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UNITED STATES NUCLEAR REGULATORY COMMISSION'S ADVISORY COMMITTEE ON REACTOR SAFEGUARDS

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UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

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ADVISORY COMMITTEE ON REACTOR SAFEGUARD

(ACRS)

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SUBCOMMITTEE ON PLANT OPERATIONS

AND FIRE PROTECTION

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TUESDAY, AUGUST 18, 2009

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ROCKVILLE, MARYLAND

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The Subcommittee convened at the Nuclear Regulatory Commission, Two White Flint North, Room T2B3, 11545 Rockville Pike, at 8:30 a.m., John D. Sieber, Chairman, presiding.

SUBCOMMITTEE MEMBERS:

JOHN D. SIEBER, Chair

SAID ABDEL-KHALIK

DENNIS C. BLEY

MARIO V. BONACA

HAROLD B. RAY

WILLIAM J. SHACK

JOHN W. STETKAR

NRC STAFF PRESENT:

PETER WEN, Cognizant Staff Engineer

KATHY WEAVER, Cognizant Staff Engineer

SUNIL WEERAKKODY

DANIEL FRUMKIN

HAROLD BARRETT

ALSO PRESENT:

STEVEN HUTCHINS

TOM GORMAN

C-O-N-T-E-N-T-S

P-R-O-C-E-E-D-I-N-G-S

8:30 a.m.

CHAIR SIEBER: The meeting will now come to order.

This is a meeting of the Plant Operations and Fire Protection Subcommittee, and I am Jack Sieber, Chairman of the Subcommittee.

ACRS members in attendance are Harold Ray, John Stetkar, Said Abdel-Khalik. George Apostolakis is supposed to be here, but I don't see him. Dennis Bley, and Peter Wen of the ACRS staff is the Designated Federal Office for this meeting. And Bill Shack, a member, is also present.

The purpose of this meeting is to review Draft Regulatory Guide 1.189, Revision 2, Fire Protection for Nuclear Power Plants, and its associated documents.

We will hear presentations from representatives of the Office of Nuclear Reactor Regulation. The Subcommittee will gather information, analyze relevant issues and facts, and formulate proposed positions and actions as appropriate for deliberation by the full Committee.

This morning Reg Guide 1.189 is a revision that has been two years in the making, roughly. It

relates to the deterministic treatment of fire protection rules, and about 50 percent of U.S. nuclear power plants will fall under this regulation.

This afternoon we will talk, have a meeting related to the probabilistic analysis of fire protection rules which will apply to the other 50 percent of the plants if the industry follows through on its use of that Regulatory Guide. So today we will hear both the deterministic and the probabilistic issues at hand.

The rules for participation in today's meeting were announced as part of the notice of this meeting previously published in the Federal Register on July 15th, 2009.

We have not received any requests from members of the public wishing to make oral statements. However, the Nuclear Energy Institute will present its view as a portion of the meeting, and a portion of the meeting has been reserved for that purpose.

A transcript of the meeting is being kept and will be available, as stated in the Federal Register notice. Therefore, we request that participants in this meeting use the microphones located throughout the meeting room when addressing the Subcommittee.

Participants should first identify themselves and speak with sufficient clarity and volume so they can be readily heard, especially by me.

We will now proceed with the meeting, and I call on Sunil Weerakkody of the Office of Nuclear Reactor Regulation to introduce the presenters.

Sunil?

MR. WEERAKKODY: Thank you.

I'm Sunil Weerakkody. I'm the Deputy Director, Fire Protection, of the Division of Risk Assessment in the Office of Nuclear Reactor Regulation.

We are here today to present Draft Reg Guide 1.189 to you and request your endorsement to it.

To give you the context of the specific part of 1.189 we would like to brief you on, in 2006, the staff wanted to issue a Generic Letter to the industry to address the issue of multiple spurious actuations of fire-induced circuits. The Commission disapproved that effort and directed the staff to work with the industry to come up with methods that the industry can use in order to disposition this issue.

Since then, a team, led by Dan Frumkin, who is the team leader in Fire Protection, has been working with the industry, had numerous public

meetings with NEI and other interested stakeholders to develop those methods.

We believe that in Reg Guide 1.189 we are proposing a method that the industry can choose to use in order to come into compliance with the regulatory expectations with respect to multiple spurious actuations.

As you may be aware, if this Committee and the full Committee endorses issuance of this Reg Guide, we plan to issue it in the fourth quarter of this year. As soon as this Reg Guide is issued, a clock starts for the industry to start implementing the expectations and come into compliance.

With that, I am going to introduce Dan Frumkin, who is sitting all by himself in the front there. Alex Klein, who is the Branch Chief, is out.

So, Dan, if you could please give the NRC perspectives on where we are with respect to 1.189.

MR. FRUMKIN: Thank you, Sunil. I think you just took my first three slides.

(Laughter.)

But what I am going to talk about today is the background of the issues, the changes that we have made to the Regulatory Guide. I am also going to talk about the public comments that we have received,

discussion of the public comments that were not incorporated that were received, and an explanation of why those comments, why the non-incorporation of those comments is not going to be a problem with the path forward. Then the path forward is, as Sunil discussed, of issuance of the Reg Guide and licensees applying this, and the end of enforcement discretion, which we have in the area of circuit failures that takes fire protection out of the normal regulatory process.

So the long-term goal is to end all these enforcement discretions that we have for multiple spurious and manual actions and get fire protection into the normal regulatory process.

As Sunil mentioned, back in 2006, we issued a Commission paper, a SECY 06-0196, which had attached to it a proposed Generic Letter which was one approach, which was at the time the recommended staff approach to bring fire-induced circuit failures, multiple spurious actuations to closure.

The Commission's response in their SRM, their Staff Requirements Memorandum, to that SECY stated that the generic letter in its current form did not contain the necessary specificity for a licensee to understand what they are supposed to do, and sent

the NRC back to the drawing board, and to examine licensee analysis methods in this area, including those using system or functional scenario development approaches and using the normal public regulatory process to enable stakeholder engagement, develop or endorse guidelines that provide a clearly-defined method of compliance for those licensees who do not choose to adopt NFPA 805.

This second paragraph is our clear direction from the Commission. In my opinion, the staff followed this bullet by bullet to bring this issue to closure.

The response to that Commission paper was issued in Commission Paper SECY 08-0093, which was titled, Resolution of Issues Related to Fire-Induced Circuit Failures. The Commission Paper is about 25 pages long, but this diagram pretty much provides as much information as is needed to explain the concept of how to bring fire-induced circuit failures.

Obviously, the devil is in the details, and that is where the comments from the industry come in, but I think it is the overall concept, I'll say, that I am about to explain about this diagram is the NRC and the industry stakeholders are on the same page. From this diagram, we have gone to more and

more details that are documented in the Reg Guide. Then, when we get to some various points, there are some disagreements between the staff and the industry, but overall the umbrella concept is very consistent.

What is in this diagram, it is a diagram that you have a tank of some sort, two redundant trains, just for example, and they provide the source through the pumps and the valves to the vessel that we need to put water in. This is not an actual plant system. It is just a diagrammatical, just to explain the concept.

In a reading of the rule, 10 CFR 50, Appendix R, it says that a train of systems necessary to achieve and maintain hot shutdown conditions is required to be protected in accordance with III.G.2, specifically 20 feet of separation with suppression and detection, three-hour barriers or one-hour barrier and suppression and detection.

The current staff reading of the rule and the basis of this clarification is only the train of systems necessary to achieve and maintain hot shutdown conditions is required to be protected in that manner.

There's other equipment in the plant that has the capability of affecting, adversely affecting, safe shutdown. We have designated that in accordance

with the rule, components important to safe shutdown or components important to safety that could adversely affect safe shutdown or components important to safe shutdown.

The most obvious example of this is in this orange oval. There are some circumstances where the orange oval, redundant pump set, there are some circumstances where that pump could start and perhaps adversely affect safe shutdown.

But the position of the staff is, as long as the pump system in the green box is protected, that is compliance with III.G.2 and the licensee need only provide assurance through a variety of methods, including III.G.2, but not limited to III.G.2, that the components in the other orange boxes aren't going to affect safe shutdown.

So, for example, this could be a surrogate for aux feedwater system, where the RCIC is in the green and the HPCI is in the orange, for example. And if HPCI spuriously starts, you could affect safe shutdown. But if RCIC would be completely protected and HPCI could perhaps be mitigated, once it starts to shut it off, and there was a feasible and reliable manual action, that would be an acceptable manual action, and it wouldn't need to be vetted through

III.G.2.

And similarly with the other items in this diagram, Item 1, for example, a drain-down valve on the tank. If that valve were to open due to a spurious actuation, due to a fire, as long as the green box equipment was protected, and you could reliably and feasibly close that valve before you had a challenge to safe shutdown, then that would be acceptable. Also, you could use other tools, which I will get to on other slides.

Again, you will see in Item No. 2, this one here, if a PORV or SRV were to open, if it was not required, not part of the safe shutdown system, it could be mitigated with manual actions or other tools, and perhaps even -- this is kind of a surrogate for an RHR system. If those were to open, and it could be feasibly and reliably isolated, or there's other tools available to demonstrate adequate protection, then the control valves for this equipment, the control cables would not necessarily require III.G.2 protection.

What I believe is the core of this issue is that there are examples in the plant where PORVs or RHR valves could adversely affect safe shutdown in a very short amount of time. What the previous NRC staff did was they said, well, since it can affect

safe shutdown in a short amount of time, you have to protect it in accordance with III.G.2. But that is not the plain reading of the rule. Because there is a protected train, you don't have to protect it in III.G.2.

Now we have had many discussions with the industry, and they are in agreement, to my knowledge, they are in agreement, where feasible and reliable manual actions are not available, and you don't have other means available to protect safe shutdown, then you will have to provide either protections in accordance with III.G.2 or route the cables outside of the area, as in III.G.1-type protection.

So we are in agreement that, where there are potential real safety issues because of possible hot shorts, but not for the equipment that is required for safe shutdown, then physical protection might be required.

MEMBER STETKAR: Dan, I want to talk about it later, but this drawing might help me understand a couple of things.

