcordia member of TCC Atis.

MR. ROCK: Brian Rock, Hubbell Incorporated, observer.

MR. KOVACIK: Jack Kovacik, Underwriters Laboratories, member of the TCC.

MR. ODE: Mark Ode, Underwriters Laboratories, member of TCC.

MR. DRAKE: Bill Drake, Actuant Electrical, member of the TCC.

MR. BUNKER: Merton Bunker, U.S. Department of State, member of TCC.

MR. EARLEY: Mark Earley, NFPA staff secretary of the TCC.

MR. McCULLOUGH: Bob McCullough, chairman of Code Panel 9 representing the IAEI.

MR. McNEIL: Mike McNeil, FMC, member of TCC.

MR. LIGGETT: Danny Liggett, DuPont, member of TCC.

MR. LOYD: Richard Loyd representing Steel Tube Institute.

MR. FOLZ: Stan Folz, National Electrical Contractor Association, member of the TCC.

MR. COGBURN: Larry Cogburn, National Electrical Contractors Association, member of TCC.

MR. REED: Rock Reed, American Honda, member of the PGMA.

MR. STOLL: Bob Stoll, member of PMC5 representing Portable Generator Manufacturers Association.

MR. TURNER: Chris Turner, Generac Power Systems representing PGMA.

MR. JOHNSON: Don Johnson, chairman Code-Making Panel 17, National Electrical Contractors Association.

MR. KELEHER: Paul Keleher, Electrical Services.

MR. WAITE: Bob Waite, Mr. Keleher's electrical engineer.

MR. KISSANE: Dan Kissane, Pass & Seymour, member of the TCC.

MR. FONTAINE: Mike Fontaine, NFPA staff.

MR. BLUNT: John Blunt, regular-fast staff.

MR. OWEN: Rich Owen, International Association of Electrical Inspectors, member of the TCC.

MR. LaBRAKE: Neil LaBrake, member of TCC representing Edison Electric Institute.

MR. ADAMS: Tom Adams, member of TCC representing EEI.

MR. FLEGEL: Mike Flegel, Reliance Control Corporation.

MS. O'CONNOR: Gene O'Connor NFPA and recording secretary to the TCC.

MR. MONIZ: Gil Moniz, NEMA.

MR. FISKE: Bill Fiske, Intertek, member of the TCC.

MR. WALLAC: Chris Wallac, NFPA staff.

1 THE CHAIR: Thank you. Let me briefly
2 go through the procedures on how we'll proceed
3 today, and then we'll move in for the first hearing.
4 Basically for all of these hearings that we have set
5 up this morning, I believe we have about 6 of them
6 that will be scheduled before noon. On each one of
7 those we'll ask the appellants to give about 10
8 minutes to speak and present what they would ask.
9 For those of you that are presenting, keep in mind
10 that Council does have all of the written material
11 that you have sent in, and the Council has had that
12 written material. So if you could not sort of
13 replow that same ground again in your written
14 remarks, it would be greatly appreciated.
15 After that 10 minutes is finished we'll
16 ask any respondents on the other side also to have
17 10 minutes to be able to do it. And again if there
18 are multiples of you, we certainly ask that you
19 recognized those that have spoken before you, again
20 don't repeat the same audits again and in going
21 through the same audits again for the Council. We
22 want to try to use your time as efficiently as
23 possible as we can here today.

When that is completed we'll open it up to questions from the Council to either side. When that is finished we'll give about 5 minutes for each side to simply make any closing remarks. I also remind you in all of these hearings ultimately the decision of the Council is issued by written decision. No member of the Council staff will convey any information associated with that decision. That written decision will come from Miss Cronin who is the secretary of the Council, and that will be the only means of communication of the ultimate decision of the Standards Council on the issue.

For the record, I do want to make a note that for the first two hearings I will be recusing myself because I was involved in both of those particular issues personally. So I've asked Council Member Farr to take over the chair and actually run those two hearings as we begin.

So I am going to turn the chair over to him at this time. Mr. Farr, you can begin with that first hearing.

MR. FARR: Good morning. As Mr. Pauley

1 said, my name is Ron Farr. I will be acting as the
2 presiding officer over the first two hearings that
3 we'll have this morning. At this time we'll have
4 Hearing No. 1, Agenda Item 10-8-1-b, and we ask the
5 appellant, Mr. Keleher --
6 Yes.
7 MR. CARPENTER: James Carpenter, member
8 of Council. I would like to note for the record
9 that I am a member of the Technical Correlating
10 Committee. As a Technical Correlating Committee
11 member, I participated in consideration in voting on
12 the issues that appear to be related to this appeal.
13 I have therefor reviewed my obligations under the
14 guide of conduct of participants in the NFPA
15 process, particularly Section 3.5 (D) of the guide
16 to consider whether there is any reason for me to
17 recuse myself from consideration of this appeal. I
18 have concluded that I do not have any views that are
19 or would appear to be fixed concerning the issues,
20 and I am fully able to give open and fair
21 consideration to this appeal.
22 For the record, therefore, I have
23 considered this matter and believe that I can fully,

1 fairly, and impartially fulfill my role as a Council
2 member on this appeal.
3 MR. FARR: Thank you, Mr. Carpenter.
4 At this time I would ask the appellant, Mr. Keleher,
5 to come to the table, please. If both of you
6 gentlemen for the record state your names.
7 MR. KELEHER: Paul Keleher, Paul
8 Keleher Electrical Services.
9 MR. WAITE: Bob Waite.
10 MR. FARR: Mr. Keleher, the issue here
11 is that you're appealing the issue and asking to
12 overturn the floor action to reject an identifiable
13 part of Comment 1-101.
14 MR. KELEHER: Correct.
15 MR. FARR: Proceed forward. You will
16 have 10 minutes, sir.
17 MR. KELEHER: Paul Keleher,
18 representing Paul Keleher Electrical Services of
19 Berlin, Mass. The particular actions to which this
20 appeal relates are 2011 ROP Proposal 2-193, 2011 ROC
21 Comment No. 2-108, and association technical meeting
22 certified amending motion 70-3.
23 Proposal 2-193 comment 2-108 and

1 certified amending motion 70-3 all seek to propose a
2 new paragraph 5 under 210.19(A). That would if
3 accepted limit voltage drop in 120-volt branch
4 circuits to 5 percent or less at any outlet. The
5 objective of this proposal, which has been clearly
6 stated, is to ensure that standard circuit breakers
7 protecting 120-volt branch circuits provide an
8 instantaneous response to volted short circuits and
9 ground faults. Similar proposals in previous code
10 cycles to limit voltage drop by rule have lacked
11 evidence to substantiate a problem that would be
12 remedied by such a requirement.
13 Proposal 2-193 has been substantiated
14 by more than a thousand field short circuit tests
15 conducted at 120-volt receptacle outlets. The
16 conclusions and the analysis of the test data were
17 reached by comparing the test results to a cable
18 standard for short circuit withstand ratings that is
19 already used in several locations in the NEC. A new
20 reference to this standard will be added to the 2011
21 edition.
22 Some key points of the test data and
23 analysis are as follows, so that you can understand

the issues. In about 60 percent of the tests, voltage drop exceeded 5 percent. In about 60 percent of the tests, the branch circuit breaker failed to clear a short circuit instantaneously using its magnetic response mechanism as thermal magnetic circuit breakers are designed to do. These two facts establish a correlation between the failure of a circuit breaker's instantaneous short circuit response and outlets with voltage drop exceeding 5 percent. But more importantly, of the tests in which the circuit breaker's magnetic failed to clear a short circuit test instantaneously, protection of conductors from excessive I square T heating was inconsistent, overheating the circuit in 20 percent of the cases. In 3 percent of the tests, I square T heating rose close to the point where receptacle screw terminals may be loosened by expansion contraction.

Finally, in reflecting the proposed solution, in a hundred percent of the tests in which the breaker's instantaneous response did operate, no overheating occurred.

In a presentation to Code-Making Panel

2 at its 2011 ROC meeting, a major manufacturer of circuit breakers admitted that standard circuit breakers, and I quote, cannot always protect from parallel arcing faults, unquote. This public admission corroborates the need for this proposal.

The submitter maintains the position that if inconsistent over-current protection at high impedence outlets results in latent circuit damage caused by the heating effects of fault current as the data demonstrates, then a legitimate safety issue does exist that the NEC must address. The detailed results of the test sample of a thousand and 17 tests was submitted as substantiation to proposal 2-193. And I presented this data and the above analysis of it to the code panel in person at its ROP meeting prepared to answer any questions by the panel members.

Following a presentation of the above evidence by the submitter, Code-Making Panel 2 voted 12 to nothing at its ROP meeting to reject this proposal. The panel statement, I quote, The panel reaffirms their position taken on similar proposals in previous code cycles that voltage drop is a

1 design consideration that must be dealt with by the
2 installer designer for each installation and can be
3 specific to the involved equipment. Unquote.
4 The submitter maintains that when a
5 proposal is substantiated with test evidence
6 documenting the existence of a problem, a rejection
7 statement cannot ignore the evidence that was
8 presented. At the ROC stage, having just heard a
9 major circuit breaker manufacturer publicly admit
10 that standard circuit breakers cannot protect from
11 all parallel faults, Code-Making Panel 2 again
12 rejected the public comment of the submitter 2-108,
13 12 to nothing by stating, and I quote again, the
14 submitter has not provided data that shows that
15 conductors are damaged in the circumstances claimed.
16 Unquote.
17 This rejection statement has not been
18 clearly stated but seems to be asking for evidence
19 that does not adhere to standard industry protocol
20 for measuring product performance. Standard
21 protocol is to compare results obtained from field
22 performance testing to limits established in
23 appropriate test standards that have been developed

by competent recognized engineering organizations for this purpose. This proposal has adhered to standard industry protocol.

At the NFPA's technical meeting on June 10th, certified amending motion 70-3 moved the following new text. 5, permissible voltage drop, the circuit conductors of a 15 or 20 ampere 120-volt branch circuit shall be size such that voltage drop measured at the rate of ampacity of the circuit shall be 5 percent or less at any outlet.

Speaking for Code-Making Panel 2 in opposition to the motion, the panel chair once again completely ignored the evidence repeating the panel's ROP position that voltage drop is a design consideration. Code-Making Panel 2 has had many opportunities to provide evidence to substantiate stated positions and has failed to provide anything except opinions. When presented with hard evidence documenting existing conditions, the submitter maintains that unsubstantiated contrary opinions are an insufficient response and constitute denial of due process. Therefore, the submitter has filed this appeal. As remedy, the submitter seeks to have

1 the unsupported rejection statements of Code-Making
2 Panel 2 overturned and certify amending motion 70-3
3 accepted. Thank you.
4 MR. FARR: Thank you. Anybody wishing
5 to speak in support of that opposition? If you have
6 a position on that, if you would please take the end
7 of the table.
8 MR. ODE: Mark C. Ode, Underwriters
9 Laboratory speaking for the NEC Technical
10 Correlating Committee. The NEC Technical
11 Correlating Committee agrees with the floor action
12 to reject the acceptance of an identifiable part of
13 proposal 2-193. Proposed revision was unanimously
14 defeated in both proposal and the comment stages by
15 CMP 2. Certified amending motion to accept an
16 identified part of proposal 2-193 was also defeated
17 on the floor of the annual meeting.
18 The NEC TCC supports the panel's
19 statement to reject this proposal since voltage drop
20 is a design issue and may be very specific to a
21 particular installation and for the specific
22 equipment used. 90.1 of the NEC states the purpose
23 of the NEC as practical safeguarding. The purpose

of this code is a practical safeguarding of persons and property from hazards arising from the use of electricity. In paren B it says, This code contains provisions that are considered necessary for safety. Compliance therewith and proper maintenance results in an installation essentially free from hazard. Paren C provides the information that is critical to this particular appeal.

This code is not intended as a design specification or an instruction manual for untrained persons. There are parts of the NEC such as 695.7 that do not permit the voltage at a fire pump controller line terminals to drop more than 15 percent below normal voltage under motor start up conditions, but this is a safety issue, not a design issue. Furthermore, voltage drop is an issue for exit lighting and emergency lighting. Again for safety reasons. But requiring all circuits to comply with the voltage drop requirements is a design issue, not a safety issue.

The Technical Correlating Committee recommends the appeal be denied by the Standards Council. Thank you very much.

MR. FARR: Thank you, sir. Questions from Council members?

If you would like to come back to the table.

MR. GERDES: Ralph Gerdes, Council member. Question for Mr. Keleher. Several questions actually. You have noted that this in a presentation a circuit breaker manufacturer made the statement that standard circuit breakers cannot protect against parallel arcing faults. It seems to me in some of your arguments that you've taken this standard circuit breaker out of context and applied it to other scenarios. Do you agree or disagree?

MR. KELEHER: I'm not sure what you mean. Please describe your question more.

MR. GERDES: When I read a lot of material I see a lot of reference to arc fault circuit interrupters which have different characteristics, response characteristics than maybe a standard circuit breaker, and I think your argument seems to be the standard circuit breakers aren't adequate enough but we do have other kinds of breakers that we put in buildings to protect certain

scenarios, right?

MR. KELEHER: Standard circuit breakers are what are used to protect 120-volt circuits, they have been used for many, many years to protect 120-volt circuits in all occupancies. They are thermal magnetic devices, and because there has been no limit no restriction on the amount of impedance that is permitted in a branch circuit, we can run a 120-volt branch circuit using 14-gauge wire as far as we like and it's a legal circuit. The resistance developed by that, by an excessive length of wire prevents the circuit breaker's instantaneous response mechanism from operating, and the only response left to the circuit breaker to respond to a short circuit or ground fault, when the impedance is too high to trigger the magnetic response, is the breaker's thermal response. That has not been tested.

The data that I have gathered illustrates and demonstrates that when the thermal response is the breaker's only response to a short circuit, because there is too much impedance for the magnetic to work, that is when problems arise. That

80 percent of the time it is good, it's quite variable. It's kind of indeterminate. It's more or less inversely related to current, but 20 percent of the time is not fast enough to prevent the conductor from overheating according to the accepted standard.

Does that answer your question? So an arc fault built into a circuit breaker is -- an arc fault circuit breaker is a standard thermal magnetic circuit breaker with arc detection added to it. The arc detection, we're not talking, the issue we're dealing with here is not arcing. The issue we're dealing with is heating. An arc doesn't have to be involved for a short circuit current to overheat a wire. So if there is no arc involved but there is overheating involved, the arc fault adds nothing. It don't add to any safety. It doesn't prevent the overheating unless there is an arc.

MR. GERDES: Let me change gears then. You claim that you have been denied due process because the committee has failed to accept your substantial data that you proposed.

MR. KELEHER: They haven't responded to it.

MR. GERDES: When I think of due process I'm thinking of procedures and things like that. Did you have the opportunity to go to the panel meeting and discuss your proposal?

MR. KELEHER: I presented it in person.

MR. GERDES: You had an opportunity on the floor of the convention to present your proposal?

MR. KELEHER: Correct.

MR. GERDES: You still contend you have been denied due process?

MR. KELEHER: The denial I tried to describe in this appeal is that when a proposal is accompanied substantiated by hard test data, a denial needs to consider the data. And I don't believe that the data has received due consideration.

MR. GERDES: Thank you.

MR. FARR: Mr. Clary.

MR. CLARY: Shane Clary, member of Council. The response from the Technical Correlating Committee regarding safety issues that list a safety issue has been demonstrated that's

1 basically why the panel has rejected both your
2 proposal and your comments. Is there a safety issue
3 related with this issue, i.e., if you don't have the
4 -- you have a greater than 5 percent?
5 MR. KELEHER: Yes. I tried to explain
6 that in the data, the analysis, I had hoped
7 explained it clearly enough, perhaps not. When
8 breakers cannot respond instantaneously, one cycle,
9 with their magnetic design response to a short
10 circuit, if there is too much resistance in a
11 circuit, if the resistance in a circuit because it's
12 too long, for example, prevents the breaker's
13 designed response to a short circuit which is its
14 instantaneous magnetic response no delay involved,
15 if that's prevented from working, then the only way
16 a breaker has of responding to that short circuit is
17 its thermal response. Now it's an inverse time
18 inversely related to current, but it's intentionally
19 delayed. It's tested for very low levels of
20 over-current. A typical household example of this
21 is plugging a coffee maker and a toaster in the same
22 receptacle and running both at the same time.
23 You're putting 30 or 40 amps on the line, may be a

20 amp line, and after a few minutes it will trip to prevent the excessive current from damaging the circuit. That is tested by UL, and this proposal does not challenge that in any way.

But the issue at hand here is when there is a fault in the circuit, either a short circuit with two conductors touch each other or a ground fault where the live conductor touches a metal piece of electrical equipment, now there is a very high current involved because the only resistance to the flow of current is the wire. So the current go up expediential. Much higher. And hopefully it's high enough to trigger the instantaneous response of the breaker and clear the circuit instantly in a cycle. But if there is too much resistance in the circuit, that current doesn't get high enough and the instantaneous response is not triggered. The only thing left is the thermal response that's tested at very low levels of over-current.

The test data has demonstrated when the thermal response is the breaker's only response to a short circuit, 20 percent of the time the current

and the duration of time that that current remains on the line results in a conductor heating that exceeds accepted standards. So if a circuit breaker is unable, because there is too much resistance in a circuit to clear, to effectively and consistently keep conductors from overheating 100 percent of the time in all cases, it's not doing its job. And that is a safety issue. Over-current protection requirement is a core requirement of Article 240.

MR. CLARY: Any documented cases of either home or commercial fires that can be directly related to this issue?

MR. KELEHER: I believe there are but I can't bring you specific case citings. There are over 20,000 fires a year in which circuit breaker protection are involved. This organization publishes that data, and it can be, it could be analyzed for that to answer that question.

MR. CLARY: Thank you.

MR. JARDIN: Joseph Jardin, member of Council. Question for Mr. Ode. In the panel statement the remark is made voltage drop is a design consideration must be dealt with by the

installer and designer. I wonder, Mr. Ode, if you can elaborate maybe on how that effectively addresses the issue Mr. Keleher has raised.

MR. ODE: When a circuit breaker or an over-current protective device like a fuse is installed, the purpose of that is two-fold. It's set up so that it will provide protection for the branch circuit, for the feeder, or the service.

The design consideration we're talking about is and has been a long standing issue with design specifications. The fine print notes that are included in both 210.19 and 215.2 are really talking about voltage drop considerations as a reason for not exceeding a 3 percent level for a branch circuit and a 5 percent overall including the feeder. So if you are talking about a circuit breaker or a fuse, in the reaction time we're talking about somewhere between 1 and 3 quarter and 3 cycles of time. To have an instantaneous trip you would have to have a much, much higher amount of fault current through the over-current protective device.

The 3 percent level is a design

consideration that we've used for many, many years. In looking at whether or not a motor will start up, for example, a device will operate, like lighting fixtures and other kinds of loads. 3 percent is what is recommended. 5 percent overall. So if you look at a 5 percent voltage drop on a 120 volts you're talking about a minimal amount of voltage drop. The voltage could vary that much just from the utility company.

So it truly is a design consideration as to what kind of voltage you're going to have on a particular circuit. If, for example, I'm supplying these lights, if I design a circuit that is too long, don't increase the size of my conductor appropriately, then the lighting may fail to operate properly. But again, that is design consideration not a safety issue. If I'm talking about illumination for exit lighting or emergency lighting, then that becomes a safety issue, and that's dealt with accordingly in the NEC. That is not a design issue. Being able to get out of this building because we have proper illumination is a safety issue. Providing proper operating voltages

for receptacles and lighting fixtures and motors and those kinds of things are truly a design issue not a safety issue.

So if I'm looking for safety then I look at those kind of critical loads. For example, the fire pump that I talked about in the response from the NEC TCC, if the fire pump doesn't operate or doesn't have enough voltage to start up during its lock rotor condition that's a safety issue. But if I have a regular water pump, for example, for water pressure in a bathroom, that's certainly not a safety issue. That's truly a design issue. And every single circuit should not have to meet the kind of safety issues that we're talking about for those kinds of critical loads.

And I'm sure that that is what Panel 2 looked at. I have been involved in some of the -- been sitting in obviously as an observer for that kind of discussion for quite a while. And those are the kinds of considerations that the panel is looking at. Is this a safety issue or is it truly a design issue. And Panel 2 continues to maintain as does the Correlating Committee that we're looking at

a design issue. And if it truly is a safety issue then it's already covered in the NEC.

Does that answer your question, sir?

MR. JARDIN: Yes.

MR. KELEHER: Can I rebut at some point?

MR. FARR: Not at this point. Questions from Council at this time.