Take the tank-drain valve on the left there that you have highlighted as important to safe shutdown. In the Reg Guide, all tank drain valves, regardless of the size, regardless of where the water

goes, seem to be included in the important to safe shutdown category.

There is a table in the Reg Guide. And it just says, success path, supply tank, spurious drainer bypass. Suppose that is a 10-inch drain valve that will drain that tank in 45 minutes. Is that still included as only important to safe shutdown?

MR. FRUMKIN: The staff felt that it was important to draw a clear line between important to safe shutdown and -- or required for safe shutdown and important to safe shutdown. Now everything that is required for safe shutdown requires that III.G.2 protection.

MEMBER STETKAR: I understand.

MR. FRUMKIN: But when you get to the important to safe shutdown, if it is not feasible to do a manual action, or you can't do a manual action reliably, then the staff interpretation of III.G.1 is that you are required to provide sufficient protection.

MEMBER STETKAR: I understand.

MR. FRUMKIN: But the protection doesn't --

MEMBER STETKAR: Let me get back to my --

MR. FRUMKIN: But the protection doesn't

need to be III.G.2 protection.

MEMBER STETKAR: I understand.

MR. FRUMKIN: Okay.

MEMBER STETKAR: I'm not a lawyer, but I understand how that works. My question is, suppose that valve opens spuriously and you drain that tank within 45 minutes. Is that valve an important to safe shutdown valve or a required for safe shutdown valve?

MR. FRUMKIN: That valve would be an important to safe shutdown valve that cannot be feasibly and reliably mitigated, and therefore, would need some protection.

MEMBER STETKAR: Okay. That gets me to the second part of my question. There seems to be an implicit assumed one hour throughout the Reg Guide. It isn't stated very explicitly anywhere, but it seems to be assumed that, if something can be mitigated by a manual action within one hour, that defines important to safe shutdown rather than required for safe shutdown. Is that true?

MR. FRUMKIN: In one case it is, and that is actually on this diagram as well. Along this green box, we put this valve. This is the valve that we need that we use that one-hour analysis for. We don't use the one-hour analysis for anything else. It is

drain valves that are part of the train of systems required for safe shutdown.

MEMBER STETKAR: Well, I carefully asked you about that tank-drain valve, and I said 45 minutes to make sure that I understood it was less than one hour. And you said, if there was an action that was reliable and feasible, that that action must be accomplished within 45 minutes now. Then it, indeed, is an important to safe shutdown, not a required for safe shutdown valve.

What I need to understand somehow between now and noon is what criteria, implicit or explicit, have been applied throughout this whole process for taking credit for manual actions, and is there an implicit or explicit time window applied to those criteria?

So I just wanted to bring this up and let you continue now, but I would like you and NEI, if they are coming up, to clarify that because I really couldn't quite understand that.

MR. FRUMKIN: Yes. Well, just before I go on, honestly, if we stay on this picture the whole time, I think we will probably be more productive.

(Laughter.)

MEMBER STETKAR: It helps.

MR. FRUMKIN: But this drain valve was one of the contentious issues between the staff and the industry because the staff believed that this valve is a required-for-safe-shutdown valve, and the industry felt --

MEMBER RAY: Which one are you pointing at?

MR. FRUMKIN: Oh, my mouse goes away.

Off of the green system.

MEMBER RAY: Yes.

MR. FRUMKIN: It has been kind of described as a hole in the pipe. We actually had numerous public meetings where we discussed just this issue. Basically, what we came up with is, well, if the hole in the pipe is very tiny, we don't have to worry about it. Well, if it is very big, we do have to worry about it.

Rather than leave the licensees with some sort of subjective judgment on that to make, we gave the licensees -- we agreed with the industry that, well, a hole in the pipe that was big enough that would cause a challenge to safe shutdown in an hour, if it were opened, then that is something that would be required to be protected in accordance with III.G.2. If that valve was smaller than that, such as

it would cause a challenge to safe shutdown in more than an hour, then it may still need manual actions or some other means, but it wouldn't require the III.G.2 protection.

MEMBER STETKAR: But all tank-drain valves, the number one on your -- are, by definition, not required to be protected under III.G.2, as I read the Reg Guide.

MR. FRUMKIN: Right, but that does cut both ways. If you have a 10-inch valve on a small tank, and it would drain in two minutes, then you may be required to protect that in accordance with III.G.2 or some other protection, such as relocating the cable within the area such that no reasonable fire could hit it, something like that, because there is no feasible or reliable manual actions that could protect that valve.

So, in a way, we have sliced this -- the equipment required for safe shutdown or the hot safe shutdown, the systems necessary to achieve and maintain hot shutdown conditions is deterministic, absolutely. If a licensee says, I need that piece of equipment to shut down my plant, we say, you protect that equipment in accordance with III.G.2 or better, or III.G.1 or III.G.3.

But where the licensee is worried that some piece of equipment that's not part of that green box, using that terminology, that could affect the ability to safely shut down, then the licensee is in a much more performance-based stage. They have the ability at that point to use engineering judgment, to use fire modeling, to use manual actions, to justify to the staff or even to themselves and the inspectors, and so forth, that they do not need to go -- that it may or may not need a physical protection or a plant modification.

In doing some other work for the --

MEMBER RAY: Wait. Before you go to the next slide, why doesn't the green box include the tank and the No. 1 valve over there? Because I thought I understood what John was going after, but we're getting off the track. I just want to ask that question.

MR. FRUMKIN: Well, because, as you can see, the tank feeds a number of things. The tank feeds, at least in this one, it feeds the orange box or the orange oval pump system up here.

MEMBER RAY: Yes, but that doesn't seem like a sufficient reason. Just listening to your words, I would make the green box include the tank and

the number one valve, just listening to what you said.

MR. FRUMKIN: Right, and you could make a good argument for that. I'm not arguing. There was a lot of positions, people, on one side or another that said, okay, well, the tanks should be included, the tanks shouldn't be included, and so forth. Well, we had to draw the line somewhere, and we also wanted to draw the line somewhere that was defensible and fairly easy to understand.

Now you think that it should be in, but if I said it wasn't, and that we could protect that number one valve somehow, you would at least have an understanding of what was the requirement. Because our goal here is to assure safety and, as the Commission directed us -- with my little wheel mouse -- you know, a functional approach. They also wanted us to do -- I thought the word clear was in here -- clearly-defined method of compliance.

So, although this approach, I guess, wouldn't make everybody happy, it is clear, I believe, at least the way we have set it up, and I believe that it sufficiently provides for safety. Also, I guess my point that I was going to make was, when you go back and you look at the original inspections of the plants that the inspectors did from headquarters back in the

eighties and late seventies, they very consistently said, well, if it is a piece of equipment that could adversely affect safe shutdown, then you can do manual actions. If it was a piece of equipment that was required for safe shutdown, you couldn't do manual actions.

So this dichotomy, this separation of the two types of equipment has always been in the regulatory framework. Now what we are doing is we are documenting it.

MEMBER RAY: Well, all right, I'll quit here at this moment, but all of what you said still doesn't explain why the one drain valve is in the green box and the other one isn't, which was what John was asking to begin with. So let's just leave it there.

I understand you have to make decisions, but, still, I am trying to comprehend the difference from a practical standpoint between what is required and what is important, what is green and what is orange.

MR. FRUMKIN: I guess this gets down to the point of, well, what if it is a drain valve -- the drain valve that's in the box, okay, we had to set up because the staff believed that that was a hole in the

pipe. Okay, so let's protect that under that one-hour criteria that we came up with.

Well, what if this is 10 hours? What if it causes a challenge to safe shutdown in 20 hours or 50 hours? Is it going to be required to have protection? The staff couldn't justify that.

Now if it is going to provide a challenge in 45 minutes, maybe it is going to be required to have protection, but from a performance-based standpoint, what we wanted to avoid was unnecessary plant modifications and also unnecessary exemptions for things that didn't have a real safety significance. We felt that in the green box these items really almost always have safety significance. Once we get outside of the green box, my impression is that the rule always intended to have some performance-based capabilities for the licensees.

MEMBER STETKAR: Dan, I hate to belabor it, but I will. The bypass valve, the green valve in the discharge path, you've said is included as required for safe shutdown if it's large enough to effectively disable the function within an hour.

When you just recently described the tank-drain valve, you said, well, if that tank-drain valve drains the tank in 45 minutes, it may be -- you used

the word may be -- it may be a necessity to protect it or performance-based actions may be justified to keep it as important to safe shutdown.

Well, that seems to insert a note of confusion when I apply the regulations because may be in 45 minutes is not the same as shall in one hour. So I just leave that and let you continue.

MEMBER RAY: I think you are saying the same thing that I'm trying to say, taking it from a slightly different point of view. But I think I hear what you are saying about the need to be arbitrary, which is the way I would describe it.

MR. FRUMKIN: To not respond directly to your comment, but this concept, it is unfortunate that we are talking about this concept now for the first time because this concept, obviously, has been around for a year or two. It is not immediately clear, perhaps because of my inability to express it, but when it gets a chance to sink in, the staff's position is that it is a safe concept; it is a clear concept; it is an enforceable concept, and that's our goal at the end of the day.

So, as I have been discussing, there's two categories of equipment for fire safe shutdown. One is described as the safe shutdown success path. Also,

as you heard me describe it as the green box or components required for hot shutdown.

The reason that there's all of these different names is the component required for hot shutdown, that is words from the rule, but the Reg Guide uses safe shutdown success path components. So that's why there's two different words that are kind of used interchangeably.

Then there's also the important to safe shutdown components, also the orange box. These are the components that you may use performance-based tools to evaluate.

Although both require protection, only the safe shutdown success path components, orange box, or hot shutdown components require the III.G.2-type protection of barrier separation, suppression, et cetera.

Now I will talk here a little bit about the changes to the Draft Reg Guide or the changes that are included in the Reg Guide and also I will discuss a little bit about the performance-based tools that are available for the components important to safe shutdown.

The main changes to the Regulatory Guide were Regulatory Position C.5, which was the safe

shutdown section.

First and foremost, we created this distinction between the safe shutdown success path components and the components important to safety.

For those components important to safety, we described specifically in the Reg Guide that feasible and reliable manual actions may be used where they can assure safe shutdown. Also, there's a section which describes the use of fire modeling to assess components that are important to safe shutdown.

So, if we get back to our picture for a minute, and let's say we are in a very large room, a reactor building, or something, where I would have a fire that would require this valve, I'm sorry, require the tank, but also could affect this number one valve. Well, then I've got to start doing maybe some timing, some analysis, or so forth.

But if I'm in an area of the plant that just requires this valve, or I'm sorry, that could just affect this valve, but doesn't require the tank, perhaps there's other tanks that are out there that are going to be used for safe shutdown or perhaps there won't be an effect on even a plant trip or plant transient at all; then fire modeling may be sufficient to demonstrate that this valve having spurious

actuation will not be an adverse effect to safe shutdown.

So that is how fire modeling could work, where because you have to have the transient that causes you to need your safe shutdown equipment, and then you figure out the equipment that could affect the safe shutdown. Well, if the transient requires safe shutdown equipment on a different train, then your spurious actuations, and there would be no effect, then fire modeling may be sufficient to demonstrate that you don't need any protection.

This was a major point from the licensees, is that they were concerned that, well, if we just allow manual actions, we will triple our size of our procedures, putting in dozens and dozens of manual actions to mitigate things that aren't real. That would be adverse to safety because now the procedures would be unwieldy.

This resonated with the staff, that, yes, unless this is a real effect, you don't need to -- if it is a real effect, you need to mitigate it. But if it's not a real effect, if there's no credible fire scenario that could cause the problem, you could evaluate that, document that there's no credible fire, and the licensee would have that performance-based

analysis in their back pocket for inspection.

I'm saying, performance-based a lot. I'm not saying, risk-informed performance-based. This is not a risk analysis with entry conditions on fire frequency, and so forth. This is purely a performance-based analysis. We used to call them deterministic analysis. It is that kind of analysis.

MEMBER STETKAR: Dan, if you use fire models, how do you account for the uncertainties in both the fire models and the supporting data and all of that? I didn't see any requirement in this document to do that.

MR. FRUMKIN: Right, and that gets to these deterministic analyses that we've always allowed. A licensee could have a 4-inch brick wall that wasn't three-hour rated, and they could say, well, we did an analysis of the wall, and basically, the types of fires that we are expecting, we think that the wall is going to survive.

We don't require any kind of uncertainty analysis for that type of analysis. So it is much more, when we start trying to quantify things, then I think we are getting much more into the risk-informed performance-based area, which requires NRC oversight, and so forth.

MEMBER STETKAR: You are using the fire models, as I understand it, to quantify available time windows for operator actions, which are then used to justify the fact that those actions are, indeed, reliable and feasible. So, indeed, you are using those fire models to perform a quantification.

MR. FRUMKIN: Actually, though, if that's --

MEMBER STETKAR: It is not a reliability quantification, but a quantification. It is quantifying a time.

MR. FRUMKIN: Well, the intent, and I will have to take a look at the way the fire modeling was written up, but the intent of the fire modeling was to exclude the two pieces of equipment being damaged. It wasn't a timing issue to say, well, now you have five minutes or ten minutes or twenty minutes or an hour. It was to say there's no credible fire scenarios that would damage A and B. Therefore, you don't need to.

Now there is some uncertainty in developing that, but I think that the inspectors and the licensees and the staff have a sufficient understanding of the limitations of the fire models to have a high level of confidence that, if they can't come up with a scenario, there is no scenario.

MEMBER STETKAR: You may want to look at that, make a note of it, because the Reg Guide simply endorses NEI 00-01, Appendix H. In that appendix, it says, fire modeling, however, may be used to determine the amount of time required to open any subsequent valves for cases involving need-to-open series valves to cause flow diversion. So Appendix H does talk about using fire models to develop what I call time windows for operator actions.

MR. FRUMKIN: Right, okay. Yes, that's helpful.

Yes, the Reg Guide doesn't talk about time windows. So if that is in conflict with the Reg Guide, we may have to do it, but that was not the intent of --

MEMBER STETKAR: Okay. You were just looking at a strictly heat-release rate and the fact that you have the --

CHAIR SIEBER: Well, we have the separation criteria. It either fails or it does not.

MEMBER STETKAR: Yes.

CHAIR SIEBER: On the other hand, the fire models actually will give you a time profile.

MEMBER STETKAR: They will, and the implication of Appendix H in NEI 00-01 is that you can

use them, you can use that time profile as justification for manual actions to place a piece of equipment or a set of spurious signals, is what we are talking about, in one category or another.

MR. FRUMKIN: Because we are in a performance-based type of environment, that may be appropriate, but I believe the licensee is going to have a lot more complex analysis and there's going to have to be a lot more rigor on their part.

One of the advantages we have by flying a performance-based fire modeling in this case is that our friends from this afternoon who are NFPA 805 are going to be training up our inspectors on fire modeling and risk analysis, and all of those type of things. So the inspectors are going to be much more competent and qualified or at least trained and prepared to do this kind of analysis.

CHAIR SIEBER: Well, this whole factor requires an examination of the modeling itself. I recall the curves that were drawn and the test data that was included in that, so that the curve that was basically an envelope over all the failures, and the failures occurred at more severe conditions, and deterministic analysis for that and analysis of uncertainty has to bound within a reasonable range --

what? -- 95 percent confidence, what is expected to occur.

So I think that is another way to look at it, is to examine the approved fire modeling and the fire modeling tools to see that they reasonably bound the phenomenon that is involved and then compare that to the licensee's use of the tool or the authentication of the tool situations he does use. So I think that is one of the important factors that comes out of this discussion.

MR. FRUMKIN: And the tools, the fire-modeling tools are being validated, or have been validated, by the Office of Research. They are currently working on a fire modeling users' guide, so there will be consistent application in the industry and by the staff. So we are confident -- we might be better, we will certainly be better in 10 years on quantifying/describing fire models and how they should be used in the plant. But the staff is confident now that the state of the art is sufficient to use this for this equipment important to safe shutdown.

CHAIR SIEBER: Well, the NRC developed, through the Office of Research, a set of fire-modeling tools, but I don't think that the licensees are required to use those tools exactly.

MR. FRUMKIN: That's right. There's three -- there's actually a few international tools that are available. We have a member of our fire-modeling community in the audience here. But there's some international tools.

The NRC has developed a tool. I think it is NUREG-1805. The National Institutes of Standards and Technology, NIST, has a field-based modeling tool, the FDS model, and a zone-based CFAST model, all of which have been validated and verified as part of the NFPA 805 program, and the limitations are discussed in that document.

So another major change to the document was this table that was referred to earlier, which provides examples of safe shutdown success path components and components important to safe shutdown. So that table I think is a valuable slice between what is required for hot shutdown or what requires III.G.2 protection and what can be used for this performance-based-type analysis.

MEMBER STETKAR: One last one on that table, then I'll be quiet because I know you want to get to the comments segment.

In the table, under important to safe shutdown, there's just a blanket statement that says,

HVAC systems and components required to provide cooling to success path components to the extent that cooling is required for post-safe shutdown.

Have you thought very much about new reactors? This will apply, Reg Guide 1.189 will apply to new reactors in addition to the existing fleet, is that correct?

MR. FRUMKIN: Yes.

MEMBER STETKAR: The new reactors are going to use an awful lot of digital instrumentation and control systems that tend to be more susceptible to room heat-up considerations in safety-related systems.

I was just curious whether that blanket statement that HVAC, by definition, was always only important to safe shutdown, rather than required to safe shutdown, was sensitive to perhaps some vulnerabilities in new reactors that we may not have in the existing fleet that relies more on analog systems that are somewhat less susceptible to room heat-up concerns.

MR. FRUMKIN: Well, in a way, this clarification is very applicable to the old plants, but shouldn't be used that much with the new plants. The reason is because the new plants are going to be

designed with separation, absolute separation, between trains, in accordance with III.G.1, and so forth.

So, if there's a plant that has a capability of requiring the HVAC system, a fire in the plant that could both require the HVAC system and cause some transient, or affect the HVAC system and the transient, I mean that should be established in the design, that those things should be provided with sufficient separation.

MEMBER STETKAR: So you're essentially relying on the expected design of the new reactors to obviate the need for many of the requirements in this Reg Guide, is that right?

MR. FRUMKIN: To obviate the need for many of the performance-based-type analyses.

MEMBER STETKAR: Okay.

MR. FRUMKIN: Now the types of things and the equipment required for hot shutdown are probably going to be analyzed or have been analyzed by our friends in New Reactors. But, rather than say, well, they've got to be 20 feet apart with suppressions, they are going to be on the opposite side of robust concrete walls.

Again, you are bringing up points that we have had conversations with the inspectors, and they

say, well, what if this, what if that? And when we really try to pull real examples out, what we find is the things that we put as important to safe shutdown, really it is very hard to find examples that will affect safe shutdown. And for required for safe shutdown, it is very easy.

Now there's always going to be some crossovers. So, with the equipment that is required for hot shutdown that isn't really safety-significant, we still have the exemption process. But, at least in my experience, at least talking to the industry, I wouldn't be expecting exemptions on that. Those things have already been protected quite robustly or exemptions have already been submitted.

Then in the required for the safe shutdown, I do believe -- I'm sorry -- for the important to safe shutdown, my understanding with talking to the industry is there is going to be some equipment that is going to either require manual actions, change in plant design of some sort, in order to be able to assure safe shutdown.

Now the classic example that I know about, and every time I talk to the industry folks, I'm like, give me more examples, and they can't give me more examples or they haven't given me more examples.

There was this assumption of a single spurious. So you have two valves in series. I will go back to my picture. Two valves in series under 3, where if the top valve were to have a spurious actuation, well, then the second valve would be assumed not to have a spurious actuation.

That is no longer -- this paradigm or this clarification also cuts the other way. If it is credible that both of these valves could be affected by the same fire, then the licensees are going to need to consider these valves in their analysis and be able to demonstrate that they can sufficiently protect safe shutdown.

My understanding is that some licensees relied on a single spurious analysis to not look at both of those valves. I believe that they are going to have to go back and look at those, and there's going to be some plant modifications to assure safe shutdown. I don't have any plant names, but this is just my gut feeling.