MR. HARRINGTON: J.C. Harrington, member of Council. I have another question for Mr. Ode. Kind of following up with what we were talking about. In Las Vegas I remember some discussion we were talking about the voltage drop that is being addressed now I guess as a fine print note as part of the design issue. And from a design perspective is there any belief that covering that or addressing that as a fine print note isn't getting the design done properly in all cases such that if it was a mandatory requirement in the language of the code the designs would work out better? Any belief in that or opinion on that?

MR. ODE: I worked for an engineering firm for a couple of years, and one of the things

that we did as an engineering firm is we would do a study of the voltage drop applications where the run was considerable in length. We would do it not only for the branch circuit but also for the equipment grounding system to make sure that the equipment grounding conductor was large enough to be able to carry the fault current back to trip the over-current protective device in a reasonable amount of time. Again, that was a design consideration. We did that to make sure that whatever we designed was adequate and related to the operation of the equipment.

So again it was something that we did on a regular basis and most engineering firms do on a regular basis, absolutely.

MR. FARR: Mr. Milke.

MR. MILKE: Jim Milke, member of Council. Again a follow-on to Mr. Jardin's question for Mr. Ode. You indicated that this is a design consideration except where essentially emergency equipment is involved, and I can understand that. Mr. Keleher has suggested that preventing overheating is a safety issue that should be

1 considered in design, and I'm wondering what your
2 thoughts are about that.
3 MR. ODE: The overall application of
4 branch circuit feeder and service conductors is
5 adequately covered in Article 310. 310.15 of the
6 code provides us with information on how to
7 adequately size conductors. When I go back to
8 250.122 it provides us with information on exactly
9 how to size an equipment grounding conductor to
10 adequately carry a fault current back and allow the
11 over-current protective device to protect the
12 circuit.
13 Those are already adequately covered in
14 the NEC. And Panel 2 is very, very clear and
15 concise in its evaluation of not only the
16 requirements for branch circuits in Article 210 and
17 feeders in Article 215 but is also aware of the
18 information provided in the other articles of the
19 code to provide a large enough conductor for the
20 load to be served. So it's already adequately
21 covered in the NEC.
22 MR. FARR: Ms. Brodoff.
23 MS. BRODOFF: Maureen Brodoff, legal

counsel to the Council. And I just want for the record, Mr. Keleher, if you would state any business or commercial economic interest you have related to the subject matter of the appeal.

MR. KELEHER: I am an electrician. Paul Keleher Electrical Services is my business, sole proprietor. To gather the evidence presented with its proposal, I first looked for existing evidence and found that there was none available. The evidence I was looking for was circuit breaker response to short circuits. I needed to develop a testing device that could gather this data from the field, and I feel it's critical that field data be provided.

This effort took some money. I had to have a device engineered and manufactured. I have patents, not on any voltage drop test. I have patents on controlled means of conducting a short circuit. That's quite different. And nothing I'm proposing requires that anyone create a controlled short circuit and actually test a circuit breaker. I'm not proposing that.

I'm proposing that voltage drop, which

is a reflection of impedance, be limited such that if it is so limited the circuit breaker should work. And that's all I'm proposing.

So my answer to the question is I have no proprietary interest in anything that I'm proposing to require to the NEC. Is that a satisfactory answer?

MS. BRODOFF: If you believe it is. Whatever you believe.

MR. KELEHER: I will not deny, I have two patents on controlled means, actually a third one just issued on the controlled means of short circuiting a circuit. But I'm not requiring that anyone do that, or proposing to require that anyone do that.

MR. FARR: Are there any final questions from the Council? Seeing none, Mr. Keleher, would you like to make a final 5-minute statement.

MR. KELEHER: I would like to speak to some of the comments that Mr. Ode made. First of all, I don't take exception to the fact that voltage drop is a design issue. It absolutely is. Circuits

have to have, impedance in circuits has to be kept low enough such that the circuit is capable of delivering and maintaining the voltage, appropriate voltage, under the load that it is designed to carry. And the code addresses these issues fully.

As far as grounding conductors is concern, it seems that the code has gone to great lengths and great efforts to ensure that grounding conductors are big enough at the low impedance end of the range. I mean if you are right next to a 2,000 amp service, for example, in a commercial building, the impedance is minimal and the fault currents can be explosive. It can be very high and dangerous. And it's important that the grounding conductor which is going to handle that fault current has to be big enough so that it doesn't just get blown away by the current that is available right close to a large service. But you start running out into branch circuits and long low gauge branch circuits, the resistance of the circuit builds up tremendously.

That causes two problems. One problem, the code has recognized for a long time and doesn't

1 consider it a safety issue, and that's that the
2 circuit can't adequately carry the load that it is
3 being designed to serve, and that's why 5 percent
4 limit has been in the code for a long time but as a
5 recommended practice, for efficient operation of
6 equipment. But, if the over-current protection
7 device cannot operate as it's designed to do, which
8 is to react instantaneously to a short circuit or
9 ground fault, we now have a safety issue, because
10 there is no question that circuit breakers and all
11 over-current protection devices must protect
12 circuits from overheating under all conditions of
13 normal use. And because electricians or installers
14 of circuits -- I can run a 14-gauge wire as far as I
15 want. And it's a legal outlet. It may not work.
16 It may not support anything for a load, but it's
17 legal. And that's what the code says about it, that
18 it is not unsafe. But if there is so much
19 resistance in that long 14-gauge circuit that the
20 breaker cannot respond instantaneously if there is a
21 short circuit or ground fault out there, we have a
22 problem.
23 We wouldn't have a problem if the data

showed that the thermal response was 100 percent consistent and fast enough every time to prevent overheating, but that is not what the data shows. The data shows that overheating does occur in 20 percent of these thermal responses. That's a problem. And it even shows that at some times in some occasions it was high enough to actually cause 14-gauge wire to come loose under a screw terminal.

What that means, if you have a short circuit on a receptacle circuit, 120 volt receptacle circuit, the way these circuits are conventionally wired, the ungrounded conductors are wired, the receptacles are in series with the ungrounded conductor and they're in series with the grounded conductor coming through screw terminals on each side. There are a pair of screw terminals that are common on each side, on the neutral side and on the hot side of a duplex receptacle outlet. One of those is to take the incoming feeder of the circuit and the other one is to carry that circuit to the next outlet. If you have a short circuit on say the 5th outlet in a string, every outlet -- and there is so much impedance on that circuit that the magnetic

1 response to a short circuit can't operate, then it
2 means that the fault current, whatever the system
3 can deliver and it typically runs between fault
4 current is 120-volt branch circuits typically run
5 between 100 and 1,500 AMPS. But the circuit breaker
6 needs 20 times the handle rating to trip
7 instantaneously. 20 times the handle rating on a
8 20-inch circuit is 400 AMPS. So if there is too
9 much voltage drop in the circuit because of the way
10 it's wired and there is no limit on how much there
11 can be, and the circuit can't deliver 400 AMPS into
12 the short circuit on the 5th outlet, that means that
13 outlets 1 through 4 all experience that fault
14 current. It might be 250, might be 300, might be
15 350 AMPS. If it's not enough to trigger the
16 instantaneous response of the breaker, it is going
17 to linger there until the delayed, intentionally
18 delayed thermal response cuts it off. That's an
19 indeterminate length of time. And the data shows
20 that. And it shows 20 percent of the time it's not
21 fast enough to prevent overheating.
22 MR. FARR: Mr. Keleher, your time.
23 MR. KELEHER: Thank you. And 3 percent

of the time it loosens the terminal on all those conductors.

MR. FARR: Mr. Ode, would you like to comment?

MR. ODE: I would like to make a couple of comments on what was just said. If I take a circuit breaker, for example, a 15 or 20 ampere circuit breaker somewhere between 4 and 5 hundred percent or 4 or 5 times not 20 times, but 4 to 5 times, is what typically is going to cause a circuit breaker to react in 1 and 3 quarters to 3 cycles that we expect a regular circuit breaker to act in. So if I'm talking about a 15 ampere circuit breaker, 75 amperes of fault current should cause that circuit breaker to trip in a reasonable amount of time. And that 4 to 5 times is a fairly conservative amount. If I use something other than a regular circuit breaker like a current limiting device, a current limiting device is going trip in the first half cycle of the fault. So that first half cycle is providing us with much better protection obviously. But it's also a more expensive type of device.

1 So when we look at the sizing of
2 conductors, if I'm going to increase the size of a
3 regular branch circuit or feeder conductor, then
4 proportionately based upon 250.122 of the code, I
5 have to increase proportionately the equipment
6 grounding conductor size based upon the size of
7 increase and the phase conductors. And the purpose
8 of that is to adequately provide current through the
9 over-current protective device which is found by the
10 way in 250.4 of the code which says that we need to
11 make sure that we have an adequately protected
12 system one that we has a proper equipment grounding
13 conductor going back to the source to provide
14 current flow for the over-current protected device
15 to operate.
16 So it's covered in the National
17 Electrical Code already. The unsubstantiated
18 information about conductors because of heat backing
19 out from underneath screw terminals and things such
20 as that is just, simply just exactly that,
21 unsubstantiated as far as I'm concerned. We do
22 testing on circuit breakers. We do testing on
23 devices. We don't have the kind of problems with

copper and aluminum conductors because we use the proper devices. We use the proper termination for that to not be an effect.

MR. FARR: Thank you. Mr. Keleher final opposing comments.

MR. KELEHER: My engineer has a comment.

MR. WAITE: I just want to make one comment. Depending on whose data you use and there is always that question --

MR. FARR: For the record, state your name.

MR. WAITE: Bob Waite. If you use the NEMA breaker trip curve at 4 to 5 times to handle rating, the trip time guaranteed not to trip in less than 4 seconds. Not several cycles. With the square D Q O as in quick operating that time drops to 1 second, but it's still considerably more than what was mentioned. So there is considerably more heating involved. There is a great difference between 7 seconds and 7 cycles. And it is an issue.

And in regard to the non-substantiated, there are several different calculations based on

1 Mittendorf, Soares, and Onderdonk for how many short
2 circuit I squared T.
3 MR. FARR: Mr. Waite, your 1 minute
4 closing comment has been used.
5 Mr. Ode, do you have a closing comment?
6 MR. ODE: No, thank you.
7 MR. FARR: Thank you. At this time I
8 would close this hearing with respect to this issue.
9 I remind Council members and the NFPA staff that the
10 decision or outcome of this particular hearing will
11 be issued by the secretary of the Council and no
12 further discussion can take place or outcomes of
13 this particular hearing until the written decision
14 has been issued. Thank you.
15 MR. FARR: The next hearing on the
16 agenda is Agenda Item 10-8-1-c. We're also at the
17 same time going to hear 10-8-1-e bother dealing with
18 the same issue. The first one would be dealing with
19 overturning the floor action to accept Comment 3-69
20 which failed on the floor, and then at the same time
21 we're going to be listening to extending or asking
22 for an extension on the implementation date. We'll
23 ask both of the appellants to comment first, and

then we'll have opposing comments.

Mr. Clary.

MR. CLARY: Shane Clary, member of Council. For the record I am recusing myself on this agenda item. I will not participate as a member of the Standards Council in the hearing deliberations or voting on this matter.

MR. FARR: Mr. Carpenter.

MR. CARPENTER: James Carpenter, member of Council. I would like to note for the record that I am a member of the Technical Correlating Committee. As a Technical Correlating Committee member I participated in the consideration and voting on the issues that appear to be related to this appeal. I have therefore reviewed my obligation under the guide for conduct of participants in the NFPA process, particularly Section 3.5(D) of the guide to consider whether there is any reason for me to recuse myself of consideration of this appeal.

I have concluded that I do not have any views that are or would appear to be fixed concerning the issues. And I am fully able to give

open and fair consideration to this appeal. For the record, therefore, I have considered this matter and believe that I can fully and fairly and impartially fulfill my role as a Council member on this appeal.

MR. FARR: Thank you. Mr. Pauley.

MR. PAULEY: Tim Pauley, chairman of the Council, just for the record, I also note for this hearing and issue I will be recusing myself from the discussion, deliberation, and voting on this, as I have a specific public comment in on this issue. Thank you.

MR. FARR: For the record noted that we did speak with both Mr. Flegel and Mr. Turner with respect to both of the appeals, and they have agreed to move ahead with hearing this at the same time.

With that, Mr. Flegel, 10 minutes.

MR. FLEGEL: Good morning. My name is Mike Flegel, president of Reliance Controls Corporation located in Racine, Wisconsin. Reliance Controls manufactures manual transfer switches, generator accessories, and a line of home protection products. Instead of reviewing my appeal letter I would like to give you some insight as to what I

went through during the code-making process.

I really think the process normally works very well so my criticism is only related to what I feel is an isolated situation although may give you some insight on how to better improve the process. To make this insight more meaningful it's necessary to understand the safety issue at hand.

The issue is where to install GFCI protection in standalone portable generators or electrical systems where the system is not grounded. A system is considered grounded when the neutral of the power source is connected to the earth usually by a ground rod. The vast majority of electrical systems covered by the NEC are grounded systems where the ground connection is made at the service entrance. This makes it difficult for people to relate to ungrounded systems.

We all know the tremendous value a GFCI protection adds to electrical safety. 2008 NEC requires the use of GFCI protection on all receptacles used in temporary installations regardless of the power source by having it built in or by adding it in a temporary distribution system.

The proposal that was made to CMP 3 was to build in GFCI protection into the generator thereby eliminating the need for other GFCI protection. They also said having the protection on the power source would protect the worker from ground faults that occur from defective cords that are between the generator without the GFCI protection and the downstream GFCI protection that was added as required. The same logic would apply to protect utility lines running from utility transformer to your house if a GFCI were installed on the utility transformer. That is at the power source.

We probably have all heard stories about someone using a metal ladder while working on a house that comes into contact with the electrical lines of the house and getting injured or killed. A GFCI on the output of the utility transformer would most certainly protect people from this kind of injury plus protect the whole house from ground faults without having to have any other GFCI protection. But would it really.

In this example the current would flow out of the utility transformer GFCI through the

utility wire running to the house to the ladder through the person to the ground back to the service entrance ground rod at the house through the electrical panel to the utility wire running back to the utility GFCI at the transformer. The utility transformer GFCI would not see any differential in the outgoing and incoming current and would not trip. I'm saying the same would happen for any ground fault in the house.

The moral of the story is that GFCI protection can be installed incorrectly, and it can look like it is protecting people when it is not. Correct installation requires the GFCI to be installed between the system ground and the wiring system, for the GFCI to be effective. As for closeness it is the closeness to the system grounding point that is the key not the closeness to the power source.

Everyone seems to agree that portable generators used in temporary installations normally need not have a system ground. Logic would tell you if you wanted to prevent ground faults don't attach the power source to the ground. So not having a

system ground which is a floating system is a good first step.

Why have GFCI protection at all in a floating system. Because installation and other ground isolation means can fail especially in harsh environments such as those that can exist in temporary installations. One of these failures can pull a neutral to ground somewhere in the system away from the power source, essentially creating a system ground. Under the new code that requires the GFCI protection to be built into certain portable generators, the system ground would now be after the GFCI protection, and like the GFCI on the utility transformer, the GFCI protection on the generator will not detect the ground fault. If people have no other GFCI protection which is no longer required, they will be killed or injured.

So where should the GFCI protection be located in a floating system since the system can become grounded anywhere between the generator and the worker, it should be as close to the worker as possible so it has a higher probability of being between the system grounding point and the person

being protected.

So what was the official panel statement to my comment? Of the 6 paragraphs 5 related to interpretation issues and one on a response to my technical argument. On the technical issue the panel said a GFCI receptacle would work even if equipment grounding conductor was not conducted to it. This is true but has nothing to do with the system grounding connection I was referring to in my comment.

Since the interpretations in the other 5 paragraphs are not related to GFCI installation issues, with some being somewhat convoluted citing numerous sections of the code, sometimes even going back to panel's rationale 35 years ago, I wonder what the intent really was. It almost seems like it was meant to end the debate by distracting people from the real issue that was presented and prove the commentator in general had a poisonous position that was completely against the code, what the code was trying to do.

It seems to me if I make a sound technical argument that shows a safety problem and

it is rejected, the response should be a corresponding technical argument showing why my argument is not valid rather than a convoluted and sometimes incorrect interpretation that doesn't apply. This is like saying we can't do this because the code doesn't allow it.

All this seems like a strange response for a code-making panel but not so strange if you piece a few things together that have happened over the last 4 years. The approach of we can't do this because the code doesn't allow it, is an approach UL has to take in their standard development process, and it's no coincidence that the panel took this approach in their statement.

I feel UL unduly influenced the panel, driven by an honest effort to improve safety, from the task group that drafted the proposal where 40 percent of the members were UL employees, through the comment stage where the panel statement was a little more than a restatement of a magazine article and other comments made by UL well before comments were submitted.

UL seemed to dominate the process. UL

has been trying to get the STP for portable generators to require GFCI protection on portable generators, an issue that has been rejected by the panel for sound technical reasons. The STP has heard many of these interpretation issues and not accepted them.

UL feels the ANSI process in some instances does not generate safe standards so have decided to take a more aggressive approach in the last 4 years and taken several initiatives to meet their objectives. One such initiative is manipulating a related process in which they have more influence like the NEC. UL being aggressive and having objectives has to be good for safety except when that process puts the objectives above the safety to such an extent that some at UL stopped listening to others especially those they think have a hidden agenda.

I think UL's actions cut off the NEC debate in this instance. Any time you cut off the debate you manipulate the process to meet a pre-determined end result rather than letting the process work freely to produce the end results. In

the long run UL's credibility -- in the long run this will hurt UL's credibility even though it may have some positive results elsewhere. Unfortunately in this case this process may take the lives of some innocent workers.

I have more information about my experience with the code-making process and UL but I'm running out of time. I think a special task force should review all aspects of the code as it relates to portable generators as most of the code was developed for other applications and may not apply to portable generators. This doesn't stop people from misapplying the code rather than admitting the code doesn't address the issue, especially the code experts.

They should probably start with determining what a portable generator is. A good argument can be made it is an appliance because it fits that definition perfectly except it supplies power rather than utilizes it. This could start a meaningful dialogue as to whether or not portable design features are within the scope of the NEC.

On a conflict issue, does the NEC look

at conflicts within the same article. CMP 3 by building the GFCI protection into the generator makes the generator incompatible with the assured equipment grounding in the same article. It is the intent to make the installer bring in an older generator without the GFCI protection built in to use that program. As time passes that will be increasingly harder to do.

I'm seriously concerned about the safety of this change. No one has demonstrated to me that this code change doesn't improperly and solve GFCI protection. At this point I would be happy just to have an intelligent conversation on the subject with people other than generator and GFCI manufacturers.

Please note there is no evidence presented during the proposal stage to say what was being done in the 2008 code is unsafe. I believe that this provides support for my position and evidence that what is in the 2008 code works. Why? The process doesn't want more time to understand better why this is happening is most troubling to me.

MR. FARR: Your time.

MR. FLEGEL: One sentence. If there is no safety problems why be in a hurry to creating one by making a change. Thank for listening.

MR. FARR: Mr. Turner. You wanted to speak at this time, fine.

MR. TURNER: Good morning, Mr. Chairman, Council members, my name is Chris Turner. I'm a principal engineer at Generac Power Systems located in Waukesha, Wisconsin. Today I'm here to represent the portable generator manufacturers association and its members.

The first thing we would like to thank you for allowing us the time to make this appeal. I will be brief and hope you take our request in serious consideration. For your information the PGMA is a relatively new association, however it's current members can account for approximately 85 percent of the annual portable generator sales in the United States.

Our request is simple. We are not looking to change the code, rewrite the code, nor are we challenging the code. 2011 NEC proposal

3-140 makes changes to Article 590.6 of the code and specifically 590.6 A 3 will require the addition of GFCI protection for all 125 and 250 -- up to 30 AMPS located on portable generators 15 kilowatts and smaller used to supply temporary power to temporary wiring installations used by personnel during construction, remodeling, maintenance, repair or demolition of buildings, structures, or equipment. This new requirement has a specific implementation date of January 1, 2011, and it is this implementation date we wish to appeal.

The PGMA is here today to request delay of 12 months to the implementation of Article 590.6A3. We are requesting this delay because of new design considerations, testing, and evaluation of all the new products this change will encompass. Supplier and vendor lead times to change production tooling, provide samples and then produce production parts and quantity. Time to allow us to introduce the new design product to our external customers, internal marketing, sales, service, and training groups. Time to allow us to recreate all the sales and marketing point of purchase advertising

information as required. Time to allow us to deplete costly inventory of current design component and assembly. Time to allow us to submit the new design product to 3 party testing agencies that evaluate this type of product for sale to various retailers and individual states. And time to allow us to completely evaluate the design changes we incorporate will produce product that are electrically safe and robust as the current products manufactured today.

We hope that based on the fact that portable generators have been used safely by personnel on construction sites for many, many years, and to the best of this association's knowledge, electrocution events are not being targeted by OSHA or the CPSC. The comparatively short delay to this change will not have an adverse effect to those statistics.

We understand the line needs to be drawn in the sand in order to make the code change effective. We as manufacturers can make the changes. Indeed we will make the changes necessary to conform to the new requirements. However, we

respectfully ask you to consider moving the line in the sand. Thank you.

MR. FARR: Mr. Turner, can you comment on what PGMA stands for, please?

MR. TURNER: Portable Generator Manufacturers Association.

MR. FARR: Thank you. Mr. Bell.

MR. BELL: Kerry M. Bell, member of Council. For the record I am recusing myself on this agenda item and will not participate as a member of the Standards Council in the hearing, deliberations, or voting in this matter.

MR. FARR: Thank you, Mr. Bell.

Is there a position of the panel or TCC with respect to this?

MR. AYER: Larry Ayer representing the TCC on this issue. A test group was formed prior to 2008 NEC code cycle to look at GFCIs for temporary wiring. In the 2008 version Article 590.6 permits GFCI protection to be located at any point in that temporary wiring. As a result of the test groups two proposals were created both with the intent to move the GFCI protection to the beginning of the

temporary circuit.

One proposal was sent to Panel 3 dealing with temporary power, and one proposal was sent to Panel 13 dealing with generators. The proposal was viewed in Panel 13 and accepted during the ROP stage. Comments were submitted and reviewed during the ROC stage, and the panel found they could not reach consensus and therefore the proposed language would not be adopted in the 2011 code in Article 445.

Panel 3 who has jurisdiction over temporary wiring reviewed their proposal, and it was accepted in principle with added language indicating that the new code language would only affect generators manufactured after January 1st, 2011. The TCC reviewed the work of Panels 3 and 13 during the ROC TCC meeting in February of 2010, and during that time they did not find a correlation issue with the work done by both panels. The use of portable generators at construction sites as a temporary power source in accordance with Article 590 is part of Panel 3 purview. Panel 3 accepted in principle proposal 3-69 to move the GFCI requirement to the

1 beginning of the temporary circuit to reduce the
2 influence of the cord set provide increased
3 protection of the entire temporary circuit. The TCC
4 recommends that the appeal be denied by the
5 Standards Council.
6 Can I go ahead and address Mr. Turner's
7 appeal as well?
8 MR. FARR: You still have some time
9 left.
10 MR. AYER: With regard to the Turner
11 appeal, the TCC agrees with Mr. Turner that the
12 present date of January 1st of 2011 may not be
13 sufficient to retool and reengineer their products,
14 and the TCC recommends extending the date to
15 January 1st, 2012.
16 MR. FARR: Thank you.
17 MR. OWEN: Can I present the code
18 panel.
19 MR. FARR: Yes, please.
20 MR. OWEN: Mr. Chairman, my name is
21 Dick 0wen. I am a member of code-making panel 3. I
22 was asked by the chairman of code-making panel 3 to
23 speak to this issue since he unfortunately could not

be here. We concur with Mr. Ayer's comments and won't go over them again.

The panel has heard this issue and debated extensively and did not accept the technical arguments that the proposer or the commenter stated. Also to Underwriters Laboratories as a part of just about every co-panel but they're not the driving force of this, and they are a small part of this. I am not defending either side of this, but we did not hear or take into account whatever issues may be between Underwriters Laboratories and anyone else in this issue.

The main reason I'm speaking is because of the second appeal that was put in on this. The effective date of January 1st was discussed without any comment or opposition. During the code panel hearings it was not brought up at the annual meeting either the electrical section or on the floor. So this is basically coming as almost new material at this point. And there is no argument against this, no discussion of it. And the panel concurred on the January 1st of 2011 effective date for this. Thank you, sir.

MR. FARR: Comment from members of Council? Questions? Mr. Milke.

MR. MILKE: Jim Milke, member of Council. For Mr. Owen. I may be confused here. I thought, you're in agreement with the appellant?

MR. OWEN: Yes, sir. I wasn't aware until now this was going to be combined. So we are in agreement with the TCC as far as overturning this appeal or denying this appeal. We differ with the TCC. The TCC wants to allow an extra year for implementation of this. And the panel never discussed that, agreed on it. So I'm just saying we feel we should hold to that date.

So we concur with the TCC on this and we are in opposition to the appeal.

MR. MILKE: May I follow up.

MR. FARR: Mr. Milke.

MR. MILKE: To the TCC chair, I don't recall your name. It sounded like you were in favor, you were supporting the appeal.

MR. AYER: The TCC is supporting the appeal of Mr. Turner, not supporting the appeal of Mr. Flegel.

MR. MILKE: Sorry to dominate here. The TCC is in favor of the appeal. I thought you heard you say you're opposed to the TCC's view but in favor of the appeal. I'm confused.

MR. OWEN: We concur with the TCC opposing the appeal of just -- of the first appeal. We are in opposition to the TCC for the second part of the appeal which extends the effective date. Just that one small issue.

MR. MILKE: Thank you.

MR. HARRINGTON: J.C. Harrington, member of Council. Just to follow on discussion with what we had for Mr. Owen. You had mentioned that when this appeal came in of Mr. Turner's it was new information, if you will, because I guess there was something that had come in after you had had your previous meetings. So as far as the panel's view that you oppose the extension, is that based on actual vote that everybody in the panel participated or actual meeting you had as opposed to a few members weighing in on that?

MR. OWEN: The original proposal recommended the effective date of January 1st, 2011.

1 There wasn't really any discussion at the panel.
2 That was just accepted and voted in favor by the
3 panel. This extension of 1 year was not discussed
4 by anybody speaking before the panel. And like I
5 said, it was not brought up at the annual meeting in
6 the electrical section or as an NITMAM on the floor.
7 So it's coming out of the left field I guess for
8 lack of a better term.
9 MR. HARRINGTON: So what you're saying,
10 the date should be fine is based on your previous
11 discussion earlier on as opposed to having the panel
12 revisit it recently in the last couple of months.
13 MR. OWEN: For lack of any discussion
14 on the matter, because this didn't come up at that
15 point. We just recommend that it's held to the
16 original effective date.
17 MR. HARRINGTON: Okay.
18 MR. FARR: Mr. Gerdes.
19 MR. GERDES: Ralph Gerdes, Council
20 member. A question for Mr. Turner. You sent an
21 email to Mark Earley in June 28 and you note, for
22 example, some of your difficulties of meeting the
23 deadline, one being GFCIs for 20/30 AMPS don't even

exist today, is that true?

MR. TURNER: Yes. As receptacles they don't exist as GFCI receptacles. There are other components which I think I indicated in my email. There are GFCI modules that are additional to the receptacles that will provide GFCI protection. So it's not like you take a duplex out of a panel and put a duplex GFCI in a panel. The twist lock as we call them, the 20 and 30, twist lock receptacles simply are not manufactured as GFCI outlets in their own right today. So we would have to make considerable design changes to our control panels to incorporate these other components that would give us GFCI protection.

If I can just address the timing issue.

MR. FARR: You'll have a chance to make some closing comments and address that at that time. Further questions from Council? Mr. Gerdes.

MR. GERDES: Ralph Gerdes, Council member. A question for Mr. Flegel. In reviewing all this material you seem to be indicating some problems if we put this on the generators, and I'm seeing this discussion maybe between what I am going

to call maybe a more permanent installation involving transfer switches and the code seems to be addressing portable scenarios that may or may not be grounded. Can you elaborate, maybe clarify.

MR. FLEGEL: It has nothing to do with the transfer switch, it's purely a portable generator and standalone use. The issue is where in that system, if the system is not grounded, where in that system is the GFCI protection most appropriate? If you ground the system at the generator, no-brainer. You want the GFCI protection on the generator. If you don't ground the generator, the system can become grounded through a fault somewhere between the generator and the person you want to protect. Not knowing where that point is going to be, because you have to put the GFCI protection after the ground point -- ground point, GFCI protection, worker. If you don't know where this ground point is going to be -- and you don't -- if you don't ground the generator you don't know where that is going to be in the system because through some defect in wiring it may occur out beyond the generator, in which case the GFCI is behind the

ground point and the worker becomes exposed to ground faults. So it's very important to install the GFCI properly.

Everybody is used to GFCIs in their house. There isn't a system, house system that I know that isn't grounded at the service entrance. So it's a no-brainer to know that GFCI protection anywhere in the house is going to be appropriate. It's when you don't ground the system that you don't know where that ground point eventually may end up. So therefore you don't know where to put the GFCI. To be the safest if you don't know where that point is going to be, you put the GFCI on the belt of the guy using the tool because chances are it is going to be someplace between him and the generator.

MR. GERDES: So your fundamental position is since you don't know where the ground is we shouldn't put the GFCI on the generator.

MR. FLEGEL: That's right. I pleaded. I'm not in favor of grounding generators. I think that adds another dangerous level because essentially you're breaking down the isolation system. I don't think portable generators should be

1 grounded and that's part of my argument and
2 confusing things a little bit, but when I saw CMP 3
3 not going for my argument of completely rejecting
4 the proposal, I said, Well you have to do one thing.
5 You have to ground the generator. And I'm afraid to
6 tell you what one of the responses was. And it was
7 well, you know, these little feet, these rubber feet
8 that you put on a generator, they eventually wear
9 off and the generator becomes grounded anyway. I
10 almost went ballistic. This is an installation
11 document, gentlemen. You have to tell, if you are
12 adding something to the system and you're not
13 telling people how to install it properly, you have
14 got to tell them. I didn't win on that one either.
15 It's all about safety. That's all.
16 MR. FARR: Ms. Brodoff, do you have a
17 question?
18 MS. BRODOFF: Mr. Flegel, just for the
19 record, would you just describe any commercial,
20 economic, or business interest you have related to
21 this appeal.
22 MR. FLEGEL: We don't make GFCIs. We
23 don't make portable generators. We're aware of

generator systems. I am involved in the process because I don't want to see something done that is going to hurt somebody. I suppose if you wanted to make a connection it would be rather convoluted and would depend on a lot of things happening, but my interest here is purely safety.

MS. BRODOFF: What does your company do?

MR. FLEGEL: We manufacture transfer switches, manual transfer switches that connect a portable generator to a house. We make generator accessories, not GFCI protection, but wheel kits and other things that are used with portable generators. And we make a line of home protection devices, phone out alarms, water alarms, those kind of things.

MS. BRODOFF: And is that a technical question. Forgive me since I am not a technical person if I'm missing something. If your appeal were upheld, what would be the method left in the NEC for grounding portable, the wiring of portable generators.

MR. FLEGEL: Excellent question. There is none. It wouldn't be grounded. But the code now

1 does not require the GFCI to be built into the
2 generator. It allows it to be added through
3 distribution devices such as spider boxes,
4 individual protection, cord protective GFCI devices.
5 And that in itself in an ungrounded system is moving
6 the GFCI closer to the worker.
7 Now ideally the code should be changed
8 so that if you're using a generator with GFCI
9 protection it must be grounded. Alternatively and a
10 method that I think just as safe is not grounding
11 the generator and telling people that they need to
12 add downstream GFCI protection. Both of those
13 systems have pluses or minuses. The guy that is
14 adding the GFCI protection could always forget to do
15 it, but then he doesn't have a grounded generator so
16 that's a barrier against ground faults right there.
17 Driving a ground rod is one step closer
18 to electrifying people. I mean driving a ground rod
19 is like taking, if this table were metal, like
20 taking a utility neutral connecting it to this metal
21 table and saying okay guys, go to work on this
22 table. How would you feel about that? That's a
23 pretty unsafe situation, isn't it. You certainly

1 want GFCI receptacles in the room. So grounding
2 essentially does add a level of danger.
3 Now in utility systems there are
4 reasons for doing that. This has been debated years
5 and years and years ago because you have a grid
6 system, because you have elevated lines, there is a
7 need to ground the utility system. With a portable
8 generator you don't have the same scenario. Right
9 now the code allows you to leave it ungrounded. It
10 has to be grounded in certain situations when it's
11 connected to premises wiring, so forth so on, but
12 right now in standalone use there is no requirement
13 in the code to have it grounded. I think that's a
14 good positive safety thing to do.
15 MR. FARR: Miss Cronin.
16 MS. CRONIN: Amy Cronin,
17 secretary to the Standards Council. This is for
18 Mr. Turner. Implementation dates when you hear that
19 it would result in having to retool due to some
20 manufacturing changes and such, there are concerns
21 that it can't be done right away. And the argument
22 against that is Article 90.4 in the NEC that
23 basically says AHJ can waive the requirement if the

technology is not available yet. Do you want to speak to that, why you don't think that that would suit your needs.

MR. TURNER: No disrespect but AHJs have completely different opinions from person to person. Yes we may have AHJs that will accept the installation. We may not. How do we control that? Typically if it's in the code that's what they want to see.

MS. CRONIN: Thank you.

MR. FARR: Any final questions for members of Council? Hearing none, we'll ask each one of our individuals starting with Mr. Flegel if you would like to make a 5-minute closing statement. And from that point move on to Mr. Turner, and then our representative from the TCC panel.

MR. FLEGEL: I don't have much else to say. I think the questions were great, and I got the issue on the table. It is a safety issue, an issue, and issue of how you install the GFCI protection in a portable generator systems that is not grounded. And there were some issues left on the table that I think need to be addressed.

The current code as approved will provide a situation that I feel is more dangerous than the 2008 code. The 2008 code can have some revisions to it that would make the applications safer like if the generator did have GFCI protection you need to ground the generator. That is an element that had to be added to the code and I think it also needs to be added to the code to explain that in an ungrounded system exactly where the GFCI protection needs to be. That's all I have.

MS. CRONIN: Thank you.

MR. TURNER: I would just like to briefly address --

MR. FARR: State your name.

MR. TURNER: Chris Turner. I'd just like to address the timing issue. I would have to agree with Mr. Owen as far as Code Panel 3 is concerned, the change to the implementation date is new material, but it is simply based on the fact that this particular change has been going through the appeals process until today. I mean we were not sure what was going to happen to it until really the June decision in Las Vegas. So that's why it is a

new request to change the date.

MR. FARR: Thank you.

MR. AYER: Larry Ayer representing the TCC. Basically as part of all of these comments and proposals that were submitted, there is basically two underlying arguments as submitted by Mr. Flegel's appeal. GFCI on generators will not function reliably unless the neutral and ground conductors are connected to a functionally grounding system. We -- not to be the case for instance as long as GFCIs are installed properly and second even Article 406 where if we were going to replace a 2 I receptacle we can replace that with either another 2 I receptacle or replace that with a ground fault device and will still function properly without an equipment grounding conductor.

The second thing was that many generators are manufactured with an isolated neutral or no neutral ground bond and therefore the GFCI will not work properly. But all in 250.20, 250.26 and 250.34 all of those sections address grounding of AC systems as well as separately derived systems. Separately derived systems using portable generators

must be grounded. So there must be a neutral to ground bond. Thank you.

MR. FARR: Thank you, sir.

No further comments, we'll close this hearing. We remind members of NFPA staff and Council that the outcome of this particular hearing is a responsibility of the secretary to the Council. She will be issuing a written decision and until that point no discussion. We'll close this portion of the hearing this morning.

Until Mr. Pauley takes back over we'll take a 15-minute break.

(Recess.)

THE CHAIR: I would like to call the session back to order again. I'm Jim Pauley chairman of the Standards Council. I'd like to thank Mr. Farr for filling in as chair during the last two hearings.

We are going to get ready to move into hearing Number 3. It's Agenda Item 10-8-1-f on our hearing list. I am going to ask, because we have a lot of folks in the room, I am going to ask everyone who has not, did not introduce themselves previously

and put their name on the record when we're in the last hearing, I'm going to ask if you'll do that now so anyone who was not here in the last hearing when we went around and did all the introductions if you can introduce yourself for the record, please.

MR. DUNCAN: Jim Duncan, from Sparling Electrical Consultants, Seattle, Washington. I'm a principal on Code Panel 10.

MR. TOOMER: Ronald Toomer, chairman of Code Panel 4.

MS. THOMPSON: Elaine Thompson Allied Tube and Conduit.

MS. HORTON: Pat Horton representing the Steel Tube Institute.

MR. BRETT: Marty Brett, Wheatland Tube Company.

MR. MERCIER: Dave Mercier, Southwire.

MR. TEMBLADOR: Richard Temblador, Southwire.

MS. TOMASINO: Alisha Tomasino representing Compa Covers.

MR. COMPAGNONE: Carlo Compagnone, Jr., Compa Covers, president.

THE CHAIR: Anybody else hiding around the corner? Thank you all for doing that. Agenda Item 10-8-1-f, this motion has to do with NFPA 70 3-17 E, and I'll ask the appellants if you'd like to come to the end of the table please.

Again in case you weren't here the last time I'll quickly review two items. One the structure of the hearing, then I'll ask for any recusal statements that we have. Structure-wise 10 minutes I will ask the appellants if they have essentially presented their appeal to the Council. Then I'll ask for any comments on the respondent side whether that be from the TCC or the code-making panel or anyone speaking on that issue. We'll open it up for questions of Council. Very quick 5 minutes at the end for each side making closing remarks and close out the hearing.

Any statements from Council members as we begin? Mr. Carpenter.

MR. CARPENTER: Member of Council. I would like to note for the record that I am a member of the Technical Correlating Committee. As a Technical Correlating Committee member I have

1 participated in consideration and voting on issues
2 that appear to be related to this appeal. I have
3 therefore reviewed my obligations under the guide
4 for conduct for participants in the NFPA process
5 particular Section 3.5 (D) of the guide to consider
6 whether there is any reason for me to recuse myself
7 from consideration of this appeal. I have concluded
8 that I do not have any views that are or appear to
9 be fixed concerning the issues. I am fully able to
10 give open and fair consideration to this appeal.
11 For the record, therefore, I have considered the
12 matter and believe that I can fully, fairly, and
13 impartially fulfill my role as a Council member on
14 this appeal.
15 THE CHAIR: Thank you. Any other
16 statements? Again I will remind everyone before you
17 speak please state your name for the record, that
18 way we'll make sure that we capture your comments
19 appropriately.
20 So I'll turn it over to the appellant.
21 MS. TOMASINO: Alisha Tomasino speaking
22 on behalf of Compa Covers and Carlo Compagnone, Jr.
23 Thank you all for the opportunity to

1 speak before you today. We appreciate your taking
2 the time to consider our appeal.
3 It appears that throughout this process
4 the proposal was declined repeatedly for a couple of
5 different reasons that we've heard. Number 1, it's
6 been argued that the code already contains
7 provisions sufficient to require some sort of
8 protection over the wiring contained within the
9 electrical boxes, and in particular Article 110.12
10 B.
11 Number 2, because of the possible
12 financial expense involved in the requirement of
13 protecting the wiring contained in the device boxes,
14 this appeal has been declined.
15 And finally, what was said and what we
16 heard at the Las Vegas convention was because
17 Mr. Compagnone, Jr., had developed a product to
18 address the issue of covers over the electrical
19 boxes, that is the only reason he is here before you
20 today. Yet he is attempting to address a problem
21 that he finds daily on each and every jobsite, a
22 problem that is in fact causing property damage,
23 injury, and death. Frankly, the code panel is not

seeing the forest through the trees. The real issue, which is that of safety, has been overlooked.

The electrical code provides protection for wiring at all points of vulnerability, but at no point in the code is there a clear requirement that the wire, which sits exposed in the electrical outlet box for weeks and sometimes months on a jobsite, be protected during this vulnerable period. The failure of the electrical code to contain a provision to this effect is mind-boggling particularly since in just the index to the code alone there is a half page dedicated to specific provisions in the code which provide for protection.

One example of the specific provisions Article 300.4 A 1 concerning board holes requires the protection of wiring and joist rafters or wood members. Unless 1 and a quarter inches between the outer edge of the wood member and the wiring can be maintained. If 1 and a quarter inches cannot be maintained between the wiring and the wood the electrician is required to install a protective metal plate with a thickness of 1-16th of an inch. The failure to follow this directive will lead to

damaged wiring.

Just this one example alone the code makes it very clear and very specific mandate on protecting these particular wires from damage. But why does the code fail to include a mandate on the wiring which is left exposed in electrical outlet boxes? There are no provisions in the code that even protect the wiring in the device box indirectly.