For the most part, though, this clarification that you see on this diagram is very consistent with what most licensees have done. Licensees who didn't do this, there are some licensees who have no fire barriers in their plant, some

licensees who haven't done a lot of fire protection at all. Those licensees have gone to NFPA 805. They realize that even to do a paradigm like this would be much more complicated than they could handle.

So, if we didn't have 805 and plants going to that, I think there would be a lot more discussion between some of the licensees and the NRC staff. But because the licensees who have perhaps the programs that need the most work, because they are going to NFPA 805, they are not in the pool of the people we are having our discussions with.

MEMBER RAY: Let me make an observation and see if you have any comment on it. It looks to me like one of the problems we have, I think, looking at it as we do, there is no difference between required and important other than the ones that are in the required category are part of the success path by definition.

In other words, it has to do not with the outcome or the consequences, but it has to do with the location of the item in question, period. That is what I meant by being arbitrary, because we tend to look at things in terms of outcomes, and there isn't any difference, I claim, based on all I have seen and what you have said, between required and important

other than where the thing is located. If it is located in the success path, then it is required.

MR. FRUMKIN: Right, and that argument --

MEMBER RAY: Can we stop there? I mean, if that is a correct understanding, it helps me.

MR. FRUMKIN: Yes.

MEMBER RAY: I'm okay with it, and we can move on. All right.

MR. FRUMKIN: Yes.

MEMBER RAY: Now go ahead and say whatever you want.

(Laughter.)

MR. FRUMKIN: And that arbitrary designation --

MEMBER RAY: You don't know how many hours I have been spent trying to unravel that, until we finally got here to this picture.

MR. FRUMKIN: Not hours, years.

(Laughter.)

That arbitrary designation is written in the rule. That is how the rule was written.

MEMBER RAY: Well, that's a matter of opinion, but we shouldn't debate that here.

MR. FRUMKIN: The current staff opinion, as through our Office of General Counsel's no legal

objection process --

MEMBER RAY: Okay.

MR. FRUMKIN: -- agrees with that interpretation of the rule, which is just as you described.

MEMBER RAY: Thank you. I am much better off now.

(Laughter.)

CHAIR SIEBER: You think.

MEMBER RAY: Well, I couldn't make any sense out of it for a long time.

CHAIR SIEBER: Right.

MR. FRUMKIN: Probably the 85 revisions of the original SECY may have had those exact words at one point.

MEMBER RAY: Okay.

MR. FRUMKIN: So, if we don't have specific comments on this diagram, I will get to the public comments that we have received.

We had three industry stakeholders provide public comments. The Nuclear Energy Institute provided comments on behalf of, likely, most of the NRC licensees. Then we had public comments from Dominion, and I think it was Florida Power and Light. Florida Power, I think some of their comments were to

pull in the NEI comments. Actually, Dominion had some other comments that were unrelated.

Many of the comments were editorial in nature, and in the view of the NRC staff improved the document, and therefore, were incorporated. These comments related to many of the chapters other than Section C.5. Probably only about half of them addressed Section C.5, and there was information about fire breaks in cable trays that is not currently part of the NRC process, but we still have a paragraph describing how to put them in, but they are not in the regulatory framework. So that is just one example of one of the ones that we included. But, for the most part, we included those editorial improvement-type comments.

A significant comment was that the industry stakeholders commented that NEI 00-01, Rev 2, should be referenced in the Guide, and this comment was consistent with the Commission direction, as I described in the slides before.

Also, what we did is we had numerous conversations with NEI on their Revision 2. We saw Revision 2B. We commented on it. We gave it back to the industry, or maybe that was Revision 2C. We had a number of public meetings describing the issues on

this NEI 00-01, which we describe as the Industry Implementation Guide.

Because it was consistent with Commission direction to consider the Guide, and also consistent with our positions, there was no reason not to endorse it to the extent that we did.

CHAIR SIEBER: Overall, you had, from NEI, you had 83 comments. You accepted 54 of those carte blanche, which were basically editorial. You accepted in concept six of them. Twenty-seven you decided you didn't need a change, but one of them was rejected. And the same thing with Florida Power and Light, a lot of those were basically duplicates of NEI's, but you rejected one of those.

Make sure that in your discussion you talk about the two that were rejected.

MR. FRUMKIN: Right. I will just jump to this slide here. This is slide number 11. This is numerous other comments that were considered and were accepted. But the ones that weren't accepted, the bulk of the editorial ones, they addressed things like, the Guide does not supersede a plant's fire protection program.

There was comments that said, please tell us, please provide us, the licensees, some confidence

that the current fire protection program isn't going to be superseded by this, or the approved fire protection program isn't going to be superseded by this Guide.

So a number of the non-acceptances related to that one. Some of the non-acceptances related to the fact that the information was located elsewhere in the Guide, and the other one, the other majority of the non-acceptance ones were there were means available to deviate from guidance in the Guide written in the Guide. So we didn't need to add more discussion along those points. So those are the general ones.

I hope that I am going to pick up the ones that we are not accepting, these three public comments that were not incorporated, these next slides, 8 through 10.

One of the comments that wasn't incorporated was the request for the endorsement of Appendix E of NEI 00-01 which was an industry implementation guide for operator manual actions. The reason that we are not endorsing that section is, although we did have numerous discussions with the licensees about NEI 00-01, whether it was a miscommunication or just a disagreement, there was one

significant comment that they did not incorporate into their document, which was an assumption that there will always be 10 minutes to do a manual action. There was no justification; at least in the opinion of the staff, we didn't have sufficient justification to endorse that type of thing.

And secondly --

MEMBER RAY: Endorse that type of thing?

MR. FRUMKIN: Endorse a 10-minute -- you always have 10 minutes to do a manual action assumption. That's what I mean by type of thing.

MEMBER RAY: You always will have or you need to assume --

CHAIR SIEBER: You will always need.

MR. FRUMKIN: No, no. We cannot, we won't, we are not prepared to endorse that there will always be 10 minutes available to do a manual action.

CHAIR SIEBER: Okay.

MEMBER RAY: Of course.

CHAIR SIEBER: That's right.

MR. FRUMKIN: Okay. Then that was part of the assumptions of that Appendix E. Then there was also a lack of clear discussion on the reliability of manual actions. In the opinion of the staff, there was some good, useful information there, but it wasn't

as sufficiently clear as we would have liked to see in order to endorse.

Probably one of the issues with, not really an issue, Appendix E wasn't in the previous revision of NEI 00-01, so it hasn't been vetted through the staff, through each of the various revisions. This is only the first time we have looked at it, and I don't know that the staff was really even considering incorporation of it when we looked at it. So it may not have gotten the view, the level of scrutiny that it needed to be endorsed.

Our path forward for this is we do have a NUREG series document, NUREG-1852, which provides useful information for evaluating post-fire operator manual actions. Again, that is an NRC document, but what we have seen through about 11 exemptions for manual actions that we received on the docket is licensees do understand that; they do understand how to apply it. It is a fairly clear document.

So we are confident that in the interim, before we can endorse some industry implementation guidance, that that is an effective fallback position.

Additional information has been added to the Guide regarding manual actions. We did add some information about manual actions to the equipment

important to safe shutdown and how that can be applied, and fire modeling may be used to demonstrate that a manual action is not necessary to mitigate spurious actuations for equipment important to safe shutdown.

So this is another tool, fire modeling is a tool that may be able to justify the exclusion of a manual action in some cases. The bottom line is that, my bottom line is that industry implementation guidance is good. We will work with the industry on this manual actions implementation guidance if it continues to be important to them, but we have enough information on manual actions in the Guide for licensees to move forward with this clarification.

The second comment was a discussion of a 20-minute duration of direct current hot shorts. Basically, the NEI 00-01 said that all hot shots would self-short to ground or not be hot shorts anymore after 20 minutes.

CHAIR SIEBER: They would clear.

MR. FRUMKIN: I'm sorry?

CHAIR SIEBER: They could clear.

MR. FRUMKIN: They would clear. That's the word.

CHAIR SIEBER: Yes. Okay.

MR. FRUMKIN: They would clear within 20 minutes.

The reason for not incorporating this is actually based on the testing that some of the industry stakeholders have done. Duke Energy did some testing on DC circuits, and the NRC is in the midst of doing some testing on DC circuits. Although the AC circuits tend to fail very quickly, in a matter of a minute or two, or a millisecond or two, up to a minute or two, the DC circuits are not showing the same kind of failure times.

I believe that in the current testing they have had a DC circuit that locked in for 15 minutes before it cleared. And that was one of two tests that tested DC circuits.

CHAIR SIEBER: And what causes that, the resistance in the junction area; it defaults?

MR. FRUMKIN: I'll have my test expert provide some insights on that.

MR. BARRETT: This is Harry Barrett from the Fire Protection Branch in NRR.

What differentiates DC from AC is two different things. One of them really has nothing to do with whether it is AC or DC. One of them has to do with fire intensity. If you end up having a slow-

growing fire or a very slow heatup of the component, you can end up having an extended duration, just because the length of time that it takes for it to continue to fail to the point where it shorts to ground ends up being lengthened because the heat transfer process is essentially stagnant, and it just sits there.

The other item --

CHAIR SIEBER: Why is that unique for DC as --

MR. BARRETT: It's not. That particular part is not unique to DC. That could be for AC, and it could be for DC; it doesn't matter.

And the other thing is that there are some DC circuits that are fused much higher. Some switch gear trip coils may end up having a 35-amp fuse on them. Having a higher fuse rating could end up meaning that you have to have a much better short to ground in order to blow the fuse. We have seen that happen in some of the tests with larger components, like large PORV coils or trip coils and breakers; you can end up having a large enough fuse that you just don't blow the fuse.

In the DESIREE fire testing that we observed a couple of weeks ago out in Sandia, we

actually ended up shorting to ground at the tray and vaporized the conductor, but didn't blow the fuse.

CHAIR SIEBER: So it does have something to do with the --

MR. BARRETT: A hundred and twenty-five volt DC, we had an arcing fault to the point where it actually vaporized the conductors, and we didn't blow the fuse.

So some things are unique to DC because of the application the way they are. We may end up seeing that with AC, if you end up having higher current ratings, let's say, in a lighting panel, and you have a 50-amp breaker. Then you might end up having the same kind of phenomenon with that, but it has to do with the fuse sizes, and it also has to do with the amount of heat flux.

CHAIR SIEBER: Yes. Well, I can picture AC circuits, for example, pump-start circuits, where you have a provision in the protection scheme to allow high currents during the early part, but that's usually relatively short in duration.

MR. BARRETT: Right, right.

CHAIR SIEBER: Okay. That answers my question. Thank you.

MR. FRUMKIN: Well, our folks from

Research, when this is done, I am sure they will be very happy to come in and bring in burnt cables and show videos and --

CHAIR SIEBER: We already did that.

MR. FRUMKIN: -- regale you. Well, but this is a whole new testing. So you will get it all again.

CHAIR SIEBER: The same cables, new tests.

MR. FRUMKIN: That's right.

(Laughter.)

CHAIR SIEBER: Okay.

MR. FRUMKIN: But the bottom line, I guess the point is the testing is not bearing out that DC circuits can be assumed to clear within 20 minutes.

Now, based on the body of testing, we are confident that AC circuits will clear in 20 minutes, and we plan to endorse that again.

Then, where for DC circuits there's also other options available, where these hot shorts could affect safe shutdown, such as manual actions, fire modeling to assure that what needs to be damaged to cause the transient and what needs to be damaged to mitigate the transient aren't affected by the same fire. So there are tools out there.

But, in the judgment of the staff, this is

a real issue that cannot be handled with a simple assumption. This is going to take some work on the part of the licensees to demonstrate their ability to safely shut down.

CHAIR SIEBER: Yes. To me, the difference between DC and AC continues to be sort of arbitrary, and I guess if you want to distinguish between, you would say DC circuits take longer to fail, as opposed to looking at the fusing or interruption capability. To me, it stretches it a little bit.

MR. BARRETT: Yes, there's several factors you have to consider there. It is not just the fact that it is DC or AC.

CHAIR SIEBER: Right.

MR. BARRETT: It is not a simple phenomena.

CHAIR SIEBER: But I would think that if a licensee wanted to take exception, you would require a detailed analysis, including the protection scheme and the setpoints or limitations that were there.

Okay, thank you. That answers my question.

MR. FRUMKIN: So the third major area of non-incorporation -- I think I made that term up -- has to do with concurrent hot shorts for components

important to safe shutdown.

I will add that these issues that we have are not in the required for safe shutdown. There's a strong parity between the staff and the industry that those equipment required for safe shutdown in that green box is required protection, according to III.G.2 or exemption. That's not where these issues are coming up. These issues are coming up in the application of the orange box or the equipment important to safe shutdown.

So what we found, just the staff interpretation of the application of this concurrent hot shorts issue, is that they are trying to set limits on the consideration of concurrent hot shorts. The staff's position is that that is risk-informed; they are using risk-informed assumptions, which is perfectly acceptable to the staff, except it needs to come in or it is the staff expectation that risk options come in under Reg Guide 1.174. Other options, such as manual actions and fire modeling, are also available.

CHAIR SIEBER: Okay. So this is really not a technical issue? It is a how-to-apply-the-rules issue?

MR. FRUMKIN: Yes, that's the staff's

position, and I think it gives me some satisfaction to know that we do have these tools out there that aren't going to require licensees to do drastic modifications of their plants and spend lots of money. As they have described to me, these systems have been in operation for as long as 40 years. To modify them physically to avoid this would create a new system that may be subject to new failure modes that weren't being considered.

So we have risk tools available that would come into the NRC for review. Also, there's manual actions and fire modeling which they could do their own analysis and keep that in-house for subject to inspection.

CHAIR SIEBER: Okay.

MR. FRUMKIN: This is a summary of the public comments. In the view of the staff, there is sufficient guidance and alternatives available for licensees to complete fire-induced circuit analysis, including multiple spurious actuations. There's a variety of methods available that would allow licensees to avoid modifications to resolve non-safety-significant circuit analysis issues.

For licensees that cannot resolve these issues technically without the risk options, NFPA 805

is also available. Obviously, that is a more costly approach because it takes in the entire plant, but, again, it doesn't introduce modifications that aren't necessary.

Lastly, the NRC staff will continue to work with the industry in refining this implementation guidance for the open issues, but I'll just repeat my mantra, that this refinement is not necessary to fulfill the Commission's direction regarding clearly-defined method of compliance. In the staff's judgment, we have met all of the goals of the Commission in bringing this to closure, providing clearly-defined method of compliance, using the public process of issuing the Reg Guide, numerous public meetings with industry stakeholders. We did have some public participation in some early meetings, and we feel like we've met their intent.

That takes me to my last slide, that our goal is to issue the final Regulatory Guide 1.189 before the end of the fourth quarter of 2009. The issuance of the Reg Guide will start the clock on Enforcement Guidance Memorandum EGM 09-002, which will give licensees six months to identify non-compliances, and then it will give them another 30 months to resolve those non-compliances.

So licensees who identify non-compliances during that period will not be subject to enforcement, and that is really the goal of the enforcement discretion, is to give the licensees a window to look for things, without looking and then getting hit with a violation.

Then, really, at the end of six months following the issuance of the Reg Guide 1.189, the enforcement discretion will end for all issues that haven't been identified. So the inspections will begin at that point. Obviously, some items will be identified in the corrective action system, but that, again, is something for the inspectors to inspect.

I misspoke. Currently, there are inspections going on in this area, but there's also currently a more broad inspection Enforcement Guidance Memorandum out there that covers all-circuit findings for multiple spurious. So that is being inspected, but these are all being put through with the Enforcement Guidance Memorandum, and not receiving cited violations.

Then the NRC will revise its inspection manual to assure that licensees are appropriately implementing the clarification, as described in this Reg Guide.

And that's all I have.

CHAIR SIEBER: Okay. I would like to ask the members, before we take a break, if they have additional questions on the staff's presentation.

MR. WEERAKKODY: Jack, this is Sunil Weerakkody, NRC. I just want to make a couple of comments for the information of the Committee.

I took a couple of notes in terms of things that I want to speak to Dan and, if necessary, with New Reactors.

One is with respect to the questions on fire modeling. We have the other track, 805, in there. We are very clear with respect to the training requirements, the knowledge levels for people who use fire models.

I am going to talk to Dan later and make sure that we have parity because fundamentally, if a licensee uses fire models, they should be subject to the same standards. So that is a take-back for us. We may have done it; we may not, but I want to explore that.

The second thing is with respect to John's questions on HVAC and the important to safety, we have been meeting, Dan has been meeting with NEI and other public interested stakeholders in terms of determining

drafting for this with respect to required or important to safety.

We have a couple of members from NRO here, the New Reactors organization here, but I'm going to bring that question that John raised back to their attention, especially in light of what you said about the digital and the nature that they have thought through that.

MEMBER STETKAR: Also, there are some plants, existing plants, that are proposing to replace their safety-related protection control systems, their current analog systems with digital systems. So there may be some subset of the currently operating fleet that falls into that regime of susceptibility also.

MR. WEERAKKODY: All right. Thank you, John.

Just to make it very clear, because digital is a whole new area that has been under the NRR, and not open view, I just think I want to take it back and make sure 1.189 has carefully thought through that. I do not know at this point how Office of New Reactors feels about that, but that is something that we need to think about.

MEMBER STETKAR: The reason I brought up HVAC is part of the overall theme that I had in terms

of just kind of a general concern about pigeonholing certain types of systems or equipment or functions in a particular category as either required for safe shutdown or important to safe shutdown because of an implicit credit for some type of operator action and some sort of implicit time window available. That is the basic concern.

HVAC is an example in terms of susceptibility of digital I&C. Other more mechanical components, like these valves, are other examples and more a mechanical side of the equation.

MR. WEERAKKODY: And the last thing I wanted to share with the Committee members is, in fact, I think the need for arbitrariness. You know, all the questions that Dan got initially with respect to our definition or application of the important to safety versus required for safety.

I thank the Committee for your patience. Dan had the very hard job to clarify the unclarifiable. If you look at the Commission, you know, as regulators, we wish we could have just said, here's what you need to do. Go do it. But when the Commission said it lacks specific guidance, there was not specific guidance, that put us in a situation where Dan and his team had to meet with the industry,

basically, go with a different plan, different configurations, and come up with something that makes sense.

So I appreciate the questions, and I'm glad I wasn't sitting there with Dan. But thank you for your understanding.

Like I said at the beginning of the meeting, we firmly believe that the staff has developed enough guidance to meet the Commission's expectations, and we would like this Committee to recommend to the full Committee that this Reg guide be endorsed, so that we can issue it in the fourth quarter.

Thank you very much.

CHAIR SIEBER: Do members have any questions to ask Dan?

I take it you have completed both of your sections that are on the agenda?

MR. FRUMKIN: Yes. Yes, I have.

CHAIR SIEBER: If we want to ask Dan questions, now is the time.

(No response.)

MR. FRUMKIN: Well, I will be available after --

CHAIR SIEBER: Yes, but you will be

sitting over there, perhaps.

Okay, if there are no additional questions, this is an appropriate time to take a break. I would suggest that we try to be back, by that clock there, at quarter after 10:00.

(Whereupon, the above-entitled matter went off the record at 9:47 a.m. and resumed at 10:14 a.m.)

CHAIR SIEBER: Okay, I think we are ready to begin.

At this point in the meeting, we would like to hear from NEI: Tom Gorman and Steve Hutchins.

MR. HUTCHINS: Good morning. My name is Steve Hutchins. I'm a loaned employee from Exelon working for NEI as the Project Manager for Fire Protection.

I would like to thank the ACRS Subcommittee for this time to share our comments. We gathered industry comments from about 17 different utilities and gathered them and submitted them as one package to the NRC.

But I would like to thank the NRC, also, for two years of very positive interaction and meetings, public meetings, over 40 public meetings, to work out the Reg Guide and also NEI 00-01.

I want to introduce Tom Gorman. Tom is

our PPL employee who is the Chairman of our Fire-Induced Circuit Failure Task Force and one of the principal authors of NEI 00-01. He is going to review the public comments.

Tom?

MR. GORMAN: Thank you, Steve.

Before we start, I would just like to add that a lot of what we are focusing on here today are the few differences that we have left relative to the criteria, and I believe we have really made a lot of progress on putting together a criteria that the industry will be able to use to put a lot of the debate that we have had for a period of time behind us and to stabilize the regulatory and, from the licensee perspective, the inspection aspects of plant fire protection design.