It's been argued that Section 110.12 is sufficient to protect the wires in the device boxes. Yet this provision refers to equipment only. Specifically the internal parts of electrical equipment including buss bars, wiring terminals, insulators, and other surfaces. This provision of the code only addresses the internal parts of electrical equipment. Not once does it mention premises wiring. Without a specific mandate electricians are not going to protect the wiring within the boxes. The statistics make that clear and that was something we included in our substantiating documents, this long article by John R. Hall Jr., dated March 2009 by the NFPA.

1 You will note historically on previous
2 code cycles the issue of covering electrical outlet
3 boxes was not raised. For instance, 2 cycles
4 previous to this there were no proposals or comments
5 seeking to add a requirement that covers be required
6 over electrical boxes. This is changing with the
7 times. Last cycle there were three comments and
8 proposals and for this cycle there were 7 comments
9 and proposals seeking to add a requirement that
10 covers be placed over electrical outlet boxes.
11 Clearly Mr. Compagnone is not the only
12 one who sees a problem with this lax aspect of the
13 electrical code. For some reason, however, there is
14 a lack of agreement that it is a huge problem.
15 According to Mr. Hall's article, 88 percent of 2003
16 to 2006 nonconfined home structure fires involving
17 premises wiring group equipment involved electrical
18 failures or malfunctions as a fact of contributing
19 to ignition. The two leading specific factors
20 contributing to ignition were unclassified
21 electrical failure or malfunction which was
22 33 percent, and unspecified short circuit arc which
23 was 28 percent. The leading factors contributing to

ignition were short circuit arc from defective or worn insulation and arc from faulty contact or broken conductors.

If we look back on the construction industry, the process moves so much faster today than it ever did before. Painters used to paint by hand, now they spray paint everything coating the unprotected wiring in the device boxes. The photographs that we provided as substantiating documents are pictures of what has been found on various jobsites.

Insulation used to be put up by hand from rolls. Now it's sprayed on into the unprotected boxes covering the wiring with them. Drywall used to be cut by hand with a hole cut out for the electrical boxes. Now drywall is installed over everything and power routers are used to cut out the device boxes damaging the unprotected wiring within. All of this causes damage to the premises wiring.

The times are moving fast. The construction industry is moving faster, and the electrical code is not keeping up with it.

Something must be done. Isn't the purpose of the electrical code for safety?

Reviewing the statistics we provided, if nothing is done in this code cycle in relation to this problem, these statistics are only going to worsen. Those injuries, property damage, and those deaths will continue to be the responsibility of the makers of the code. Thank you very much.

THE CHAIR: Any further comment?

MR. COMPAGNONE: I'm a master electrician. I work in the field.

THE CHAIR: Your name.

MR. COMPAGNONE: Carlo Compagnone, Jr., master electrician and president of Compa Covers Incorporated. Throughout the whole code book, Article 110.7 talks about wire integrity. 110.27 B talks about protection against live parts, 250.4 effective ground fault current path. 250.12 clean surfaces. 300.4 board holes as she mentioned. 300.5 direct burial conductors. All of these, especially effective ground fault current path, 250.4 can't be met if they are spraying these boxes and the ground in the box is covered with paint.

Electricians going into homes are setting finish on 200, 300 devices are not scraping every ground and cleaning the paint off. And it is just something that I see daily.

The construction industry is just moving too quick, and it's almost like we have to slow it down a little bit. We have to implement a cover to be placed and slow the process down. Everything is rush, rush, rush. And I see the workmanship out there. It's awful. And guys aren't covering the boxes unless we make a mandate saying that this is what we have to do to get the job done.

THE CHAIR: Thank you.

MS. TOMASINO: It almost seems like going over this and hearing the feedback about Mr. Compagnone having invented a cover to address this problem, almost as if he shouldn't have developed a cover before he looked at the statistics and put it before everybody here today or before the code-making panel, because the statistics show that it is a problem, and this premises wiring group is causing fires within the home. These fires are coming from the damage caused in this wiring that is

1 left exposed. Thank you.
2 MR. COMPAGNONE: One more thing. A lot
3 of times these wires are getting cut with the power
4 routers and they're only leaving 2 to 3 inches of
5 wiring, and electricians, there is no slack. They
6 can't pull that, and they're just using that 2 or
7 3 inches, and outlets make it work. And the
8 inspectors they don't see it because they only see
9 the rough end of it. They don't come back until the
10 finished end when the plate is on. So they're not
11 picking up there is no more 6 inches in that box.
12 There is 2 or 3 inches in that box, and it's just
13 going to get worse, and worse, and worse.
14 THE CHAIR: Thank you.
15 MR. COMPAGNONE: Thank you.
16 THE CHAIR: I see on the list
17 Mr. McCullough that you're Panel 9 to speak. Would
18 you like to speak on behalf of the committee?
19 MR. McCULLOUGH: Bob McCullough,
20 chairman of Code Panel 9. This issue had been
21 discussed. We had two proposals and 2 subsequent
22 comments to Panel 9 on this, and the panel agreed
23 both at the proposal meeting and the comment meeting

that the wiring in the boxes could be subject to compromise but did not feel that a separate code rule was necessary. 110.12 B is one section that the panel felt does contain guidance for these types of installations.

So after lengthy discussion at both the proposal and the comment meeting, they were rejected, and the other proposal and comment. Panel 9 felt that the situation is addressed in other areas of the code, proper enforcement of those rules by the AHJ will take care of the issues.

THE CHAIR: Thank you. Is there any comments from the TCC?

MR. DRAKE: Bill Drake representing the Technical Correlating Committee. We discussed this also at a meeting yesterday. We looked at the record that was there. We looked at the arguments both pro and con. There is not a whole lot that we had to add to it. We thought that the comments and the responses by the code-making panel were pretty inclusive. We really could not add much more than what Bob has said today.

THE CHAIR: Thank you. I'm going to

open it up to questions from the members of Council. Mr. Gerdes.

MR. GERDES: Ralph Gerdes, Council member. My understanding is the code has performance language that you do need to protect this box, and you're indicating that there is a problem out there in the real world that it's not being protected.

You made a comment about the fact that the electrical inspectors aren't picking up on these problems. Could you elaborate on that? To me it seems to be an inspection issue.

MR. COMPAGNONE: The problem is after the completion of rough wiring, you get an inspection for the rough. Everything looks fine. Electricians pull out of the job. They're gone for weeks, months on end, other contractors are moving in, doing their insulation, board hang, plastering, so on, so forth. And we come back. We're left with the boxes full of plaster, foam sprayed in the boxes, paint sprayed in the boxes. And you don't see that inspector again until the completion of the job on the finish. So he is not seeing the in

between. And a lot of guys like I said, it's hurry up, hurry up, hurry up. They're not cleaning out these boxes.

So workmanlike manner which the code addresses everything should be done in a workmanlike manner, they're leaving that stuff in the boxes. They're leaving some of the foam in the boxes. The wires that should have been 6, 8 inches long are now 2 inches long. And they're making it work. That is just not, doesn't stand up to the NEC.

MR. GERDES: My understanding is when you install this box and you are pulling your wires, doesn't the code require protection at that point? I don't know whose fault that is.

MR. COMPAGNONE: That's the whole, we tuck our wires and push them back as best we can, but it's open game until we come back. That's the problem.

THE CHAIR: Any questions?

MR. JARDIN: Joe Jardin, member of Council. This would be a question for the panel chair, to the appellant's point that section I believe 110.12 (B) doesn't address outlet or device

boxes. Can you comment on that?

MR. McCULLOUGH: When this was discussed it was the feeling of the panel that the term equipment in our estimation certainly included the box. That we considered that piece of equipment, and if that is damaged or filled with plaster or paint or whatever, that it's the AHJ could invoke the provisions in 110.12(B) to have that corrected. 38 years in the field doing inspections, and I didn't see, I wouldn't have gone to work in the area that Carlo talks about because the work is not being done properly.

MR. JARDIN: Just a follow-up. In your previous testimony you seemed to suggest there might be some other areas in the code that similarly address the issue. Can you elaborate on some of those specific areas?

MR. McCULLOUGH: In 110.12 Carlo already made reference to 110.70 integrity of connections and whatnot. It's nebulous. 110.12 is the catch-all if you will, but it certainly in the panel's estimation it set a precedent that there is ways to enforce the issues that were raised by the

1 submitter without having to write a whole new code
2 section to deal with it.
3 THE CHAIR: Mr. Harrington.
4 MR. HARRINGTON: J.C. Harrington,
5 member of Council. Follow up question for the panel
6 chair. The same section 110.12 that we're talking
7 about it seems to talk about the equipment needs to
8 be installed in a neat and workmanlike manner as
9 part of the requirement in that section of the code.
10 So I'm wondering on your view with some of the
11 pictures we have here with boxes filled with plaster
12 or foam or whatever how that relates to the
13 installation requirement that are neat and
14 workmanlike manner, in compliance with that.
15 MR. McCULLOUGH: Bob McCullough, chair
16 panel 9. In that case, if the inspector discovered
17 that condition would use the provisions in 110.12 to
18 have that removed. Electricians have, there is, I
19 don't know, a number of different ways to protect
20 the interior of that box and the contained wiring.
21 In some areas it's as simple as putting a piece of
22 duct tape over the opening. That keeps the paint
23 out. Keeps the spray foam out. Will it keep the

1 router out, the pin router, maybe not. Of course
2 maybe if the drywaller gets a big enough ball of
3 duct tape wrapped around the bit, stalls his machine
4 out, it will stop.
5 The point is there is other ways to
6 keep that box free of foreign materials other than
7 requiring the installation of a physical cover as
8 mentioned.
9 MR. HARRINGTON: I guess my question
10 maybe wasn't specific enough. Rather than ways to
11 prevent it from happening, I guess what I was asking
12 is if the requirement is that it be in a neat and
13 workmanlike manner and if the eventuality is that it
14 ends up in a situation where it's filled with
15 plaster or filled with foam, is that the eventuality
16 of what happens, at that point is it your view that
17 that situation would still be meeting the
18 requirement of neat and workmanlike or would someone
19 have to physically do something to address that?
20 MR. McCULLOUGH: AHJ discovering a
21 condition like that you would fail the installation
22 and have the foreign material removed.
23 MR. HARRINGTON: Thank you.

THE CHAIR: Mr. Harrington, Mr. Compagnone would like to respond to your question also.

MR. COMPAGNONE: The problem with that is the inspectors never see this part. They never see this. They see the nice work we do. The wiring all tucked back into the boxes. And then they leave and they don't come back until the rugs are down, the switches are on, the plates are on, and we have no one to go to to deal with this problem. This is the in-between problem.

THE CHAIR: Questions, Mr. Clary.

MR. CLARY: Shane Clary, member of council. Mr. Compagnone, you stated when I look at both your proposal and your comment that you had supplied additional supporting material to NFPA, what was that material? What was in that material?

MS. TOMASINO: Alisha Tomasino, if I may, we provided an article written by John R Hall Junior March of 2009.

MR. CLARY: The same thing we have?

MS. TOMASINO: You have the whole packet as well as the photographs and what we

1 submitted initially prior to the appeals process.
2 Along with the transcript from the hearing from Las
3 Vegas.
4 MR. CLARY: Thank you.
5 MS. TOMASINO: The pictures were just
6 black and white.
7 THE CHAIR: Mr. Milke.
8 MR. MILKE: Jim Milke, member of
9 Council. To Mr. Compagnone, I guess I'm wondering a
10 bit about the due process. It appears that you
11 submitted a proposal that was rejected. And I'm
12 wondering what relief you may be seeking from that
13 due process where you feel you were not properly
14 treated?
15 MR. COMPAGNONE: She will.
16 MS. TOMASINO: If I may, I think part
17 of the issue is this was bounced around a couple of
18 times from Panel 3 to Panel 9. Panel 3 seemed a
19 little bit heading in the direction that we had
20 hoped would happen, that it would be put into the
21 code book, and then it was, I think it went to a TCC
22 and they decided that Panel 9 was the appropriate
23 panel. So throughout the past couple of years it

was bounced around a little bit.

I think at this point, again some of the other feedback that has been received is that people don't want the covers to say not for permanent installation. They don't want to have to install a specific cover, and perhaps it was submitted maybe our submission was written inappropriately and should have been written a different way. Whatever goes into the NEC there should be a requirement that a cover be put on whatever that cover should be, there should be something that requires a cover on that box during the construction process because this is what you're seeing. And then you have electricians going in cutting things out. So however you word it, I think that's kind of where we're going with this, and that hopefully answered your question. Or I tried. Thank you.

THE CHAIR: Mr. Huggins.

MR. HUGGINS: Roland Huggins, member of Council. This is for the appellant. As far as changing the NEC which has some guidance in there when the installing contractor returns and it has

been messed up in the box, don't they have some responsibility to comply with NEC and raise a red flag that the conductors have a problem?

MR. COMPAGNONE: Yes, they do. That is the problem. But what is happening, they are trying to make what they have work at that time. Jobs are being pushed along, hurry up, hurry up. The general contractors they don't want to hear it. Get it done. And the right way to do it would be if there is no slack and the wire is short, well we have to take the box apart. We have to run a new wire. We have to get back what we had originally. GCs don't want to hear that.

So these guys are making what they have work and that is where you violate the NEC, 300.14 gets violated. Integrity of the wiring, 110.7. A lot of other articles in the code get violated because of this. They are not met.

THE CHAIR: Miss Brodoff.

MS. BRODOFF: Maureen, legal counsel. Just for the record, Miss Tomasino, would you just state what your current business economic interest is related to this appeal.

MS. TOMASINO: Mr. Compagnone actually has a corporation called Compa Covers, and he many years ago, I am not sure, developed a cover specifically for the electrical boxes to be put in place during the construction process, actually developed a cover for whatever size and shape. I am not a technical person, but whatever box is there he has a cover that will cover that during the construction period and can actually be removed, so that would be the economic interest.

THE CHAIR: Tim Pauley, Chair of the Council. I did have a couple of questions for the record. One, I want to make sure there is nothing in the NEC today prohibiting the product that you've developed from being used, is that correct?

MR. COMPAGNONE: Yes, right.

THE CHAIR: And the second question I want to clarify, perhaps going back to your point that you made that this had been tossed around a little bit, was this an issue also raised during the previous code cycle?

MR. COMPAGNONE: Yes. The previous code cycle I went to Hilton Head to the ROP, and I

spoke Panel 3 and Panel 9, and Panel 3 there was an argument, a good debate. Pretty much half and half, but they decided that it wasn't a good fit and they shuffled it to Panel 9. I don't really know what happened but it kind of went back and forth and then the TCC got involved, and I'm trying to follow it as well.

THE CHAIR: Thank you. I guess I'll ask is there any commentary from the TCC with respect to that jurisdictional issue that seems to have been raised to toss this back and forth, or did the TCC assign jurisdiction?

MR. DRAKE: Bill Drake, Technical Correlating Committee. TCC looked at the issue and it's part of what our job is to find correlating issues and code especially in two different code panels are involved, and it was the determination of the TCC that this would fall under the jurisdiction of code-making panel 9 and not Panel 3.

THE CHAIR: Thank you. Mr. Milke.

MR. MILKE: Same question.

THE CHAIR: Any further questions from the members of Council? With that I am going to go

back and give you a quick 5 minutes on both sides, if you have anything you want to add, and I'll also note for everybody if there is nothing you need to add don't feel like you have to take the 5 minutes, but if there are elements that you want to rebut in the discussion or bring up in your closing remarks, I give the opportunity to you to do that.

MS. TOMASINO: This is why I love to talk. I have nothing further to say. Thank you very much.

MR. COMPAGNONE: I believe I put it all out there. I mean the industry today is moving too quick and too fast, and that's the bottom line. Being an inventor of this product, I have gotten calls from Hawaii, Alaska, all over Puerto Rico, and I am hearing especially down south, Florida, Arizona. The workmanship is shoddy, it's getting real shoddy and just awful. And I'm seeing it in the northeast. I'm 20 minutes from here and it just, we need to slow the industry down. And by implementing a cover it will just bring everything, I believe, to slow it down and let the job go on the way they should.

THE CHAIR: Thank you. Mr. McCullough.

MR. McCULLOUGH: I am going to let the panel's unanimous vote on these stand.

THE CHAIR: Anything further from the TCC?

MR. DRAKE: No.

THE CHAIR: With that we'll bring this particular hearing to a close. Thank all of you for participating in this hearing. We appreciate your time and effort and your participation in the NFPA code and standards development process. As stated earlier and I remind everyone, only a written decision will be issued after the Council makes a decision. No member of NFPA nor member of the Council is permitted to convey any information associated with that decision. It will come from the secretary of the Council, Miss Cronin, and that will be the official communication of the response of the Council on this issue. So thank you again, all of you, for participating.

We'll close this particular hearing and we'll move directly into the next hearing which is Agenda Item 10-8-1-i-1. This is an appeal I believe

with Mr. Mercier with respect to an issue in 517.30(c)(3). I don't recall anyone new coming into the room, but I am going to ask if someone has come into the room since we last did introductions if you can make that known to me please.

Seeing no one, again gentlemen we are going to follow the same format as we did in the previous hearing, and I am going to ask at this point for any statements from members of Council.

Mr. Bell.

MR. BELL: Kerry Bell, member of Council. For the record I am recusing myself on this agenda item and will not participate as a member of the Standards Council and the hearing deliberations or voting of this matter.

THE CHAIR: Mr. Carpenter.

MR. CARPENTER: I would like to note for the record that I am a member of the TCC. As a TCC member I participated in consideration and voting on issues that appear to be related to this appeal. I have therefore reviewed my obligation under the guide for conduct of participants in the NFPA process particularly Section 3.5 (D) of the

1 guide to consider whether there is any reason for me
2 to recuse myself from consideration of this appeal.
3 I have concluded I do not have views that are or
4 would appear to be fixed concerning the issue, and I
5 am fully able to give open and fair consideration to
6 this appeal. For the record, therefore, I have
7 considered the matter and believe I can fully,
8 fairly, and impartially fulfill my role as a Council
9 member on this appeal.
10 THE CHAIR: Thank you. Seeing no other
11 discussion, I note this particular appeal with
12 respect to overturning the floor action to reject
13 comment 15-101. I'll turn it over to you,
14 Mr. Mercier.
15 MR. MERCIER: I am going to let
16 Mr. Temblador start.
17 MR. TEMBLADOR: Richard Temblador.
18 Thank you for the opportunity to speak and address
19 this Council. I have been involved in the NEC
20 making process since the 2002 cycle, and I think
21 it's a great process. Our issue is and our basis
22 for appeal is not that the process wasn't followed.
23 The process was followed. Our issue is really that

1 the NEC process is a good process however it has
2 some minor flaws like any other process. I think
3 these flaws were exposed at the annual meeting. So
4 I want to go through them and we are going to
5 address some of those issues.
6 One issue in particular, one flaw is
7 that the process can lead to the discussion or
8 healthy debate being prematurely cut off, and I'll
9 kind of set the scenario for you. At the annual
10 meeting on this day, early in the day, the
11 membership endured extensive debate on many similar
12 issues. Very lengthy debate. And this was repeated
13 several times on similar issues just slight
14 variations of this issue. And as a result, the
15 membership grew very tired and their patience waned
16 quite a bit.
17 As a result one member began to quickly
18 call for the question on many issues as the day
19 progressed. And the membership went along with them
20 every single time. There wasn't one instance where
21 the membership didn't go along with the call for the
22 question. And I think our issue is at the latter
23 part of the day and I think people were tired and

1 they wanted to get out and end the meeting
2 effectively. So our issue to effectively address
3 this issue was cut off basically, as result of that
4 process.
5 Our second issue is that the annual
6 meeting in our view is not an adequate forum to
7 properly address the numerous technical issues
8 raised by the supporters of the NITMAM. There were
9 18 or more particular issues or concerns that were
10 brought up, and to address those on the floor and
11 have that discussion is virtually impossible. In
12 addition, the general membership lacks the technical
13 expertise and the context with regard to this issue
14 to address it properly. There is not enough time to
15 address this issue raised by the proponents of the
16 NITMAM.
17 CMP 15 has experience. They dealt with
18 issues for many cycles and they basically, had they
19 had the concerns that the proponents of the NITMAM
20 had they would have rejected the comment and would
21 have agreed basically with Mr. Lipster and
22 Mrs. Horton and proponents of the NITMAM but they
23 didn't. They accepted the comment. The proponents

of the NITMAM are well versed the NEC and code-making process. I have the utmost respect for them and consider them many friends as well. In this case they provided information that was either misleading or was dramatically incomplete to support their cause.