I would also like to just give you a little bit more history. We have been working on this revision of NEI 00-01 for probably two to three years, but there's some history on the issues that we have been discussing in these documents that some would suggest go back 30 years. Others you can go back and you can point at active discussions on specific topics probably 15 to 17 years ago. I know back in November of 2000, some of us were here as representatives of a

BWR Owners Group presenting a paper which was a predecessor of NEI 00-01 that related specifically to the guidance for post-fire safe shutdown. So there is a long history on this stuff.

We appear to be converging on a solution to the differences of opinions and to be putting together a criteria that we will be able to apply and, hopefully, will stand the test of time as we go forward.

Some of the information on the slides will be almost identical to what you saw with Dan. Some will be slightly different or a couple of differences.

Again, we go back in our history to the issuance of Generic Letter 2006-XX. That was rejected. One of the reasons for disapproval was the fact that licensees couldn't really be expected to perform an analysis without a clear regulatory footprint, without clear regulatory guidance on how to do that.

As Dan had stated earlier, the endorsement, the encouragement of the Commissioners to work with industry and to come up with a criteria that did meet the requirements for a clearly-defined method for the operating plants was something that we believed was very important also. We were encouraged

by the fact that NRC was requesting that we be involved in that process.

Those were words that I think I spoke myself in 1997 at the BWR Owners Group document, where people asked, what would you like out of these meetings, as we formed an Appendix R Committee for the BWR Owners Group. I said I would like a clear design criteria that we can all apply and that we know, when we are done applying it, that we can reference as we get into discussions about what is and what is not a required performance criteria for post-fire safe shutdown. As I said, I think we are converging on that.

We have been working with the staff for the last three years. We have had a lot of back and forth. We have made a lot of progress. We won't talk so much about the progress, but we will talk about the differences today.

We went back and we revised NEI 00-01 to put in the specific methodology for the resolution of the multiple spurious operations issue. That, I think, is something that you haven't really heard too much about. So that is one of the areas that I think we have good agreement between the staff and the industry, and that is how we are going to address the

issue of multiple spurious operations.

We have built in generic lists that were developed by each of the owners groups of the potential combinations of equipment failures that need to be looked at by each one of the licensees. We have also provided provisions for an expert panel process that would review that generic list and would adjust it with additional plant-unique equipment combinations, and in some cases would have the ability to remove certain combinations from the list that were not appropriate to the particular vintage of the plant that was under evaluation. So we have that expert panel process.

Then, in the middle of that, we came upon this criteria of required for safe shutdown and important for safe shutdown. So we viewed that as a way to resolve some of the differences of opinion between the industry and the NRC relative to the use of manual operator actions. We have incorporated that into NEI 00-01.

MEMBER RAY: Do you agree with what I said earlier, that the difference between required and important is the location of the item, that required is in the success path?

MR. GORMAN: I was debating whether we

were going to get back into that issue or not. Since you brought it up, I have a slightly different explanation of --

MEMBER RAY: Can you say it like in a sentence or so or --

MR. GORMAN: Probably not.

MEMBER RAY: -- does it take a paragraph?

MR. GORMAN: It really, in our mind, comes down to that single-flow diversion path off of the discharge line on the required system. We initially argued that all flow diversions --

MEMBER RAY: On the safe shutdown path?

MR. GORMAN: Yes.

MEMBER RAY: Right.

MR. GORMAN: We initially argued that all flow diversions were important to safe shutdown; they were not required for safe shutdown. The NRC staff was uncomfortable with that position relative to large full-flow-diversion situations. If you had a full-flow diversion where your damage could happen very quickly, they were concerned with allowing operator manual actions for that scenario.

We said, well, if it happens very quickly, that is not something where we would be able to justify the use of an operator manual action, and we

would be forced to provide the required protection.

To end that debate, what we decided to do is we generated that Appendix H. What we said initially is that all flow diversions off of the safe shutdown path are going to be classified as required. What we attempted to put into Appendix H, and I hope you read it this way, was a criteria to determine whether or not some of those valves could be considered as important.

So, for example, if you had a large full-flow flow diversion off the injection path and the required for safe shutdown path, that would not make the cut for important to safe shutdown. That would pretty much stay as required.

If you had a small, 2-inch line, a midflow line, for example, for the pump that failed to close, most of the plant systems are designed such that the loss of flow through that midflow can be tolerated.

So we proposed the criteria that is in Appendix H where we said, if an analysis, including thermal hydraulic analysis, were to demonstrate that the flow diversion were to cause a problem with respect to safe shutdown within one hour, then you can't consider it for operator manual actions. If it takes more than hour, then you can consider it.

We also said in there that that one hour is a separate criteria from the criteria that we included in Appendix C on Operator Manual Actions for justifying the feasibility and reliability of operator manual actions.

Operator manual actions, if they are allowed, need to be justified on a separate criteria that addresses both reliability and feasibility. All we are doing with that one-hour requirement in Appendix H is we are determining whether or not looking at a feasibility and reliability criteria is an option for us.

MEMBER RAY: Okay. So you would not include everything on the safe shutdown path as required, provided it met the exclusion that you just outlined --

MR. GORMAN: Correct.

MEMBER RAY: -- in which case it would then be important, even though it was in the safe shutdown path?

MR. GORMAN: As flow diversion, yes.

MEMBER RAY: Yes, yes. Okay.

MEMBER STETKAR: Tom, in Appendix H there's kind of a categorical statement that says I can screen out any flow diversion paths less than 1-

inch in diameter. What's the basis for that?

MR. GORMAN: We can't envision a 1-inch diameter flow diversion giving us a problem with respect to the makeup systems that we have.

MEMBER STETKAR: I know you have looked at -- most of the examples in NEI 00-01 come from Boiling Water Reactors.

MR. GORMAN: Right.

MEMBER STETKAR: Have you thought about, there's a requirement for maintaining level in a Pressurized Water Reactor, and you can take credit -- in fact, the only system that you can take credit for is the charging and makeup system. Have you thought about a 1-inch flow diversion from that system?

MR. GORMAN: I have not specifically thought about it relative to that.

MEMBER STETKAR: They tend to about 2-inch lines.

MR. GORMAN: Yes, if it is significant, it would need to be looked at.

MEMBER STETKAR: I was curious why the 1-inch categorical exclusion for any plant, any system.

MR. GORMAN: Some of that came from previous criteria. As I said, the document is predicated on BWR owners' criteria. We are talking

about systems with --

MEMBER STETKAR: A good fraction of the plants that are applying these happened to be Pressurized Water Reactors that actually have slightly different systems.

MR. GORMAN: Yes. I would say, if you look at the split between NFPA 805 and the deterministic, I would say the NFPA 805 group of plants is heavily weighted toward the PWRs.

MEMBER STETKAR: That's true.

MR. GORMAN: The majority of people looking at the deterministic criteria, at least in my view, are still in the BWR category.

MEMBER STETKAR: Yes. Still, if I have a Pressurized Water Reactor and I have a charging system that is required to maintain pressurizer level, and I want to use a deterministic criterion, this says I can screen out a 1-inch flow diversion path in that system.

MR. GORMAN: Yes.

MEMBER STETKAR: I was just curious what the -- I am a bit concerned about black-and-white absolutes, 1.00 inches, 1.00 hours, in terms of criteria that apply, you know, specifically criteria that apply universally to everyone everywhere

regardless of the actual plant situation.

MR. GORMAN: Yes. Well, I guess one of the implicit, maybe not stated, requirements of the guidance document is that you shouldn't do something foolish.

(Laughter.)

MEMBER STETKAR: Okay. I hope not.

MR. GORMAN: Because we are expecting these analyses to be performed by people who are qualified engineering personnel that base their decisions and their actions based on engineering principles and engineering analysis. That was pretty much the argument that we got into, the discussion that we got into at NRC relevant to flow diversions. We don't want to be arbitrary, but we know that there are flow diversions of specific sizes that both they and we would agree are not a problem for these systems.

MR. HUTCHINS: And that was one of the reasons for the expert panel also, is to bring in --

MR. GORMAN: Right.

MR. HUTCHINS: -- operators, maintenance people, those types of people, to review the lists, so that we have some collegiate review of the list versus just an engineering person sitting down.

MR. GORMAN: Right.

CHAIR SIEBER: On the other hand, you didn't go through all the instances of approximate 1 inch and decide whether that was valid for each and every case or not, is that correct? It is just sort of a number --

MR. GORMAN: Not specifically, no. Right.

CHAIR SIEBER: Yes, it is just sort of a number you picked, and it seems reasonable to me.

MR. GORMAN: Yes. And that's not a current revision or addition to the document. I think that's been in there since the first time we wrote in 1997.

MEMBER STETKAR: Thanks.

MR. GORMAN: Yes. So did I answer the question?

MEMBER RAY: Yes. Yes. No, that's fine. Thank you.

MR. GORMAN: And NEI 00-01, Revision 2, has been issued to the industry for use, and that was in May of this year. People have it out there, and people are reviewing and trying to understand it and trying to apply it.

The interface with Reg Guide 1.189, Rev 2, it was our intention to have the guidance in 00-01

endorsed to the largest extent possible within the Reg Guide. Our reasoning for that was that we thought we had developed a fairly comprehensive criteria where we looked at what we considered to be every aspect of post-fire safe shutdown, and we provided criteria that was consistent with the application of those principles over the last 30 years. We also believe that we have added in criteria that addressed the recent issues on multiple spurious operations and discussions we had with the staff relative to required and important to safe shutdown.

We also believe that we had put in information there that kind of provided good clarity on when an operator manual action could be used and when it couldn't be used, and when you needed to make a submittal to get approval to use it.

So it was our intent to have that information included. That was pretty much our substantive set of comments related to the comments we provided to the Reg Guide. Most of those comments that we put in have been accepted.

As I said before, I think we made good progress on the whole criteria document. We do have a couple of open items, though, and they happen to align very well with the open items that Dan talked about.

CHAIR SIEBER: Okay. Well, let me ask you this question or let me ask the staff: are these open items for the staff? In other words, by calling these items open items, does that mean the staff is not prepared to issue the Draft Rev 2 of Reg Guide 1.189?