I'll give you a few examples. One issue raised had to do with insulation thickness and its effect on conductor fill. And effectively those well versed in the code know this is a nonissue. No standard insulation thickness exists in the NEC. NEC has a list of different insulation types that are permitted in both conduit and MC cable. And those insulation thicknesses can vary for 12-gauge wire from basically I think it's 10 or 15 mills to 60 mills. Our insulation thickness was well within those types. In fact the insulation thickness we have on our cable that we submitted on the particular construction that passed is similar RHA or RHW or SA type insulation which is 45 mill.

So there was a lot of information that was misleading that the proponents should know because they make conduit. They install conduit.

They install MC cable. These types of insulations are permitted in both EMT conduit and MC cable as well. So no issues with that.

The other one is the inference that unsafe nonlisted products would be permitted by the code, and that is just simply not the case. I'll go through and list several comments that Mr. Lipster made during his testimony at the annual meeting. He stated, allowing the use of a prototype cable does not -- allowing use of a prototype cable that is not available for use has no product standards, has never been tested as a wiring system, has no field performance record, is bad code.

Anyone involved in the NEC process knows that typically when you want to make a code change where something is not permitted by the NEC you typically develop a fact-finding report. That fact-finding report is used to support that code change to prove you can do something. That consequently drives a change in the NEC and then that consequently drives a change in the product standard.

The product standard in this case is UL

1569 MC cable standard. The requirement that we put forth was this product be a listed MC cable with additional requirements for mechanical integrity to be acceptable for use in the installation of emergency systems. And so we went through that process. The process of fact finder report was supplied. The panel reviewed that and they accepted all those issues.

I am going to hand it over to Dave Mercier.

MR. MERCIER: Dave Mercier, Southwire Company. Mr. Temblador provided examples from our written appeal and from the association meeting. I would like to provide an overview of what we see as core issue of our appeal.

The NFPA NEC is a great process but not perfect. The weakness of the process I believe is at the annual meeting. The strength of the annual meeting is addressing issues where codes conflict. There are many NFPA codes and it is a great place to resolve those issues. It's weakness is in addressing specific technical issues within the specific code. We believe this weakness was abused

1 in addressing comment 15-101. Specific technical
2 issues just cannot be properly covered at the annual
3 meeting at the depth they need to be covered.
4 Second, it was stated that several
5 times as a fact by the opposition that procedures
6 were not follow that were set by the rules governing
7 committee. I have conferred with several people's
8 staff and as stated in Mr. Talka the chairman's
9 response letter to this appeal, all procedures were
10 followed. I look forward to the Council's response
11 to this specific issue.
12 Much has been said about the
13 fact-finding report. Mr. Temblador mentioned that,
14 and Mr. Talka in his letter to the Council fully
15 addressed this issue. The report was in a response
16 to request by the panel. It was a simple report to
17 address the issue of ability to provide additional
18 mechanical protection of type MC cable. The report
19 was provided to the panel. It was reviewed by the
20 panel, and comment was accepted by the panel. If
21 more time was needed by the panel, a whole motion
22 would have been appropriate. And with my experience
23 on code-making panels, I have seen very few panels

that do not hesitate to use that at a comment stage.

The fact-finder reports are not considered a standard and should never be considered a standard. The panel in accepting this comment required a listing for this specific use and stated additional requirements. The UL standard will have additional requirements added to this for a specific use and then a listing would be applied to this product. An example of this being done now in the code is type MCHL, HL standing for hazardous locations. For class 1 dif 1 there are specific requirements for MC cable for allowed use and hazardous locations. Once that was passed in the code the UL standard then adopted that as an additional feature to MC cable and then can only be used in those environments when it's listed for that specific use for that specific feature.

The panel many times they do want a third party to supply data in an aid to making a decision. The majority of the time they like to see UL fact finder reports to do that. I have been a member of panels and this has been done many times. It's not an unusual process at all.

As Mr. Talka pointed out in his response letter, this is not a standard. It is not to be intended to be a standard. In review of the kind of a process and in my experience a lot of times new members to NEC panels don't really understand it is the sequence of how a code comes into place and how UL interacts. The NEC sets use and general requirements. A fact-finding report provides third party input. A UL standard is developed to assure safe design for NEC use of the product. A UL listing then assures that the manufacturer meets the standards. As seen this process was misrepresented at annual meeting which in turn misled members.

As Mr. Talka recommends and showed in his response, the panel did ask for a fact-finding report. It was provided. The panel accepted. After the association meetings votes were taken on the subject, and I believe from limited information from the proceedings of the association meeting and for an example Mr. Talka had changed his position after learning of our appeal to this matter.

The code council should overturn the

1 association's position due to what I believe was
2 misconduct and willfully misleading a group not
3 familiar with the NEC process.
4 We did not really intend after the vote
5 to file an appeal. We were to let the process
6 stand, but after many veteran members came to us,
7 you know, and said the process came up short and
8 didn't allow you a fair opportunity to address the
9 issues. We decided to in turn put in a formal
10 appeal. Thank you very much.
11 THE CHAIR: Thank you. I am going to
12 ask now for comments. Is there anyone else speaking
13 in favor of this appeal? Please. State your name
14 for the record.
15 MR. DUNCAN: Jim Duncan. I'm a
16 principal member of Code Panel 15. Don Talka asked
17 me if I could be here today and talk about the panel
18 process. And may I do that?
19 THE CHAIR: Please. And as expediently
20 as you can, please.
21 MR. DUNCAN: I'm here to support the
22 appeal and support the panel action. This is an
23 issue of branch circuits, emergency branch circuits

in patient areas. This is a very important part of the integrity of the electrical system for health care facilities. It is that last couple hundred feet before you are providing power to medical equipment that can be the difference between life and dying ventilators and heart monitors, etcetera etcetera.

So this is something very important. It is something that this panel has talked about for three cycles. During the proposal stage we asked for, we were interested in this new product, and we asked for a fact-finding report. That fact-finding report was provided. At the comment stage there was a good dialogue, a long dialogue, and a vote was taken and the panel approved this change to the code to use a special type of MC cable in these circuits.

The vote was 8 to 3. We actually think as engineers Doug Erickson from the hospitals, Hugh Nash is a well-known electrical engineer in health care, myself I have designed systems in healthcare facilities for 35 years, that having a cable that is a little flexible, that if there is a drill or something that happens to the wall that having a

1 strong flexible cable is equal and might even be
2 better than EMT. EMT is a concept we've stuck with
3 for many years, but after a lot of discussion,
4 professional opinion, this panel voted to add this
5 method to the code.
6 So I'm here to say that in spite of
7 what was said at the annual meeting, there was due
8 process and the right process at the code panel. We
9 all read and asked good questions about the UL
10 fact-finding report on crush and impact strength
11 equivalent to EMT, and we're satisfied that it met
12 the criteria.
13 I ask the Council to uphold this
14 appeal, to be in favor of the appeal and support the
15 panel action. I think what is at stake here, and
16 this is the second time I have come to this meeting
17 to appeal is the integrity of the code. A safe,
18 successful, and a smart code is one that is
19 innovative and one that changes over time. And this
20 is a good process. And so this is the time to make
21 this change in this particular way of feeding
22 circuits in patient care areas. And I'm opposed and
23 I too have a problem with the annual meeting where

1 inaccurate statements or misleading statements can
2 be made and votes can be taken quickly that do not
3 represent the integrity of the code or the
4 professional thought that is behind making changes.
5 Thank you.
6 THE CHAIR: Thank you. Anybody else
7 that wants to speak in favor of the appeal? Yes.
8 I'll ask if you can make some room at the end of the
9 table. Those folk who are going to speak in
10 opposition of the appeal, if you'll please take a
11 seat there, and again introduce yourselves for the
12 record when you speak. Since we have some folks
13 speaking in opposition, I assume, Mr. Owen, you're
14 coming to speak on behalf of the TCC?
15 MR. OWEN: Yes, sir.
16 THE CHAIR: I'm going to ask to hold
17 that comment until after the other folks speak since
18 they are speaking directly to the appeal in this
19 matter and then comments from the TCC. Thank you
20 for that. I will leave it to either of you who
21 wants to begin.
22 MR. LOYD: Richard Loyd, and I did
23 leave you a card. Thank you, Mr. Chairman, members

1 of the Standards Council. I represent Steel Tube
2 Institute. I have been a participant in the code
3 process for many years. I serve on two code panels
4 for the NEC and then the air conditioning committee.
5 I've attended annual meetings since the early '80s.
6 I don't know for sure if I've ever missed one. I
7 won't say I've attended every one because I can't
8 remember that far.
9 I'm speaking in opposition to this
10 appeal, in support of the NFPA process and the floor
11 action on CAM 70.20 relating to comment 15.101. The
12 first item I would like to address this morning is
13 the complaint from Southwire that the submitter
14 Mr. Temblador did not get to speak on the floor to
15 address allegedly misleading and incorrect
16 statements.
17 I was also at the mike when the
18 question was called. However, that is a process
19 we've come to expect as long as I have been in the
20 process, which is 30 years or so. That there are
21 folks that listen intently and when both sides have
22 had a chance to speak, and people start rambling on
23 or recovering plowed ground again, somebody gets up

1 and asks the question. That is always the danger
2 when you lay back and wait to speak, to get the last
3 word in so to speak. Sometimes you don't get it.
4 But Mr. Temblador and Mr. Mercier who
5 both represent Southwire just spoke. Mr. Mercier
6 did have a chance to speak after several of these
7 speakers. In fact he spoke directly after Ms.
8 Horton. He did not address any of this misleading
9 information at that time. He had every opportunity
10 to.
11 I reviewed the balloting on the
12 recirculation, the floor action, and consensus has
13 not been achieved. Therefore, I feel that appeal
14 should be denied. The real problem here and
15 Mr. Mercier brought it up, is the substantiation.
16 He made a statement so I quickly looked and
17 Mr. Duncan also made a statement, they requested a
18 fact-finding report. Well in proposal to this
19 comment, which was 1578, they rejected this thing 12
20 or 11 to 1, one ballot was not returned, so it was
21 unanimous. Their statement was at this time the
22 panel is not aware of any MC cable that has a crush
23 impact penetration circuit protection performance

1 equivalent to EMT. The submitter had not referenced
2 any type MC cable that perform equivalent to EMT in
3 this regard. The panel is not receptive to writing
4 code around products that do not exist. No
5 reference to request for fact-finding report.
6 So the real problem is substantiation.
7 In his comment Mr. Temblador used for substantiation
8 type MC can be constructed to provide an enhanced
9 mechanical protection comparable to EMT. That was
10 his substantiation. Clearly, Section 4.4.5 D
11 requires substantiation be provided.
12 Now, the whole problem was he brought
13 the substantiation to the meeting. Hot off the
14 press. Dated December 3rd. And it was a very brief
15 fact-finding report, and I have been on Panel 8 and
16 really think this issue should be in Panel 7. But
17 it wasn't. It was in Panel 15. But in Panel 8 we
18 get fact-finding reports and oftentimes as you guys
19 know they're very technical, and we do have
20 expertise. But generally I end up going outside to
21 get some clarification. Often I go to my UL friends
22 or go to other engineers to find out exactly what
23 the fact-finding report says and means. So when you

1 get a fact-finding report at the meeting, there is
2 no time to speak to it. In fact a quick review of
3 it, Ms. Horton asked to speak and the chairman said
4 you will not be allowed to speak on this issue at
5 this meeting. So we had no opportunity.
6 You know, the process is very precious.
7 It's been tried and proven true over time. Don't
8 mess with the process. It works. Robert's Rules of
9 Order I don't know when it got started but it still
10 works pretty darn good. Please uphold this process
11 and deny this appeal. Thank you.
12 THE CHAIR: Thank you. Ms. Horton.
13 MS. HORTON: Pat Horton, Steel Tube
14 Institute. I have been in the process since the
15 early '80s and participated in all the NEC
16 development since that time. I have attended all
17 the meetings. I've attended TCC meetings, and I
18 think I'm quite familiar with the process as
19 Mr. Mercier. I know that there are things that
20 don't get addressed right sometimes, but I think
21 that we've learned a lot over this period of time,
22 and I believe that they're right, that the integrity
23 of the code as Mr. Duncan said is at hand here

1 because everything I have seen over the years, I
2 have seen many fact-finding reports come in. They
3 come in on time. There is opportunity for people,
4 like a lot around this room, to look these over in
5 addition to the code panel members and find things
6 that might be wrong within those fact-finding
7 investigations or what else is needed.
8 Mr. Talka stated that there are
9 products that go into the code that have not been
10 listed, and that is true. And a lot of times that's
11 due to new technology, due to a safety issue that
12 has to be addressed at that particular time that
13 needs urgent. But we have found over the years when
14 you get a lot of people looking at fact finding
15 investigations you find the holes and they're able
16 to fix them before the listing is issued then, and
17 you see what you need to do. Fact-finding report
18 they test only what a client asks them to test. And
19 in this case, they did do some testing. I did make
20 a couple of errors on the floor. They were not
21 serious errors because they didn't change the fact
22 that the resistance after a test is increased. It
23 was increased on the impact test as well as

1 vibration test. But the 2 53 percent increase in
2 resistance was on the vibration test. I just wanted
3 to verify that.
4 This started out with proposal 1554.
5 And when the code panel made their statement, they
6 did ask for a fact-finding investigation at that
7 time. That is not the new 1578. But they also said
8 in addition to a fact-finding report, the panel
9 recommends that this information will be more
10 appropriately located in Article 330 under uses
11 permitted. Article 330 is the primary article for
12 MC cable. That article does not even allow MC cable
13 where it is subject to physical damage. And I think
14 that the panel recognized when this first started
15 its 2008 code that Panel 7 really did need to take a
16 look at it because they go into a lot of depth and
17 they would look at a lot of the things that people
18 have brought up that were not covered in the
19 fact-finding investigation to see if it's a viable
20 product. I wanted to call that to your attention.
21 I also found out that this is what
22 happens when you really get to look at a
23 fact-finding report, and I was present at the code

panel meeting. There was probably not much more time spent on this than is being spent here today on this issue. When you really dig into it you start seeing things. I found in Section 25 of this UL 1569 that is the standard for MC cable that it contains crush test for all cable. And Section 25.2, describes the equipment and its use and uses a compression machine and this is the quote out of it, "Whose jaws close at the rate of 0.50 inches permitted." That same 0.50 is found again in Section 25.5. The report says the construction was done to UL 1569. However, I notice that the report says that they used a rate of .20 per minute not 50 per minute.

Now I think that we can all wonder why that deviation, and I have my own idea why, but those are some of the things that would be looked at if there had been more time and if the substantiation had come in with the comment. There are a number of things that at the time doesn't permit discussing here today.

A big concern is that the text is just wide open and there are already three different

1 types of MC cable out there. And there is a lot of
2 confusion in the market about which one is which and
3 which one do you use, and the markings, I believe a
4 lot of times lost in not exactly on the product but
5 they're lost in installation. This identification
6 is what Richard was going to talk about on the floor
7 that day. They had a recap of several panel
8 statements from several code processes. The one
9 from 2005 proposal 1735 showed some of these same
10 concerns. And what the panel said at that time was
11 when there is a listing for this cable and a
12 distinctive type designation, the cable may be
13 considered if it can be shown to have equivalent
14 mechanical protection.
15 So I feel that I agree with Richard,
16 that I do not believe it meets the need for the
17 content of comments because the comments that you
18 have to have substantiation with the comment, when
19 you make a one sentence that says it can be made to
20 do this, and you don't tell anything about it and
21 you don't submit paperwork, then how can people be
22 expected to review it like it ought to be reviewed.
23 I think this needs to go back and have another look

1 at the 2014 code. Mr. Carpenter noted in his TCC
2 ballot that that is what would happen. You don't
3 put it in the code and there is a chance for the
4 panel then to look at it in depth in the 2014. I
5 would be glad to answer any questions. Thank you.
6 THE CHAIR: Thank you. Is there anyone
7 else besides the TCC at this point speaking of this?
8 Yes.
9 MS. THOMPSON: Elaine Thompson, Allied
10 Tube and Conduit. I just wanted to revisit and we
11 did put this in our written submission, but the
12 issue of the call the question during the annual
13 meeting, and I think Richard did address the issue,
14 but I think did not mention the fact that during
15 that whole process there were 10 times of the
16 question was called, and before this issue was
17 raised on the floor, it had been called 8 times. So
18 I would think again that the people that were
19 speaking against the CAM 70-20 would have known that
20 this could have happened and probably should have
21 been prepared at the mike to address any issues
22 they felt they needed to address.
23 So I think that again, the Council

1 would need to decide if there were 10 questions that
2 were called would not all of these issues have to be
3 revisited if you would rule in favor of this. And
4 since this is one of the major basis of their
5 appeal, I think that is an important consideration
6 today. Thank you.
7 THE CHAIR: Anyone else speaking in
8 opposition? Mr. Owen, would you like to make a
9 statement on behalf of the TCC.
10 MR. OWEN: Richard Owen representing
11 the NEC TCC. Mr. Chairman, Standards Council, the
12 TCC discussed this issue at length yesterday. The
13 panel initially accepted this at the comment stage.
14 However, there was no consensus reached by either
15 the panel or the TCC during the recirculation of the
16 vote following the annual meeting. Considering the
17 lack of consensus during the recirculation, the NEC
18 TCC recommends the appeal be denied by the Standards
19 Council. Thank you.
20 THE CHAIR: Thank you. Now I'll open
21 it up to questions from the members of the Council.
22 Mr. Gerdes.
23 MR. GERDES: Ralph Gerdes Council

member. I had a question for the code-making panel member that testified. You're speaking officially on behalf of the panel and you're supporting the appeal? I want to clarify.

MR. DUNCAN: Yes.

THE CHAIR: Different question. Jim Pauley, chair of the Council. The question I have is one related to Mr. Gerdes' question. Mr. Duncan, I noted that you are speaking on behalf of the panel. I'm having a little trouble reconciling the panel's ballot results from the amendment. The amendment passed on the floor, it was balloted to the panel which essentially would have said do you agree with the amendment to overturn the comment. 8 of the panel members agreed with that and 5 did not agree. So it failed because it didn't meet the two-thirds criteria. I'll also note that more than the majority agreed with what happened on the floor.

I guess I'm having trouble reconciling the last panel position that would be reflected in the ballots with the representation that the panel to uphold the original action. Any comments on that?

1 MR. DUNCAN: Good question. I did not
2 talk to people. I think there was some confusion
3 about that vote, what it meant, our chairman and his
4 research said it doesn't matter. It's going to go
5 back to the existing code, code language. I think
6 there was just some confusion on what that -- it
7 confused some of the members. I had emails from two
8 people asking me what this meant and whether to
9 vote, even how to vote to support the panel action.
10 That's my sense of it.
11 THE CHAIR: Just to follow up on that,
12 I assume when that amendment ballot came out the
13 panel didn't have a teleconference or anything to
14 discuss it. You mentioned a couple of emails, but
15 there was no formal teleconference or meeting of the
16 panel to discuss that amendment, is that correct.
17 MR. DUNCAN: That is correct.
18 THE CHAIR: You mentioned in your
19 opening comments you were asked by the chair to
20 speak on behalf of the panel in this. So I just
21 want to make clear for the record, is your sense of
22 speaking on behalf of panel, going back to that
23 original ballot that the panel did at the ROC, I'm

1 trying to make sure I get for the record sort of
2 where the panel is in a sense and make sure we have
3 kind of got all of that on the record. I know the
4 chairman asked you to speak, but again he voted in
5 favor of the amendment.
6 MR. DUNCAN: Yes. I'm speaking for the
7 panel at the ROC stage. I didn't spend time
8 researching why some votes changed in the recirc,
9 and my observation is there is just some confusion
10 about what that vote meant, Mr. Pauley.
11 THE CHAIR: Thank you. Additional
12 questions? Ms. Brodoff.
13 MS. BRODOFF: So just to be clear, you
14 did not conduct any kind of ballot formal or
15 informal of the panel's position now.
16 MR. DUNCAN: That is correct. I talked
17 to the chairman, and I had two emails when the vote
18 was being recirculated. Also I have no dog in this
19 fight. I am an independent professional engineer.
20 I have nothing to do with electrical contracting
21 companies that install this or companies that make
22 this. My company paid my way from Seattle to be
23 here today.

THE CHAIR: Mr. Mercier, I see your hand up. I'm doing questions from the Council members. Did you have a comment on that statement? My question so I'll ask did you have a comment on that.

MR. MERCIER: Dave Mercier, Southwire. I talked to Mr. Talka. His statement was if I had known there would be an appeal I would have voted differently. And he has a letter on record to the Council stating his support of the appeal even though his recorded vote is agreeing with the association.

THE CHAIR: Thank you. Ms. Horton, did you want to comment on that question?