MR. FRUMKIN: No. This is Dan Frumkin.

In the judgment of the staff, these are issues. Actually, one of them is currently undergoing testing. Another one, which he is mentioning in there, we plan to work with the industry.

In the staff's judgment, these do not, should not stand in the way of the issuance of the Reg Guide, but that's the staff's position.

CHAIR SIEBER: Does that mean that if the testing comes out with an answer different than what you expect, you will have to revise the Reg Guide again?

MR. FRUMKIN: We would plan to revise the Reg Guide as much as necessary, but currently the testing is consistent with our current position in the Reg Guide.

CHAIR SIEBER: You mean the results of the testing?

MR. FRUMKIN: Yes, the results, the preliminary results of the testing.

CHAIR SIEBER: And when will the testing be done? When will it be completed?

MR. FRUMKIN: Probably a preliminary report, early next year, something like that. Then, again, one thing we didn't mention about this testing is the industry is involved in the testing. They have got some industry observers, which we feel is good for transparency and openness, and so forth. Then they are also providing insights into the testing as it goes on.

CHAIR SIEBER: Is industry conducting their own testing? Will this become a contest in test results?

MR. HUTCHINS: The testing that we are contemplating right now has to do more with reducing some of the conservatisms in fire PRA development. We are looking at, talking to EPRI, talking about gathering up some information. We are having an industry forum in September. We will be talking about fire modeling and benchmarking that, and then going to the NSAC, the NEI committee of all the CNOs, and asking for some money to do some additional testing to help the fire PRA reduce the methodology.

CHAIR SIEBER: Okay. So that involves Reg Guide 1.205, as opposed to --

MR. HUTCHINS: Exactly, yes. We are not looking at --

CHAIR SIEBER: Now 1.189 allows modeling of specific issues? Does the NEI work, the industry work that is being done right now involve those small modelings that they may produce to provide exemptions under Reg Guide 1.174?

MR. HUTCHINS: I think what will help that, again, we are having a benchmarking section as part of the industry forum in September to talk about that and bring together utilities that are applying fire modeling to talk about it and to try to further the technology.

CHAIR SIEBER: Okay. Why don't you go on with your open items then?

MR. GORMAN: Okay. The first open item is Appendix E on operator manual actions. As Dan explained earlier, the NRC prepares an approach for reliability to be consistent with NUREG-1852, rather than the guidance that we have included in Appendix E.

CHAIR SIEBER: And that's your NEI document?

MR. GORMAN: NEI document. Yes, we've included a number of things in appendices that needed a detailed explanation.

And our appendix tells the licensees that they should use 1852 if they are making a submittal to the NRC for approval of an operator manual action. The criteria that we have in the document, however, is a criteria that is consistent with what has been applied to operator manual actions over the history of Appendix R, and it is also consistent with criteria I believe that's been in the NRC inspection modules over the course of time.

So, for existing operator manual actions, and I suppose operator actions that would be consistent with those existing ones, we would expect people to apply the criteria in Appendix E. And if you needed to make a submittal to justify an operator action, where Appendix E gives you the criteria when you need to do that, then that submittal should be based on consideration of NUREG-1852.

CHAIR SIEBER: Well, it would seem to me that if you are going to decide as a licensee whether you need to seek an exemption or not, you would use the tool that the exemption --

MR. GORMAN: Right.

CHAIR SIEBER: -- specifies in your decisionmaking as to whether you need an exemption or not, rather than some other methodology.

MR. GORMAN: Right, and that is what our Guide says. If you are going to make a submittal to the NRC, look at NUREG-1852.

CHAIR SIEBER: Okay. On the other hand, to make the decision as to whether you are going to do the submittal, wouldn't you also look at 1852?

MR. GORMAN: Oh, yes. Yes. I guess, in my mind, they are one in the same. The distinction I am trying to make is between operator actions that many licensees have had on the books probably for the life of the plan.

CHAIR SIEBER: Well, okay.

MR. GORMAN: And that we have been going back and forth since about 2000, 2001, as to which ones are okay and which ones aren't okay. I think we have now determined that certain ones are okay, and we are saying that the ones that are okay were based on the criteria in Appendix E and should be acceptable based on that criteria.

MEMBER RAY: Can you come up with a different phrase than, if you're going to make a submittal? Because I agree with Jack that doesn't seem like an appropriate qualification. Some other way of saying where you would apply the NUREG.

CHAIR SIEBER: Well, to expand that a

little bit, if you have an exemption, you have an exemption, and the exemption stays. If something new comes up, why would you not look at 1852 to decide whether you need an exemption or not?

MR. GORMAN: Right.

MR. HUTCHINS: So the expectation would be that, if you already went through this methodology and it comes up determining that they need a new manual action on a required system, they would submit an exemption or a deviation, depending on the vintage of the plant, to ask the NRC for permission to use an operator manual action on a required system.

MR. GORMAN: Again, I think maybe an example helps here. For example, Dan's diagram with the tank and the flow-diversion valve, and we talked about that flow-diversion valve opening, draining the tank in 45 minutes.

A real-life example for a BWR would be an opening of a pumpdown system for the suppression pool. For Susquehanna, that is about a 6-inch line. It used go to the condenser. Now it goes to liquid radwaste.

When it went to the condenser, if you put a vacuum on it, you got some additional assist in pulling water out of the tank. If you postulated

spurious opening of a number of valves and a spurious start of the pump, you would end up draining the suppression pool to the point where you start to encroach upon the vortex limits, MPSH requirements for some of the pumps in about 11 hours.

So our evaluation of that was we would tell our operators, if that were to happen, that within 11 hours they needed to get somebody out there to do something about it.

So, for an operator action like that, I wouldn't believe that I would need to do a real detailed study about its feasibility, its reliability. It is something that is certainly going to be well beyond the postulated event that we would be looking at for fire containment.

MEMBER STETKAR: Yes, but suppose, Tom, on a Pressurized Water Reactor you had an RWST or a spurious opening of couple of containment sump valves to drain the RWST into the containment sump in 45 minutes.

MR. GORMAN: That's the 45-minute example, right. So that would have to be treated differently.

MEMBER STETKAR: Well, but I didn't read that anywhere in your guidance, that it would be treated differently, because your guidance just says

any valve that can drain down a tank is important to safety, not required for safe shutdown.

MR. GORMAN: Right, but in our mind, classifying something as important to safety as opposed to required for safe shutdown doesn't relieve us of any responsibility to make sure that we can safely shut down the plant. It is kind of a legal distinction that says, for these, an operator action may be feasible; for these, an operator action is not feasible.

And if you can't accomplish it, you can't accomplish it. You've got to provide the protection.

CHAIR SIEBER: The fact is that you have to do something about it, regardless of which of the two categories it fits in --

MR. GORMAN: Right.

CHAIR SIEBER: -- unless it makes no difference at all. If you can't do it within an hour, then that puts it in the required list of things to be protected, as opposed to those for which you allow operator action.

MR. GORMAN: Right. If it can cause an impact to your ability to safely shut down within one hour, then on the required path, then you have to keep --

MEMBER RAY: Yes, but the important thing, what he just said was on the required, on the safe shutdown path -- he called it the required path -- if it is part of the safe shutdown path. It doesn't automatically become required just because of the one-hour rule if it is located elsewhere than the safe shutdown path.

CHAIR SIEBER: Yes.

MEMBER RAY: But to get back, I think where we started this dialogue had to do with, can you describe when you would use the NUREG to define the operator action assumptions, I guess? You used the phrase, if you had to submit it to the NRC, then you would refer to the NUREG. And I said, can you define that in any other way? And you then said a number of things, and I lost the trail.

Basically, I think what you are saying is, if you make a change. You know, you talked about things that I was interpreting to be a change in the fire protection plan.

MR. GORMAN: It could be a change, and as a result of the application of this new criteria, there would be new issues that are identified.

MEMBER RAY: Well, okay.

MR. GORMAN: So those would be considered

on a change --

MEMBER RAY: Maybe I am putting you on the spot too much. I am trying to find something other than the phrase, if you submit it to the NRC, then look at the NUREG to define the acceptable operator action assumption.

CHAIR SIEBER: I have the same problem.

MEMBER RAY: And I am trying to get you to say it in another way, and maybe that is not fair.

The predicate is what is the problem. You only apply the NUREG if you are going to make a submittal to the NRC. Otherwise, you can assume whatever you want about the time available.

MR. GORMAN: Well, the NUREG really doesn't give you available times.

MEMBER RAY: Okay, I thought that was what you were talking about, was the difference, the disagreement --

MR. FRUMKIN: This is Dan Frumkin.

I think the distinction is something Steve Hutchins made. If it is one of the equipment that is required for safe shutdown, then a submittal is required, and therefore, they would use the NUREG. If it is important to safe shutdown, then I will let -- is that what you guys mean by if you're going to make

a submittal?

MR. HUTCHINS: Exactly.

MR. GORMAN: Right.

MR. FRUMKIN: Okay.

MR. GORMAN: If it is required for safe shutdown --

MR. FRUMKIN: You guys were just struggling there. I thought I would step in.

MR. GORMAN: If it is required for safe shutdown and you would like to propose something to the NRC where you justify the use of an operator manual action, then you had better be looking at 1852 because that is going to be the basis for how they are going to review your submittal.

CHAIR SIEBER: Yes.

MR. GORMAN: Does that help?

MEMBER RAY: I guess, yes. It is less than what I thought you were trying to say. I mean, to just say, well, you'd better look at it because that's the way they're going to review your submittal, yes, that is wise counsel, I guess. It doesn't sound like an industry position on this particular operator action.

CHAIR SIEBER: No. No, it doesn't. On the other hand, I'm not sure where else they could

go --

MEMBER RAY: Yes.

CHAIR SIEBER: -- other than to fail in their submittal.

MEMBER RAY: Okay, I'll throw in the towel.

CHAIR SIEBER: Okay. Why don't we go on?

MR. GORMAN: Okay. So we do believe we have made some reference in NUREG-1852. We also believe we have included the criteria that documents how many of the existing operator manual actions have been reviewed and how they have been inspected for periods of time.