MS. HORTON: I thank you for raising that matter because it was less -- right at a half a person from being consensus. So that you know that. So that is called to your attention. I mean that's how close it came to meeting the requirement for three-quarters or two-thirds. I've forgotten which it is.

THE CHAIR: Two thirds.

MS. HORTON: Thank you. Two-thirds,

1 but it was less than half a person.
2 THE CHAIR: Thank you. Any additional
3 questions from members of Council? Very well, I'm
4 going to closing remarks. Mr. Mercier,
5 Mr. Temblador if you have any final closing remarks
6 that you would like to make.
7 MR. MERCIER: Just to address some
8 issues. The fact-finding report, this was a long
9 process, and I documented it back to 20 years
10 chairman 3 cycles, and even though specifically in
11 the last panel position they didn't ask for a
12 fact-finding report their statement not being aware
13 of any cable can meet this was reflected and noted
14 the chairman's understanding of that was a
15 fact-finding report would address that. That was
16 from the chairman's perspective.
17 I am on Panel 7, and after I met with
18 Panel 15 I went back to Panel 7 and asked where does
19 this belong? Does this belong as part of Panel 7?
20 And the panel said no. That the hazardous location
21 feature for MC and all that are handled by other
22 panels. So they said that was an issue that Panel 7
23 had to see.

1 Regarding being able to review the
2 fact-finding report, UL reps are on the panel, UL
3 reps are familiar with the report and answered all
4 questions with the report and again it was a short
5 report. I'll leave it to that. Thank you very much
6 for hearing us.
7 THE CHAIR: Mr. Temblador.
8 MR. TEMBLADOR: If I can add something,
9 I realize that there were more people voting to
10 agree with the CAM I guess is the appropriate term.
11 But I think there was a lot of confusion as to what
12 the vote represented and whether the vote really
13 counted or not. So if there is an issue I think it
14 would be appropriate or I would like to ask that
15 this issue be reballoted so people know what they're
16 voting on. Because I think the timing of the action
17 at the annual meeting and the reballoting and the
18 appeals should be such that I think people know what
19 is happening so they can act appropriately.
20 THE CHAIR: Thank you. Closing that
21 out on the opposing side. Any quick closing
22 comments.
23 MS. HORTON: We knew the time here and

1 time on the floor did not permit going into a lot of
2 detail about some of the background. One of the
3 things is that you can't use information especially
4 from panels before. If you know things from
5 discussions and submissions prior to this cycle,
6 then when you send in your information you should
7 include that because panels change. I know one
8 particular person who was not even at the panel this
9 year was the gentleman from IAI and he was adamant
10 about this and he spoke up very vigorously in the
11 past about not wanting to go forward with this, and
12 he has cancer so he had changed.
13 But the panels change, and so you have
14 to document things as you go forward because what
15 happened here is not what is happening now. And you
16 need the documents submitted. And actually, they
17 acted on the proposal 1554 this cycle which had
18 already been rejected instead of acting on the
19 standard for -- it's kind of hard to explain. The
20 comment to the 2008 was that you should not just be
21 able to use a new type MC you should be able to use
22 standard MC anywhere you wanted to.
23 So that was the question. And they

1 have turned it right back to the rejected comment
2 and has come full circle. It would take me 30
3 minutes to explain to you what happened. But I
4 think we have to protect this process and we don't
5 go back and revote and whatnot. And everybody has
6 put in a lot of information and a lot of time, and
7 we do not believe consensus has been reached. And
8 it becomes more and more important as we move
9 forward, because we're going toward new rules and
10 regulations, and we need to get some of these things
11 straightened out. Was everything done perfect no
12 not on either side.
13 And I urge you to deny this appeal
14 because I think it's a bad precedent to set, and
15 NFPA, if this happens, you're going to have
16 fact-finding reports and all this information coming
17 in after comment time after proposal time and they
18 are going to have to figure out when do I send this
19 do I send that. We just don't, it's very difficult
20 to know what information is out there if you don't
21 get it when the comment time is due.
22 I really believe that the section on
23 comments requires that you do send it in at comment

1 time. We need to make that clear in the rules. In
2 all my experience that's the way I have seen it
3 happen. I don't recall it ever happening
4 differently because I think somebody would have
5 raised the issue. I don't know all panels so I
6 can't say it never happened, but I think it's
7 something that we need to recognize that people need
8 to have an opportunity. If it's going to be the
9 public having an opportunity to review things, in
10 all the years I have been working, I think anybody
11 would tell you I have always looked for what set
12 precedent and always look for the safety issues, and
13 I'm continuing to do so. Thank you.
14 THE CHAIR: Thank you. Mr. Loyd.
15 MR. LOYD: Just to comment on one thing
16 to Mr. Mercier and Ms. Horton, even though we're on
17 the same side here. The fact-finding report that
18 was requested in the 2005 code, there was an
19 attachment. It was a 1993 report that had been
20 submitted to Panel 7 and so forth over the years.
21 So as someone that was not following this issue, at
22 the proposal stage where it was rejected unanimously
23 and the fact-finding report was attached, I thought

it was a done issue.

So frankly, I was surprised to see the additional report handed out at the meeting. Please protect this process. If you think as a result of this general session that you need to tweak the regulations, let's tweak it for the next cycle. Thank you.

THE CHAIR: Any other final comments? Anything from the TCC? Mr. Owen?

MR. OWEN: No, Mr. Chairman.

THE CHAIR: With that I will bring this particular hearing to a close. Again I want to think all of you for your participation in the NFPA code-making process. Your participation is vital and we do greatly appreciate that. I remind everyone that this decision of the Council on this issue will be issued by written decision. No member of the Council or NFPA staff is permitted to convey any of the Council's actions on this. It will be done by Ms. Cronin as secretary of the Council, by that written decision. With that we bring this hearing to a close and move immediately into the next hearing which is Item 10-8-1-j-1. Are the

appellants in the room.

I'm going to ask for people not in the room previously when we did introductions, we'll have you introduce yourself for the record.

MR. KENNEDY: Paul Kennedy, Town of Andover, electrical inspector.

MR. ROBINSON: Wayne Robinson retired.

MR. CLARKE: Rueben Clark, CMI.

THE CHAIR: Anyone else that came in since we had the last hearing? Introduce yourself for record.

MS. PREVOST: Tammy Prevost.

THE CHAIR: Any affiliation?

MS. PREVOST: Connecticut Pool and Spa Association.

THE CHAIR: Thank you. Gentlemen, if you'd take a seat at the end of table. This is again Item 10-8-1-j-1. It is item on NFPA 70 Section 680.26(B)(2)(b). Appeal to uphold the floor action that accepted comment 17-86 which passed on the floor and subsequently failed committee ballot. Any statements from member of the Council? Mr. Carpenter.

MR. CARPENTER: James Carpenter, member of the Council. I would like to note for the record that I am a member of the TCC. As a TCC member, participating in consideration and voting on issues that appear to be related to this appeal. I have therefore reviewed my obligations under the guide for conduct of participants in the NFPA process, particularly Section 3.5 (D) of the guide, to consider whether there is any reason for me to recuse myself from consideration of this appeal. I have concluded that I do not have any views that are or would appear to be fixed concerning the issues. And I am fully able to give open and fair consideration to this appeal. For the record, therefore, I have considered this matter and I believe that I can fully and fairly and impartially fulfill my role as a Council member on this appeal.

THE CHAIR: Thank you. Any other statements?

Gentleman, quickly review how we are going to proceed with this. We'll give you basically 10 minutes to present your appeal to the Council. I'll ask for anyone on the opposing side

to also have 10 minutes or statements from the committee or from the TCC on this. I'll take questions from the members of the Council and then we'll go back and have about five minutes to make any closings that you have.

MR. CLARK: 10 each?

THE CHAIR: I'd like not to replow the same ground. I'll give you a little leeway on that over all, which I have been doing with the other hearings, but I'd like to keep it as self-contain as we can. Also we do have a stenographer recording this so please remember to state your name for the record prior to making anything statements. So whichever of you would like to speak first.

MR. ROBINSON: I'll go first. We have a handout. Can we hand it out to the Council?

THE CHAIR: Give it to the secretary of Council.

MR. ROBINSON: My name is Wayne Robinson, retired chief electrical inspector for Prince George's county. I have done inspections for over 24 years. I took on this single wire means that came out in the 2008 code, and I was concerned

1 over the issue when I was a chief inspector, and I
2 got involved in this process. And what I had found
3 out, we went from the 2005 code which required a
4 grid system, and then when the 2008 was proposed we
5 went to a single wire over the grid.
6 Now that document going around is
7 showing you the 2005 application and now the 2008
8 with the single wire. The issue is that there was
9 no documentation supporting documentation for the
10 change to a single wire. In the 2008 process, I did
11 a NITMAM, spoke in Boston. I asked to not adopt the
12 single wire application, and I was told there was no
13 documentation to support the grid system. That made
14 me a little perplexed because there was no
15 documentation for the single wire application.
16 So what ended up happening was we had
17 to do some testing. And I met Mr. Clark here at the
18 southern section II meeting 4 or 5 years ago, and he
19 was producing a grid. I contacted him and asked
20 him, Rueben, do you have any testing documentation
21 on this, and he said he was going to get back to me
22 on that because he had to check with UL and he also
23 had to talk to a Doctor Hamilton he met at a Jersey

1 pool show. Those two did not have any testing or
2 methodology or anything done to support the single
3 wire.
4 So Reuben went out and had a test done
5 through Neetrac. He realized that under 68-26 C the
6 national electric code adopted bonding of water in
7 the 2008 code, and so we went to Neetrac, or he went
8 to Neetrac to see if they could do the test. They
9 did the test. The test results came out and said
10 the single wire did not provide protection.
11 Code-making Panel 17 I think did an
12 excellent job. They work hard. I'm not taking
13 anything from them, but there is a movement from the
14 pool industry to discount this test. And the test
15 is clear, and that a single wire will not provide
16 protection.
17 So here we are we have a 2005 code
18 change no documentation supporting documents to go
19 to a single wire, no testing. Then now when I try
20 to keep the grid system in in the 2005 they say I
21 don't have testing. But yet they changed the code
22 without any but yet they require it from me.
23 So we did a test. We proved that it

1 doesn't work. They didn't like that test. So we
2 went to E 3. EPRI produced a test saying the same
3 thing. EPRI was in a draft report. Now EPRI is
4 right here in Lennox, Massachusetts. They put in
5 some pools, and these pools, they have testing
6 facilities up there and they invited everyone here
7 to go see those pool testings. The pool industry
8 comes out and said that test is not a good test. So
9 no test that you are ever going to be able to do to
10 satisfy the pool industry. They don't have a test.
11 We have a test. The test says that it doesn't work.
12 Pool industry has absolutely nothing.
13 So all the years I did inspections
14 required structural steel on the deck or wire mesh
15 associated with the single wire. That's where the
16 single wire came from but it was in conjunction with
17 steel or wire mesh which established the equal
18 potential bonding plan. Once we went to fiber treat
19 we lost that equal potential bonding plan. Now you
20 have a single wire, and when you have an event
21 electrical event, a utility fault, or a customer
22 fault, or multiple neutral grounded systems that
23 we're doing now in new communities. We have

multiple neutral grounded systems. This is showing up on pool decks. And the issue is that single wire will not provide that protection when these events happen.

We have multiple types of protection for individuals in homes now. We have arc fault circuit interrupters, ground fault circuit interrupters. We have taper proof plugs. But when it comes to a pool we have a single wire which is not going to provide the level of protection that NFPA really needs. We went from a standard of a grid system to a single wire without any documentation. And how did we lower our level of safety? I don't know how we got there. No one here can tell me how it happened.

During the TIA, issue TA 936, it came out that they did have a test and it was called fun in the sun, I have that document, done by EPRI, to mitigate stray voltage on a deck, and also it had 14 points of connection. That 14 points of connection is the same as a grid. So to say that a single wire would work, it wasn't a single wire test.

1 So in conclusion we don't have -- we
2 have a test. They don't have a test. We have got
3 two major testing organizations to say the single
4 wire doesn't work. We have got our grid systems are
5 taxed, at least in my area, manhole covers blowing
6 off in Washington on a daily basis because our
7 electrical systems and grid systems are failing
8 because of additional loads that we never thought we
9 would have. So we have got that utility issue and
10 the only way to really solve that issue is through a
11 grid system. I'll stop there.
12 THE CHAIR: Thank you.
13 MR. CLARK: Reuben Clark, NFPA member,
14 and I'm here to ask you to uphold the floor vote and
15 the electrical section's vote and pass motion 1722
16 which effectively takes the Section 680-26 of the
17 NEC back from the 2008 version to the 2005 version.
18 We're not really writing any new code. We're just
19 taking it back to that level of safety.
20 Without rehashing some of the things
21 Wayne said, when I noticed that the 2008 code was
22 changed an equal potential bonding grid on the deck
23 to protect the person standing on the deck was

1 eliminated and moved to just a single wire, I called
2 you, and I asked the NFPA several times, where is
3 the substantiation any document that changed the
4 code from 05 to 08. I was never given any, still
5 haven't been given any, because there is none. So
6 then I contacted UL because I in the interest of
7 full disclosure I have always been this way, I am a
8 manufacturer of a copper bonding grid, but one of
9 five, not one that's been stated in some of the
10 opposing people's stances, I'm 1 of 5.
11 I want to be clear. I am in the pool
12 industry. I manufacture products for other
13 companies. Phillips, Tompson and Betz, Erico, even
14 Brian Rock's company, but the majority of my sales
15 do come from the pool industry, and I care about the
16 industry. When people get shocked on pool decks
17 it's damaging to the industry.
18 I know we're not here to talk about the
19 liability of the pool industry, but what I submitted
20 in the handout is a report, the day after the floor
21 vote in Vegas, I got a call from a contractor in
22 California and a home owner in Anaheim was getting
23 shocked on the deck of his inground spa. Long story

1 shot, stray voltage coming from a high power line
2 nearby. The only way to solve the problem was to
3 tear up the deck and install a bonding grid in the
4 deck, steel or copper. The home owner said no, I am
5 not going to do that. I'm not going to that
6 expense. I'm tearing the whole thing out because I
7 am not going to subject my family and neighbors to
8 getting shocked on the pool.
9 And that's why it pains me that we
10 can't move away from this latter back mentality of
11 low low prices at the cost of safety and quality
12 product. The NSPI, the National Spa and Pool
13 Institute, was sued out of existence because we
14 couldn't regulate ourselves on diving boards. The
15 APSP, the Association of Pool and Spa Professionals,
16 now we can't regulate ourselves on drains so the
17 Federal Government had to enact the Virginia Graham
18 Baker Act on drains. I'm asking you to regulate
19 ourselves on the electrical side and provide a safe
20 code.
21 So after I found out there was none
22 here at the NFPA, I contacted UL. I think Gary
23 Siggams was on the panel at the time and he said he

had none. So I asked UL can you conduct a test of 08 versus 05. They said they cannot conduct the test. And I have several products that are listed with UL.

So then as Wayne said, I remember Doctor Hamilton, he does continuing education credits and seminars at trade shows, has a consulting firm. I contacted him and he said I cannot conduct that test. This is a very important fact because these are the two main parties that are opposing eliminating the single wire and going back to the 05 code with the grid. So I contacted NETRAC and they said that is the sole reason they are in existence.

They conducted the test, took measurements of an actual condition, the 05 code with the bonding grid works. The 08 code with the single wire does not work. So I suppose it comes down to who do you believe? The people like Donald Zipse, E.P. Hamilton and the pool industry lobby or the School of Engineering at Georgia Tech and Neetrac whose sole existence is to do this test.

But if that is still a problem and you

have trouble making up your mind on that, when the utility industry found out they were not eliminating the single wire and going back to a grid system I was given letters from 2 organizations, and I have in the packet here. And the first one is from Douglas Dorr, Project manager, Electric Power Research Institute, EPRI, the only other organization that is capable of conducting these test. And I quote to the Council, I personally run tests which conclusively show that not having equal potential grid can result in unsafe voltages during power system fault conditions, and strongly urge you to uphold the floor vote of the technical session to adopt this motion. Douglas Dorr, EPRI. I believe he was one of the people in Doctor Hamilton's letters to you said that they were against going back to the 05 code.

Here is a letter you have it in your packet that states clearly, strongly urges you. The next letter is from Charles Maldonado, PE with We Energies Milwaukee, Wisconsin, 20 years, his primary responsibility has been to address the problems, concerns of stray and contact voltage. He is the

chair, the I triple E chair of the Stray Contact and Voltage Working Group, the industry expert on this issue.

His letter to you and I quote, To be clear, I support an -- grid underneath within all swimming pool decks and strongly urge you to uphold the floor vote of the technical session to adopt this motion. And I believe I triple E is another one of the organizations in Doctor Hamilton's letter to you said was not in favor of moving back to the 08, or the 05 code.

Now, I think another statement in his letter where he takes a little shot at Wayne and I in our presentation because I presented this to Code-Making Panel 17 more than once. We spoke in front of it and he claims we couldn't answer the most elementary questions in our presentation. He also states in his letter to you, that the discussion regarding the technical issue on the matter were in depth and handled with the upmost seriousness by the panel members. In another section he states that he's willing to study it further on a task force. And that's what he

recommends doing. So which stance is it?

Another piece of documentation I submitted to you to show the conflict within some panel members is an email from Dennis Baker to the other members which I am not going to read it. It's in there but he makes 8 main points. You can read it yourself and see that he contradicts on those 8 main points. So you just can't change your stance based on what position you are trying to support at the time.

Read in the letters from the pool industry. They say that the only scientific defensible thing to do is not follow the NITMAM process because the meeting was general, yet they have no test, no science, no investigation, no scientific data to support their fact. CP 17 wants to develop a task force to study the matter further. How? How are you going to study further when the only two organizations capable of conducting the test have already conducted the test. The industry expert, I triple E, is also. They are all urging you.

So I ask you when you take the weight,

the scale of the two sides of the argument should we uphold the floor vote or oppose the floor vote, on the side to uphold the floor vote you have Neetrac, you have the test from EPRI. You have I triple E expert. You have the electrical section. You have the Edison Electric Institute, NEC electrical section and the NFPA body.

On the side asking you to overturn the floor vote you have the pool industry lobby letters and letters and opinions from people who are experts in the field but yet admit they are incapable of conducting those tests, and no science.

So I think the answer is clear. I'm asking you to prove that the NITMAM process is a valid procedure of the NFPA and pass motion 1722. Thank you.

THE CHAIR: Thank you. Anyone else speaking in favor of this appeal? Anyone speaking in opposition to the appeal? If you can make yourself known. Very well. If I can get any of you speaking in opposition come to the table, and I presume someone will speak on behalf of the TCC. Is anyone else speaking to opposition?

Very well, I'll turn over the floor to you. State your name for the record.

MR. KENNEDY: Paul Kennedy again from the Town of Andover, electrical inspector there. I'm actually representing the Association of Pool and Spa Professionals, their opinion. They have two technical experts that couldn't come to this meeting and I'm kind of green at this so I don't have a lot of technical expert, but I just want to give some of the opinions that I got from them. So I am brand new into this as far as learning the process. I have been an electrician for 37 years. 7 of the last as the electrical inspector so I am getting into the code book more and more. I know a lot of electricians they don't take the time to look at the code book. When you become an electrical inspector you have to take more time to look at it and make sense of how the code is looking to enforce it.

So just a couple of quick things that I wanted to talk about. I haven't seen any proof to the single wire doesn't work, and I'm hearing different conflicting reports now that there are reports out there that have been done or studies

done that it shows that the grid wire is the way to go. So I guess where it's already been turned down by Code-Making Panel 17 twice and a technical correlating committee once, and the suggestion has been out there to go ahead and do this study, I almost think that at this point that would be the best measure as far as going forward so that we can have the right technology or the right information so that we can look at it and make a sound judgment.

I mean has anybody seen the testing that we're talking about now from the two organizations? Has anybody seen the technical data backing up that the grid system works better than the single wire?

THE CHAIR: We would have to refer specifically to the study before we can answer that question.

MR. KENNEDY: All right. I know that the Consumer Product Safety Commission has no recorded injuries from the equal potential bonding or the perimeter bonding. To my knowledge NEC provides for practical safeguard the persons and property of the use of electricity. And I

definitely would say should not allow for obviously manufactured driven products to be brought into the marketplace. So we have to make sure that we look and make sure that this is going be something that is going to correct the problem with the utilities or stray voltage that is in the ground.

And I did hear, I understood that at the beginning when this was first introduced only one manufacturer but now I'm hearing there are five manufacturers of the grid type system. So obviously from my view, there is going to be money to be made if this gets put into the code book. So manufacturers are now looking at that as being a way to increase their, I don't know if you call it margin, the product they sell and money they can make from a product being required to be installed by the NEC.

So the last thing, just accepting the appeal would not change the fact that there is no substantiation that any other method or the perimeter bonding like we have right now, with the single wire bonding system does not work, so without a lack of practical safeguarding, I think strongly

1 recommend that the motion be rejected.
2 THE CHAIR: Thank you.
3 Others speaking in opposition? Mr.
4 Johnson, are you representing the panel?
5 MR. JOHNSON: Don Johnson, I'm chairman
6 of Panel 17 representing the panel's position.
7 THE CHAIR: Go ahead.
8 MR. JOHNSON: Not my personal position.
9 The equal potential bonding grid was prior called
10 the common bonding grid in the 1999, 2002 code. And
11 that common bonding grid was made up of the steel
12 reinforcing of the deck, the pool wall, and any
13 metal parts within 5 feet of the inside wall of the
14 pool. All of those metal parts were then in turn
15 bonded together with the bear number 8 solid copper
16 conductor. And as a means of keeping the bonding or
17 continuity back to the pool pump an alternate means,
18 if you didn't have a metallic bronze water pipe
19 serving the pool, PVC, you had no bonding connection
20 between the pump and this steel and metal around the
21 pool, an alternate method of conducting those
22 2 points was the number 8 solid conductor that would
23 connect to this common bonding grid back to the pool

pump.

In 2002 the code was completely reorganized. And essentially those same type methods of creating the common bonding grid were retained. Within the language the purpose of that common bonding grid was to eliminate voltage gradients within the pool area. In the 2005 cycle, there were proposals provided and the panel looked at this issue in some depth. The term of absolute in eliminating voltage gradients was not actually the ability to accomplish that practically in the field is nonexistent. It was changed to, the purpose was changed to reduce the voltage gradients within the pool area is one of the items that was done in the 2005 code. The term of common bonding grid changed to equal potential bonding grid.

I had a task force during that cycle, during the meeting ROP. I'm trying to back on memory. I think Paul Cravell was the chairman of that, and the directions were to -- the directions I'll get to. The reason for that making that committee is that discussion came up about the reinforcing steel that is commonly in the pool deck

of past ages of construction. The concrete deck would have steel in it, either reinforcing rebar or the metal rod mesh or structural mesh for reinforcing. The pool itself would have steel within the pool walls and that was typical construction. And basically the pool shell and the pool deck steel was all bonded together with that number 8 to make this grid.

Discussions were had that in current times many of the pools have changed the construction method to utilize fiber as a reinforcing material in the decks and pool walls, that different types of pool construction have come about that you have no metallic components. The pavers, the use of stone and pavers around the pool setting on a bed of sand did not have any type of steel or grid within that.

So from the long history of the code trying to eliminate those voltage gradients and now coming to the point of well how are we going to eliminate them because we don't have a grid of steel or mesh I assigned this task force to come back and how we were going to address the equal potential

bonding grid that was being discussed and proposed in the 2005 cycle.

And a lot of discussion about that within the committee, the task group came back and the suggestion was to provide this grid of 12-inch square number 8 solid around the pool extending 3 feet out from the water's edge, which essentially is the same type of construction that you would have with the reinforcing metal steel that you would put in the concrete. But now since there is no steel and there may be no concrete, you may just have pavers or some nonmetallic, you would have that grid around the pool. And that's what was adopted in the 2005 code. To remedy those issues of encapsulated reinforcement steel no reinforcement steel, the use of fiber and whatnot.

The same number 8 conductor solid conductor was still utilized to bond the pump motor metal casing back to this grid whether you have the copper grid tied into the pool deck or you had the steel mesh tied into the pool deck and all of the metal within 5 feet of the pool bonded together, that number 8 still went back to the pump.

1 The 2008 cycle came in with a roar from
2 industry, and there were issues of physically
3 installing the grid that came up about, well, if you
4 don't have the 3 feet some pools may abut right up
5 to a wall and you don't have any space behind it.
6 Other areas, the width of the coping to a wall is
7 much less than 3 feet. So there were arguments
8 presented, discussion, and how to accomplish that
9 since it was stipulated with this grid of 3 feet are
10 you going to go into that foundation on pass through
11 and go to the other side of the wall that is closer
12 than 3 feet. And those construction issues and
13 install issues were coming in from the field.
14 So what was discussed was the single
15 number 8 copper conductor equal potential using that
16 as the equal potential grid so that you could pass
17 through those narrow areas where a 3-foot grid was
18 not physically capable of being installed.
19 The 2011 cycle where we are now there
20 was proposals to go back to the grid and there was
21 some documentation of testing that was initially
22 provided. A lot of discussion. Some of the issues
23 are what is the protection level that is required

1 for an equal potential grid around a pool? When you
2 immerse your body into the water and you reach over
3 to the side and touch the deck, how much voltage,
4 what is the threshold that is going to cause a
5 safety concern? That level has not been
6 specifically to my knowledge derived.
7 THE CHAIR: Try to wrap up in a couple
8 of minutes.
9 MR. THOMPSON: That was some of the
10 issues with this 2011 cycle as well as documentation
11 is the number 8, single number 8 being less than the
12 grid is that significant enough to cause a change in
13 the code as it wasn't demonstrated that a safety
14 issue of potential was identified. So that the
15 committee basically upheld the 2008 method in that
16 cycle, in this cycle.
17 Since then with the NITMAM some
18 additional preliminary studies, preliminary
19 information from testing studies have come out. The
20 committee is aware of that. I have feedback from
21 the committee that in their opinion that there needs
22 to be further study of that information and a
23 complete context of the main report and test rather

than a summary. And that determining what is that threshold level of potential difference to protect the human immersed in water needs to be discussed, and if it's so found that the single wire is not adequate, then a reversal to that grid or some other modified method would be made.

Basically we're here suggesting that the issue be continued with the next code cycle, a task group be set to study it, and be determined in the 2014 code. That's where the committee is.

THE CHAIR: Thank you. Mr. LaBrake, do you want to speak on behalf of the TCC.

MR. LaBRAKE: Mr. Chairman, Neil LaBrake, member of the Technical Correlating Committee of the NEC here to represent the TCC's opposition to this appeal. There is a couple of points relative to the introduction of the code and the scope of Panel 17 that I would like to address, and although the recent EPRI testing has provided better understanding of perimeter equal potential bonding around pools, it can be evaluated further by Panel 17 in the 2014 NEC cycle. With this testing there were differences in voltage gradient between

single wire and grid wire systems. But they did not approach the hazardous conditions expected in the testing.

The Technical Correlating Committee in one of the points brought up through the package that came in on the appeal the TCC does not agree with the comment made by Mr. Hamilton that it is within the purview of the authority having jurisdiction to investigate nuisance stray voltage complaints associated with pool wiring installations already meeting the NEC.

Regarding the scope of Panel 17, there are opposition statements to accepting comments 17-86 and they need not involve other articles of the NEC. The scope of Panel 17 covers installations relative to humans and pool wiring rather than animals and agricultural wiring. Therefore the Technical Correlating Committee's position is to deny this appeal. Thank you very much.

THE CHAIR: Anyone else speaking in opposition to the appeal? I'm not sure why --

MS. PREVOST: Is it too late to speak on the other side?

THE CHAIR: In favor of the appeal?

MS. PREVOST: Yes.

THE CHAIR: Yes, based on sort of where we're at. If there are opportunities and the other folks in supporting the appeal in closing remarks if they want to give you some other time in the closing remarks that would be appropriate.

MS. PREVOST: Thank you.

THE CHAIR: It would really be up to them.

I am going to open it up to questions from Council at this point. Mr. Bell.

MR. BELL: I have a question. I've heard differing opinions and thoughts on what is considered safe and unsafe current in a pool area. I thought I heard the TCC chair say it's impossible to eliminate stray currents or gradient voltage gradients in the pool area. I would like to hear from Mr. Clark or Mr. Robinson as to what you consider unsafe voltages.

MR. ROBINSON: I believe the issue depends on your health. You can't really put an exact voltage on it. Depends if you're a young

1 child or you have a pacemaker. Our test data shows
2 with Neetrac that you had a 3 to 18 volt step
3 potential in 3 feet on a dry paver deck. To me
4 that's way too far, way too much. Everybody talks
5 about this baseline study. There was no baseline
6 done on that application, but I spent 2 days in
7 coronary care. I was shocked and they didn't run
8 out and say if you did a baseline you wouldn't have
9 felt the current.
10 So the baseline issue, the amount of
11 doing this calculation to determine whether or not
12 there is enough current on the deck is irrelevant in
13 a lot of applications. But I think, I don't think
14 anybody but a doctor or MD could answer that
15 question of really how much current is a safe level
16 of current. The pool industry feels in rating the
17 documentation that they submitted they feel that it
18 could be as high as 3 volts. 3 volts is an
19 acceptable amount.
20 MR. BELL: Do you agree with the
21 statement of the TCC chair that I think made
22 impossible to eliminate?
23 MR. ROBINSON: The thing about the grid

system is just like any agricultural area, agricultural areas have required the grid system in Wisconsin and Minnesota for years. The test data supports that there is an equal potential bond and what it does is equalizes the potential across the plane, across the grid system itself. So when you have a single wire you don't have that equalization. So it can be a higher level of voltage or current. I have got test data from an organization that did a test in Ontario, Canada, where a 230-volt KV system induced 20 amperes on a single wire application. With 35 volts with a 20 ampere induced from a 230 KV situation. A grid system would have helped alleviate some of that voltage potential, where a single wire you're getting 20 AMPs, 35 volts.

So the single wire does not help eliminate to a lower amount of voltage. It's proven through testing that it does equalize across the plane and it's much safer. So, the grid is much safer, yes.

THE CHAIR: Additional questions from members of Council? Mr. Clary.

MR. CLARY: Shane Clary, member of

Council. To the gentleman representing those that are opposed to the appeal again who exactly are you representing? I apologize for missing that when you started.

MR. KENNEDY: Sorry. The Association of Pool and Spa Professionals.

THE CHAIR: State your name.

MR. KENNEDY: Paul Kennedy.

MR. CLARY: Thank you for that. Mr. Kennedy, I am trying to figure out first of all who wrote, because if I look at the letter that came in from Jennifer Hatfield representing the Florida Swimming Pool Association and the letter that came in from Mr. DiGiovanni, Association of Pool and Spa Professionals, they're exact duplicates.

MR. KENNEDY: Really.

MR. CLARY: I'm trying to figure out who is the author of the letters or could it have been Doctor Hamilton who also submitted his remarks.

MR. KENNEDY: I don't know the answer, sir.

MR. CLARY: Thank you. And the second question related to both the partial and the

1 DiGiovanni letter, statement here on letter number 6
2 basically no study or independent database
3 organization such as the CPSC is found in any
4 reports from injury or death related to perimeter
5 bonding. The Council of the NEC code-making panel
6 are obligated to promote public safety from injury
7 or death and neither the copper grid or single
8 copper wire method perimeter bonding demonstrates
9 safety issues. Slight tingle shocks may be reduced
10 by either bonding methods but are not a safety issue
11 and cannot -- public code making.
12 Need some clarification on this. So
13 the association feels that a tingle shock should not
14 be an area of concern?
15 MR. KENNEDY: You know, I am not sure
16 what they're talking about tingle other than a lower
17 amount that is not going to be harmful on the
18 voltage.
19 MR. CLARY: Related to the question to
20 Mr. Bell too. Thank you.
21 THE CHAIR: Additional questions from
22 the members of the Council? Ms. Brodoff.
23 MS. BRODOFF: Mr. Robinson, we heard

from Mr. Clark. Could you just state any commercial or economic or business interest you have related to this.

MR. ROBINSON: Absolutely zero.

MS. BRODOFF: You don't manufacture a grid or sell systems.

MR. ROBINSON: I have had calls of being accused of that because of this process, had quite a few calls on that issue. But no, I have no affiliation with Mr. Clark or manufacturing of any grid systems.

MS. BRODOFF: Thank you.

THE CHAIR: Ms. Cronin.

MS. CRONIN: Amy Cronin, secretary to the Council. Do you have a patent related to this issue?

MR. ROBINSON: Not at all. I have two U.S. patents but they're a bonding and grounding patent, but have nothing to do with bonding pools. It's a 250.8 application of bonding panel boards and transformers, separate drive systems in dwellings, but it has nothing to do with pools.

THE CHAIR: Mr. Milke.

MR. MILKE: Jim Milke, member of Council. I guess to Mr. Robinson or Clark or Mr. Johnson, the trio, if I can do a batch like that.

First, Mr. Robinson, it's good to see somebody here from the great state of Maryland.

MR. ROBINSON: Thank you.

MR. MILKE: I have a question about this NETRAC report. Was a full report given to the committee several years ago? Has the committee studied this? If you could.

MR. ROBINSON: Actually I did a TIA 936 and submitted that report as part of the TIA, and that actually was during the same ROP process when they were in I think it was Hilton Head and that TIA was denied. It's pretty interesting. We had a 6 3 with 1 abstention vote and said come on back.

I went to Miami. I went through the council again. They said make sure you get it in this code cycle. We're looking at it. Studying it. And I put it in this code cycle, and now I'm hearing we need to study it again. So yes, it's been there some time.

MR. MILKE: Mr. Johnson, so I guess that's been my question. If this has been around for several years, what is going to be further studied, Mr. Johnson, if you could perhaps give us an idea.

MR. JOHNSON: The report is convoluted and confusing. Not the report but the Neetrac. There was a Neetrac report presented to the Council when the issue of bonding the water to this grid system, that was one report. The report that Mr. Robinson is talking about was presented. It was discussed and Mr. Hamilton HD and some others on the committee had multiple questions of technique and technical methodology with the test.

So yes, the committee looked at it and it was not accepted by all, that it was a test that would represent a proper methodology to determine whether or not the single wire worked. The results of that test showed that it did not but they were not accepted because of the technical manner, methodology that was used was questioned.

MR. MILKE: Thank you.

MR. CLARK: I can answer to that.

Reuben Clark. The report was issued. There were several questions regarding the methodology primarily from Dr. Hamilton who again as I stated earlier I had already contacted to see if he could conduct this test. He said he could not. So I was a little concerned and confused as to how he could critique Neetrac Georgia Tech's School of Engineering who does they're experts on testing methodology. How he could critique that. I took the questions back. Neetrac wrote to the executive vice director wrote another letter to CMP 17 refuting every objection on the questions.

So now it's my understanding, and I could be wrong, it's my understanding they're still clinging on to one logical fallacy, red herring that there was no baseline taken before the testing began. And again, a baseline or a control is utilized in an experiment when you're developing a theory. These were field measurements of an actual application, conditions that exist all throughout the country.

So then again, not to rehash but once the utility industry, which NEETRAC is a part of,

1 became aware of that, the other testing organization
2 who had already begun the same testing, he weighed
3 in in that packet and again he strongly urges you
4 the I triple E industry expert the chair of the
5 working group to stray and contact voltages also
6 wrote you the letter. They contacted me and said
7 please take this to them. We really want it to go
8 back to 05. And that's why I asked the question how
9 can you study it further when both of the only
10 testing organizations have already tested it. You
11 can look at the data. You can discern it all you
12 want. If you want to do that wouldn't you uphold
13 the floor vote, go back to 05 and see, because there
14 has been no testing that proves the single wire of
15 08 works. There is testing that proves the 05
16 version works and that 08 doesn't work, but if you
17 want to do the test differently, you have no proof
18 that the 08 versus works.
19 THE CHAIR: Mr. Jardin.
20 MR. JARDIN: Joe Jardin, member of
21 Council. A question for Mr. LaBrake, TCC rep. In
22 reviewing the TCC balloting on the issue and
23 listening to your testimony, it seems like the

negatives expressed and your testimony kind of centered on sort of technical issues in support of the code-making panel. Just curious of your sense if this appeal was upheld, would this correlate with the code or would there be correlation issues that would adversely affect the NEC.

MR. LaBRAKE: Neil LaBrake, TCC. The TCC did look at that and we felt there would not be a correlation issue if it went back to the previous code text. We do want to point out that as far as process, the NEETRAC testing did look at one method of the bonding grid, and the recent EPRI testing occurred after the code-making panels were meeting and just discussed during the appeal session here.

So as far as process goes, we felt that that APRI testing would be suited for evaluation in next code cycle.

MR. JARDIN: Just to follow up.

THE CHAIR: Mr. Jardin.

MR. JARDIN: When you said previous text, my question had centered around if this appeal was upheld and the action on the floor was followed through, in other words the grid system, would the

code correlate?

MR. LaBRAKE: As far as I can tell it would correlate. It would offer another alternative.

MR. JARDIN: Thank you.

THE CHAIR: Thank you. Other questions from members of the Council. Seeing none, I am going to open it back up for both sides for some quick closing remarks. I am going to ask to try to limit this to 5 minutes per side because I think we covered a lot of ground.

Mr. Robinson, Mr. Clark, I'll give you first opportunity. Any closing remarks?

MR. ROBINSON: I just want to clarify that the inventions that I am associated with have nothing to do with pool bonding. I have been getting the calls all over Florida accusing me of making a bonding grid, and I am just a retired old chef electrical inspector. I don't have anything to do with pool bonding other than I feel the safety level in Maryland, well, most counties in Maryland will not accept the single wire method because the documentation shows that it doesn't provide the

1 protection.

2 We can't lose sight that we had the

3 protection in the 2005 code. We lowered our level

4 of safety from the 2005 to 2008. I've never seen in

5 my 45 years in the electrical industry see you

6 reverse a level of safety. I don't understand that.

7 And again, if you can show me a test that a single

8 wire works, I am going to go away. You've won your

9 case. But we have a test showing that a single wire

10 does not work and you can't lose sight of that.

11 And just to follow up on his last

12 question, the EPRI testing was submitted at Redondo

13 Beach for review as a draft report. They weren't

14 happy with the draft. The data doesn't change. The

15 conclusion does. But they did, Code-Making Panel 17

16 actually gave them that draft report and the guy

17 from Georgia Power that sits on that panel also was

18 familiar with that testing documentation.

19 So just in conclusion is it's a safer,

20 higher level of safety. If you want to go back and

21 study it, study it with the grid system in and when

22 you prove a single wire works we'll go back to the

23 2008 method. But right now there is multiple

utilities that have stray current departments. And the reason why you don't hear about it is because it's a liability issue. I triple E, the EEI, Edison Electric Institute are all a hundred percent for this change because they have an issue, but they can't come forward with the issue. Kind of like doing the dirty work for the utility, and I've never been a big utility fan. But it's because of the liability issue you're not hearing about this stuff. Because it will cost them. But they've done the testing. They know that it exists. Thank you for the time. Hope you uphold the floor vote. Thank you.

THE CHAIR: Mr. Clark.

MR. CLARK: Thank you for your time today. Again the issue of commercial interest comes up. I have always stated that from the beginning it is a small commercial interest of mine but also a commercial interest of some pool builders in the industry. So you can't discount mine without discounting theirs. And again the 2 main organizations who have conducted these tests have written you letters asking you to uphold the floor

vote. The I triple E chair of the voltage working group has also written you a letter. They did this because they made the logical assumption that it would go back to the 05 code because there was no substantiation taking it from the 05 to the 08 eliminating this grid.

So if you do want to study it further I don't know how. You could do a task force to maybe study the documents further if you like, but both test organizations have already conducted the test, and as Mr. Robinson said, I would ask you to uphold the floor vote and let's go with the higher level of safety until we do, which I don't think you'll ever be done, prove that the single wire is an adequate level of safety. Thank you.

Can I have 1 minute to have somebody else speak?

THE CHAIR: 1 minute.

MS. PREVOST: Tammy Prevost, Connecticut Pool and Spa Association. I work with health inspectors, building inspectors, and just something came up. I wasn't sure I was allowed to talk today. I see a different side. I help educate

health inspectors and building inspectors on the pool industry. We've had such entrapment issues on the other side. Electrical I have the State of Connecticut and Massachusetts I work with pool builders. They're on the board with me. So they also, we don't do education on the electrical bonding grid because they don't want it, they want the single wire. On the money issue and being a manufacturer and he wants money for his product, no. I believe it's a safety issue, and that the pool builders are trying to cut a cost also. It's a very expensive process for the safety and bites into their profits, but they also don't tell you that in the pool industry. NPSC,I'm part of NESPA. I'm involved in all the politics unfortunately or fortunately. I see a different side.

I work with people, help write the laws in the pool industry in Connecticut. I'm very for it, but I also have to bump heads because as pool builders they don't want to adopt. Some; not all. That's all. I just wanted to add that.

THE CHAIR: Thank you. On the opposing side any quick closing comments? Staying within the

5 minutes.

MR. KENNEDY: I just want to recommend rejection of the certified amended motion. Thank you for your time.

THE CHAIR: Mr. Johnson.

MR. JOHNSON: Just to say that the committee recognizes the EPRI reports. They are the initial preliminary report to their studies. I don't know if we can get the full study as I think it's a $25,000 cost. But the committee feels that the studies are, the reports are not complete reports, that they should take the time to review that through task group and address this on the next cycle.

THE CHAIR: Mr. LaBrake from the TCC.

MR. LaBRAKE: No further comments, just upholding the record.

THE CHAIR: Thank you. With that I will bring this hearing to close. Again I want to thank all of you for your participation in the NFPA process. It's greatly appreciated, and for your time and effort to be here at this hearing as well.

Do remember that there will be a

1 written decision issued only by Ms. Cronin, the
2 secretary of the Standards Council. No member of
3 NFPA staff or member of the Council is permitted to
4 convey any information associated with this. That
5 written decision will be the only communication from
6 the Council on this issue.
7 We have one hearing left this morning.
8 We're going to do a quick 1 minute stretch break. I
9 realize people have been going in and out of the
10 room, but if I take a lengthy break we won't make
11 lunch at all.
12 I will note that when we come back on
13 the record we are going to switch chairs again. I
14 will explain that when we come back on after this
15 quick 1-minute break.
16 (Off the record
17 discussion.)
18 THE CHAIR: Let's get started. We'll
19 go back on the record. For this last hearing I am
20 going to ask anyone who has not been in the room
21 when we have done introductions on the record ask
22 you to quickly introduce yourself for the record
23 please. I know you three gentlemen quickly your

name and affiliation for the record.

MR. WOJCIECHOWSKI: Dave Wojciechowski, director of sales SMA America.

MR. HARTZELL: Ananda Hartzell, technical sales support with SMA America.

MR. GREIZER: Frank Greizer from SMA Solar technology, I am vice-president and responsible for product development.

MR. SCOTT: Richard Scott with Kaco New Energy. I am the manager of product development.

THE CHAIR: I ask if you have business cards leave them with the stenographer.

Anyone else in the room who hasn't introduced themselves on the record previously?

MR. DuBAY: Christian DuBay, NFPA.

THE CHAIR: And I'm Jim Pauley, chairman of the Council. I am going to note for the record I am going to recuse myself on this particular issue. There is in all of this material a comment from one of our subsidiaries of the company, and so because of that comment and its specific pertinent to the appeal, I am going to recuse myself in the hearing and the deliberations

in voting on the issue. I have again asked Mr. Farr to take over the chair for this particular item. Mr. Farr.

MR. FARR: Thank you. For the record my name is Ronald Farr. I'll be acting as chair for this particular hearing. This is Hearing No. 6, Agenda Item 10-8-1-K and 10-8-1-L. Council members. Mr. Carpenter.

MR. CARPENTER: One last time, please, James Carpenter, member of Council. I would like to note for the record that I am a member of the TCC. As a TCC member I participated in consideration and voting on the issues that appear to be related to this appeal. I have therefore reviewed my obligations under the guide to conduct of participants in the NFPA process particularly Section 3.5 (D) of the guide to consider whether there is any reason for me to recuse myself from consideration of this appeal. I have concluded that I do not have any views that are or would appear to be fixed concerning the issues, and I am fully able to give open and fair consideration to this appeal. For the record, therefore, I have considered this

matter and I believe that I can fully, fairly, and impartially fulfill my role as a Council member on this appeal.

MR. FARR: Anybody else? Thank you. Both of these appeals deal with the modification or modifying the effective dates with respect to the section of the document. With that if the appellant will go ahead, and as in the past we'll ask you to keep it to 10 minutes and allow any opposition to speak for 10 minutes. With that Council member questions and then back for 5 minute closing statement on either side. Go ahead.

For the record, your name.

MR. SCOTT: Richard Scott, Kaco Energy. We are very concerned about this proposed requirement in the code because we feel that it is not the proper time because earlier in the discussions there were a lot of pending requirements for standardization and testing, and we don't feel that there has been enough testing done on this. And there is currently no standard available. And we would like to not have the proposed 690.11 put in the code for 2011. We'd rather delay it for the

2014.

MR. FARR: Comment from member of the appellant.

MR. WOJCIECHOWSKI: Dave Wojciechowski from SMA America. First off I just want to say thank you very much for allowing SMA and Kaco to approach the Council. I think this is probably the first time at least from SMA converter manufacturer has spoken to the group, so I do appreciate it. And we do fully support your work in providing a safe and reliable PV industry. As Rich had mentioned, we do have some concerns with the 690.11 code. There are some issues within the code which may cause a little bit of ambiguity and question mark for the industry. And I'll just briefly go through this.

The first one that we see is in the code, it states that a PV system shall be protected by a listed AFCI product. Currently SMA and Kaco are in the PV industry. We're not aware of any commercially available AFC product for the PV industry. Currently I believe the UL, UL has not developed full testing standards or procedures to fully list a product for the PV industry. We are

aware of some products for the auto industry and for the aerospace industry but they are specifically developed for those industries and not for the PV industry so we see some issues in that respect.

We also feel that the code may rush the development or the industry to introduce an AFC product before its reliability tested. These guys are the technical guys but DCR arc fault requires some sensitive technology that we believe is not fully, not fully reliable at this point in time. Our concern is that if a product is rushed to market and incorporated into our inverters that it may cause multiple false positives or maybe a lack of detection of an arc fault in the case of an arc fault.

One of the other issues we have is that the code may cause some ambiguity in terms of the AHJ inspectors out in the field. Currently we are familiar with I think Section 90.4 which allows AHJ to approve project outside of the code. In a new industry such as PV industry providing an AFCI product may, since there is no product now, and if we utilize 90.4 to allow this code, because when new

products are introduced the HJ, a lot of misinformation or lack of information in the field which may prevent a lot of stalling or a lot of these projects from moving forward and we believe may hurt the PV going forward for at least the next couple of years.

In the code there is a requirement that this is for DC voltages of 80 volts or higher. I did pass to Linda Fuller and maybe most of you got this. SMA is the largest inverter manufacturer in the world. We have about 300 engineers in Germany doing a lot of research around the PV and around the inverters. We have found that arc faults are stable in voltages less than, at around 20 volts. So regardless of any case we do believe that the voltages should be reduced to 20 volt for a truly safe system.

The code 690.11 also states a manual reset. In SMA in this particular case, I believe Kaco also we do disagree with this. We do believe that an automatic intelligent resetting mechanism should be in place. Our feeling is if the product is not reliable, if there is nuisance tripping on

the line or something, if a homeowner had the ability to go up and manually reset the inverter every time it trips, you could exacerbate a problem that could be there. So we do believe it should be some sort of automatic resetting system. If it trips, there is a time out delay of some sort. Comes back on, if it trips again the system automatically locks out until a certified tech can come on to the system, review it, and assure everything is safe on that system.

So in our literature that we had provided in addition to SMA, Kaco, I think there is 3 or 4 other inverter companies that we provided that support the idea of delaying the code. We do feel as an industry that probably 2 years would be a good time to introduce a reliable and safe product for the PV industry. We support it and we do want to do this. We do believe it will take about 2 years. The inverter manufacturers that are presented in the information packet I provided, we represent probably about 75 percent of all the PV residential installation in the U.S. Just give you that background. From my standpoint that's all I

have. I'm open to questions or we're open to questions if any of the Council members have any.

MR. FARR: Anybody else speaking from the appellant side?

Anybody speaking in opposition?

MR. TOOMER: Ronald Toomer, chairman of CMP 4. I would like to say that the panel fully discussed this new section both at the proposal stage and at the comment stage. And the panel affirmed that PV CFCI protection is necessary as soon as possible for safety reasons. There have been some fires and they have been contributed because of not having this protection. Now I understand that the safety benefits outweigh the potential challenges associated with early implementation of the 690.11 requirement. This action will allow to achieve the earliest possible fire safety improvements with the best protection available at the time and to allow for future development as technology permits.

Now they brought up 90.4 and 90.4 reads that this code requires new products construction or material that may not yet be available at the time

1 the code is adopted. And in such event the
2 authority that has jurisdiction may permit the use
3 of product construction material that complies with
4 the most recent previous addition of the code
5 adopted by the jurisdiction.
6 Now it was mentioned they were
7 concerned about the listing. It specifically says
8 that it has to be a listed product. Now I
9 understand there is none available right now. Just
10 as a side line, I did speak to UL prior to coming up
11 here. And I got the impression from talking to UL
12 that some products are nearly coming on market
13 before too long, and they are working on it. And
14 UL, from my conversation with them, took the
15 position that it ought to go into effect immediately
16 because of the safety reasons involved in it.
17 That's all I have, Mr. Chairman.
18 MR. FARR: Yes, sir.
19 MR. DRAKE: Bill Drake representing the
20 Technical Correlating Committee. The TCC yesterday
21 had lengthy discussion on this whole issue and
22 looked at all different sides on it. The majority
23 of the TCC came to the conclusion that the appeal

1 should not be upheld for a couple of different
2 reasons. 90.4 does give that allowance that puts a
3 place holder so that you can wait until products are
4 available, recognizing that there are no products
5 available. There is also a recognition that this is
6 a hazard that is sitting there and we want to get
7 something out there as quickly as possible. We felt
8 that having this provision in there will promote
9 that.
10 There is one other element that came in
11 as a little off to the side that the TCC noted, and
12 it's that the process was shortcutted a little bit
13 by the annual meeting. There was no NITMAM on this
14 particular issue. And we feel that it's sort of a
15 bad precedence to set that if this goes forward and
16 all of a sudden it will send a message you can avoid
17 that whole step in the processes and just avoid the
18 annual meeting the floor vote go right for the
19 appeal process and we thought that was a dangerous
20 precedent to set. And it might be something the
21 Standards Council wants to address.
22 Sort of on the alternative side on it
23 in the panel on their deliberations they were under

an expectation that by January 2011 the standards would have been written and product would be available. That was sort of at the time of the meeting that was the impression that they had for the timing and they recognize that does not exist now, but sort of back door into the 90.4 as giving leave for that. That's it.

MR. FARR: Any comments with regards to opposition? Hearing, seeing none we'll move into questions of Council. Mr. Milke.

MR. MILKE: Jim Milke, member of Council. I guess first of all to the appellants. I don't see a specific date that you would like to propose for a delay of the implementation of this.

MR. WOJCIECHOWSKI: Officially we're asking for 2 years, and so if we can get 2 years our development, Frank is part of our development team in Germany, we feel 2 years would be a sufficient amount of time to provide a safe and reliable product. We agree we do need this product out there. We're not arguing against it. We do believe that the industry needs this type of product. We just ask for the time to develop a reliable safe

1 product. 2 years.

2 MR. MILKE: Again, this time to the

3 panel chair, this issue of the manual reconnection

4 capability that is talked about in here, there were

5 some concerns raised by the appellants about that,

6 and I'm wondering what your feel is about that.

7 MR. TOOMER: The panel thought it was

8 fine but when the standard is developed and it has

9 got to be a listed product. Nothing can come on the

10 market unless it's a listed product and approved by

11 the UL. So we feel that would be taken care of when

12 it's listed with UL.

13 MR. FARR: Mr. Harrington.

14 MR. HARRINGTON: J.C. Harrington,

15 member of council, question for the panel chair. We

16 discussed that there is no standard available right

17 now. And I'm not sure how quickly the standard

18 would be ready, but in the meantime even if products

19 become available, you mentioned some products that

20 you're under the impression that are close to being

21 ready. Without a standard in place for the product

22 what would be the approach or the methodology to

23 evaluate the acceptability of the product.

MR. TOOMER: The information I got was from UL. So UL would have to develop a standard before they can test the product and list it.

MR. HARRINGTON: They're looking for 2 years, and I'm not sure how quickly do we expect the standard would be ready within that 2-year time frame such that when products come they'll have the standard to be evaluated again.

MR. TOOMER: From the information I got from talking to UL the standard is close to being ready. They didn't give me a timetable, but they wanted to, in the conversation I had with them, to leave it as it is now. That was the information that they relayed to me.

MR. HARRINGTON: Okay.

MR. FARR: Mr. Clary.

MR. CLARY: Shane Clary, member of Council. First to the appellants. There was a comment 4-79 sent in by D Jerry Flattery, if I'm pronouncing his name correctly. And the comment was for effective date of January 1st, 2014. The panel did reject the comment. When you say 2 years, is it 2 years from the Las Vegas meeting which would put

it at 2012. 2 years from when the document -- document is that 2013. Or are you looking at, were you aware of this January 1, 2014 which was submitted.

MR. WOJCIECHOWSKI: I was not aware.

MR. GREIZER: I Think there is a standard and after the standard is published we as a manufacturer can develop the right product for the standard. And if we have developed this standard we need at minimum 1 year field test with a high number of such devices to have, to develop a reliable product. That is what we are doing on our product. So this is I think accepted.

MR. CLARY: I'm confused. Now you need 2 years minimum, if I just understood what you are saying, 2 years from the time of the standard. I'm not talking about NEC. I'm talking about UL standard.

MR. FARR: For the record can you identify yourself.

MR. GREIZER: Frank Greizer from SMA Solar Technology in Germany. What I wanted to say is we are not ready, the PV industry is not ready to

have a product, like say next year.

MR. CLARY: I understand that. I'm trying to get this date a little more pinned down.

MR. WOJCIECHOWSKI: Two years from when the UL standard is fully developed.

MR. CLARY: I don't think that's been --

MR. WOJCIECHOWSKI: When the UL standard is fully developed.

MR. CLARY: I think possibly to the chair of the panel that I may also ask the same question to the appellants. I understand about 90.4 but is there any danger of course, because I do HA all the time. HA won't exactly Q into 90.4, will see this requirement, for this requirement now and say I need it now and not accept 90.4 which could prevent even though everyone is saying we need this, but prevent any installation of the systems right now because he or she doesn't accept 90.4, and there is something out there so installation is delayed.

MR. TOOMER: I don't see how it's possible. Probably could be because they have jurisdiction. They can overrule the code.

Authority having jurisdiction. So they can, they only have to accept something that is in the code. The authority having jurisdiction. So they could overrule it. The panel didn't see that as a problem.

MR. CLARY: Okay.

MR. TOOMER: Because most inspectors understand that, we felt the safety reasons for it. That it should be in the code and it would rush up the process but still has to be a listing. I'm not saying a bad product coming on the market. I'm saying that it would rush up, if you put it off to January of 2014, you know, people, they got that much time and it will delayed the product. And the panel felt it was necessary that we have a product as soon as possible for safety reasons.

MR. CLARY: Thank you. Same question to the appellants. Do you feel, again, pinning down right now on an HA to properly interpret 90.4 anything related to that basically holding up installation because you don't have a product yet the standard says you need this, therefore come back and see me once something is out there.

MR. WOJCIECHOWSKI: You know, HAs are human, just like all of us. And you'll be amazed the burden of proof falls back to the installer and integrators and eventually back to the manufacturers to prove that a product is compliant. And when you get into ambiguities in the code where there may not be a standard available yet and there are a lot of questions that don't make it out to the general public, but there are a lot of inspector questions that come back to SMA even for issues that are part of the code.

MR. CLARY: Thank you.

MR. FARR. Mr. Gerdes.

MR. GERDES: Ralph Gerdes, Council member. It's pointed out by the representative from the Technical Correlating Committee you did not submit a NITMAM in order to bring a motion onto the floor as part of our process. Could you explain why that didn't happen.

MR. WOJCIECHOWSKI: We spoke last night. This is our first time to the group and we were not familiar with the procedures to bring these issues. We submitted the letter and then invited in

and we were not fully informed of the procedures.

MR. GERDES: That's what I thought your answer was going to be.

MR. WOJCIECHOWSKI: Yes.

MS. BRODOFF: Along the same lines and just to try to be clear, you put the Council in a difficult position because it's not typical that the Council would be word submitting with a code particularly when there hasn't been the process followed to raise those issues and have them debated in the process. And as I understand it, you seem to be asking for a couple of different things, and I just want to clarify what that is.

One is you have asked that the implementation date be delayed for a period of time which is dependent on some action by UL which in itself is a difficult thing to write into a code. So I'm not sure how the Council would write that, but it also seems that in part you are also asking that the entire proposal 205 be just rejected. And I sort of am inferring that from the fact that you also seem to have a problem with the manual reset provision.

MR. WOJCIECHOWSKI: The manual reset, the 80-volt lower limit is the other one, and those were the two.

MS. BRODOFF: So in fact you really want to, is the action you're asking, I'm just trying to get what action you're asking for because you're not being very clear. You don't have the typical record that would show exactly what you're asking for because you would have done that by making the appropriate proposals and comments and motion along the way.

MR. WOJCIECHOWSKI: Correct.

MS. BRODOFF: I don't want to put words in your mouth, but it sounds like you wish the Council to reject the actual technical committee in accepting proposal 4-205. Is that a fair statement or is there some other action you want?

MR. SCOTT: Richard Scott, Kaco Energy. I think we want first to reject the proposal.

MS. BRODOFF: Proposal 4-205.

MR. SCOTT: And if the proposal does move forward we would like to lower the 80 volts down to 20 volts and provide that auto reset

mechanism.

MR. WOJCIECHOWSKI: And a 2-year window.

MR. SCOTT: And a 2-year window.

MS. BRODOFF: You've not provided any specific language to the Council to consider. You're asking the Council to do that.

MR. WOJCIECHOWSKI: Yes.

MS. BRODOFF: You're not familiar with the process, but this is highly unusual and I'm just trying to understand. The Council typically doesn't do word submitting on a code. It's here to sort of pick and choose between alternatives raised on appeal. I guess to the extent you can you're stating general terms what you would like, and do you want to add any terms of what you specifically want to take place or do you want to rest with what the last gentleman said.

MR. WOJCIECHOWSKI: Rest with what the last gentleman said.

MR. FARR: Any questions from Council? Hearing and seeing none the appellant will have 5-minutes to make a closing statement and then

opposing side will have five.

MR. WOJCIECHOWSKI: From SMA's standpoint we do appreciate the opportunity. I know we're new to the industry. Looking at the solar power industry the business in North America is extremely robust. I think one of the few growth areas in North America. A little background. SMA is the largest inverter manufacturer in the world. We have, in addition to our manufacturing facility in Germany we actually have established a manufacturing facility in Denver Colorado bringing actually jobs and growth to North America. We do believe the PV industry in North America will be extremely robust for the next few years. I hope to be in front of you all multiple times over the next couple of generations, I guess. I don't know.

We do fully support a reliable and safe PV industry, and we are in total agreement that we do need to address the DC arc fault issues. We're asking for some time to develop that reliable system. SMA being the largest inverter manufacturer again we have 300 engineers on the product development and research side. A portion of those

are dedicated to AC and DC arc faults and come up with a reliable solution. We would love to share the results on a regular basis, provide it to the committee members, Council members here. We'd like to get some feedback from you or from some key members that we need to get feedback from.

We are asking for a delay in the implementation of this so we can get a product to market.

MR. FARR: Anything else from the appellant side? Closing comments from the opposing side.

MR. TOOMER: We're not trying to impede the PV industry at all because we understand that it's coming on board. It's going to be a big part of the electrical industry in the future, alternative power on the thing. And that's the reason that we adopted this thing is for safety. It is being put in out there now and we need this piece of product, this product, to get on the market as soon as possible. And that was the reason we went forward with this thing, and I would request that the Council reject the appeal. Thank you.

MR. FARR: Other closing comments.

MR. DRAKE: Bill Drake TCC again. The comment was made whether it's a throw out the requirement for now and revisit it later, delay of the implementation date. The TCC really looked at delay of the implementation date as one of the possibilities. It did not consider it a viable possibility to appeal throwing out the basic requirement at this time. We weighed sort of a delay of the implementation days versus the 90.4 relying on 90.4 tying the whole issue. With majority of the correlating committee believes 90.4 is the appropriate path at this time.

MR. FARR: Thank you. Seeing no further comments, I'll close this hearing. I remind members of NFPA staff and members of Council that the only persons who issue a final decision in written form will be the Council secretary Ms. Cronin. Any discussion with respect to deliberation today is not approved and needs to be handled through Ms. Cronin. Thank you for your time. I'll return the meeting back over to Mr. Pauley.

THE CHAIR: Thank you. We'll go off the record now.

(The proceedings adjourned at 12:39 p.m.)

C E R T I F I C A T E

I hereby certify that the foregoing 201 pages contain a full, true and correct transcription of all my stenographic notes to the best of my ability taken in the above-captioned matter at said time and place commencing at 8:00 a.m.

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Carol DiFazio
Registered Professional Reporter