We also believe that Appendix E provides additional criteria beyond what is in 1852 relative to what is an acceptable, what is an operator manual action that requires a submittal to the NRC, and which ones are acceptable within the bounds of the criteria that we have developed in this document.

We would still like to see Appendix E endorsed. If there are some exceptions that need to be taken, we would like to at least have that endorsement.

MEMBER STETKAR: Tom?

MR. GORMAN: Yes?

MEMBER STETKAR: I think we are doing okay on time. Just stop me if you don't think we are going to make it.

If I read Appendix E, one of the things that I hung up on, and Dan mentioned it in his presentation, is that Appendix E endorses the use of NUREG-1852 to evaluate the feasibility of operator actions. There are two or three paragraphs in Appendix E that spend quite a bit of effort to define what is time T_0 because 1852 requires a feasibility assessment based on the start of a timeline.

MR. GORMAN: Right.

MEMBER STETKAR: And when you define time T=0 can affect whether or not you determine whether there is sufficient time for operators to perform the required actions.

It is my interpretation, if I read Appendix E, that your time T_0 begins 10 minutes after the control room operators recognize that there is a fire, is that correct?

MR. GORMAN: Recognizes that there is a fire and takes actions to scram the reactor and close the MSIBs, do things to put the reactor in a safe condition.

MEMBER STETKAR: That could be some

substantial amount of time after the fire actually started, is that correct?

MR. GORMAN: It's possible.

CHAIR SIEBER: Yes, and not determined.

MEMBER STETKAR: That's right. It is 10 minutes after the operators recognize there is a fire and actually do something, and they do something, and then 10 minutes after that becomes T_0 for any subsequent operator actions, is that the way it is applied?

MR. GORMAN: It becomes T_0 as a starting point for figuring out timing, which could get you into thermal hydraulic analysis. They are going to require some kind of an analytical estimation of the state of the reactor at the point in time when you start your analysis. You can't do those kinds of analyses without boundary conditions on it.

So it is an analytical assumption, and it is --

MEMBER STETKAR: Well, the 10 minutes is an arbitrary assumption --

MR. GORMAN: Arbitrary, right.

MEMBER STETKAR: -- based on some presumed operator cognition and response.

MR. GORMAN: Right.

MEMBER RAY: Now this is the same 10 minutes that Dan was talking about?

MEMBER STETKAR: That I believe is the same 10. Dan, is that the same 10 minutes that you were talking about that the staff is basically concerned about?

MR. FRUMKIN: Yes.

MEMBER STETKAR: Okay. Thanks.

MR. GORMAN: Yes, and that is not a 10-minute timeframe to perform operator manual actions. It is kind of the starting point of your thermal hydraulic analysis. It is the starting point of your study of timing for performing operator manual actions, and it is --

CHAIR SIEBER: Yes, and as time clicks, before you start the counting of the 10 minutes and the one hour, the plant is deteriorating. So you may not reach the time for operator action. So, in my view, that is sort of conservative.

Would you conclude the same thing?

MR. GORMAN: Ten minutes?

CHAIR SIEBER: No, the fact, where the starting point is, that it is delayed from the start of the incident. It doesn't really start until the operator figures out what is going on, and then waits

10 minutes while his mind says, I'd better go out and do these things.

MR. GORMAN: Yes, and the time zero, I think we were originally asked to provide a definition for time zero in 1998. This is the best shot I have seen in 11 years.

CHAIR SIEBER: It has shreds of being arbitrary in there. On the other hand, it appears that there was some reasoning that went into the selection.

MR. GORMAN: There was some reasoning, yes.

CHAIR SIEBER: Yes. It is not totally conservative, but --

MR. GORMAN: But you can't pick a time zero that everybody in this room would feel is --

CHAIR SIEBER: That's right.

MR. GORMAN: -- 100 percent justified. It is an assumption.

CHAIR SIEBER: Yes. It would be different for different crews, too.

MR. GORMAN: Right. Now if you got into detailed fire modeling of every aspect of everything in the plant, and then you could pick a time zero for each scenario, depending on which equipment was

available and which equipment was not available, but for the deterministic rules, we don't apply design basis fires like that. We assume damage. To come up with starting points for operator manual actions, starting points for thermal hydraulics, you basically have to pick something.

CHAIR SIEBER: That's right.

MR. GORMAN: This was our pick.

MEMBER RAY: John, when Dan made the presentation, he referred to it as, there will be 10-minute criteria. I didn't understand at the time what we were talking about.

You maybe have a succinct way of saying what the heck this 10 minutes is. Could you speak what it is we are talking about here?

MEMBER STETKAR: I guess I would rather hear NEI answer that because I'm only reading --

MEMBER RAY: That's fine.

MEMBER STETKAR: -- an interpretation --

MEMBER RAY: I am trying to get something that is short and crisp. We had better try. What is the 10 minutes from the standpoint of the way we look at --

MR. GORMAN: The 10 minutes is a timeframe that defines the boundary conditions on your thermal

hydraulic analysis, which would be used to determine the amount of time that you had available to take an action prior to an impact of post-fire safe shutdown.

So, when your thermal hydraulics individuals come to you and they want to know what are the boundary conditions on the analysis, you would say the reactor scram, the MSIVs are closed --

MEMBER RAY: Okay. That's way too long. I have lost the thread. I don't know what the 10 minutes is still.

Is it an assumed --

MR. GORMAN: It's an assumed number.

MEMBER RAY: But I didn't say what yet.

MR. GORMAN: Okay.

MEMBER RAY: Is it an assumed period in which you can take credit for -- well, I don't know. Never mind. I can't say what it is.

MR. HUTCHINS: Probably the easiest way to think about it is a fire starts. It starts to grow. An alarm goes off. The control room recognizes there is a fire. There's 10 minutes where that control room operator has to diagnose the issue, and so forth. At the end of that 10 minutes is where the time zero would start for any perceived -- you know, the operator telling the local operator to go out and do a

manual action, to go somewhere.

MEMBER RAY: Okay. So you don't have to assume the interval from the start of the fire until the initiation of operator action is more than 10 minutes? You don't have to assume it's 15 minutes, for example? Is that right?

CHAIR SIEBER: Well, the starting of the fire, from a time standpoint, is not directly related to an effect on the plant. It is the effect on the plant that the operator sees. That's where the 10 minutes starts, and it is thinking time. I've got to do this. I've got to do that.

MR. GORMAN: So if you have a procedural action that says, within one hour, within two hours, within three hours, go perform this action, that's your starting point.

CHAIR SIEBER: Right.

MEMBER RAY: Okay. This isn't working. I agree we still have time, I think. So let's keep trying.

He said it was from the start of the fire until the operator had to start taking --

MR. HUTCHINS: No, no. No, I said that's time T minus zero. So these things are happening --

MEMBER RAY: What is the 10 minutes?

MR. HUTCHINS: The 10 minutes is from where the operator has recognized there is a fire, has recognized there needs to be action, and then will initiate an action.

MEMBER RAY: So it is the time during which the fire has been recognized, but during which no operator action needs to be assumed --

MR. HUTCHINS: Correct.

MEMBER RAY: -- in the analysis? Operator action then begins after the 10 minutes. Okay.

Where in this interval is this so-called time zero? The beginning or the end?

MR. HUTCHINS: At the end of that time, yes.

MEMBER RAY: Time zero then begins at the end of the time. So we have the fire at some indeterminate point in time. Its recognition begins the 10 minutes. Ten minutes later, time zero starts?

MR. HUTCHINS: That is when the operator can tell another operator to go do something, right.

MEMBER BLEY: And that time zero is the beginning of the time under which you are assuming the operator will be carrying out those actions?

MR. HUTCHINS: That's when he starts on his path, right.

MEMBER BLEY: You think he starts right then?

MEMBER RAY: There's fire, detection. Ten minutes later, action starts.

CHAIR SIEBER: Right.

MEMBER RAY: When the action starts, that's time zero?

CHAIR SIEBER: That's right. We only have one hour, and if the analysis would show that one hour is too short, then that changes the category.

MEMBER RAY: Well, no, it doesn't change it unless it's on the success path, Jack.

MR. HUTCHINS: It would change our level of protection. Then we would protect it as if it was a III.G.2 system.

CHAIR SIEBER: That's right.

MEMBER RAY: Even if it is not on the success path?

CHAIR SIEBER: Exactly. That's helpful.

MEMBER RAY: Agreed. But, anyway, I've got this timeline now straight. I'm not going to deviate from it, though.

CHAIR SIEBER: Yes, if you can't do it within an hour, it's like you can't do it.

MR. HUTCHINS: The example would be the

10-inch drain valve. If it could drain down the CST in 45 minutes, and we couldn't do a manual action and we couldn't do fire modeling, we would protect it as III.G.2, even though it was an important to safe shutdown system.

CHAIR SIEBER: As if it were safety-related.

MR. HUTCHINS: Exactly.

MEMBER RAY: But you do have the choice of fire modeling or other things. In other words, you don't automatically have to protect it as III.G.2.

MR. HUTCHINS: Right, but if we couldn't do an action, if we couldn't do modeling, we would protect.

MEMBER RAY: All right. I think I have time zero and the 10 minutes straightened out finally.

CHAIR SIEBER: Okay. Thank you very much. It is clearer now.

MEMBER STETKAR: Can I ask one last question before we get to the 20-minute duration of the hot shorts?

CHAIR SIEBER: You have less than 10 minutes.

(Laughter.)

MEMBER STETKAR: I hope this will be a

yes-or-no answer.

CHAIR SIEBER: Okay.

MEMBER STETKAR: In Appendix G, there are lists of -- I think Appendix G, by the way, is really good. There are lists of various multiple spurious -- I have to be careful -- whatever you guys called it.

MR. GORMAN: Equipment combinations I called it.

MEMBER STETKAR: Yes, multiple spurious operations -- I call them multiple spurious operations. They are different. SMOs.

For the Boiling Water Reactor, it seems to say that I do not need to consider multiple spurious operations that can prevent scram. Is that correct? Because there has been some justification that the operators can scram the plant quickly enough.

MR. GORMAN: The operators have direction in their emergency operating procedures, if they do not scram when they intend to scram, to take immediate action to save the plant.

MEMBER STETKAR: So that means that, if I am doing an assessment of SMOs, I don't need to worry about any fire-induced effects that can prevent a reactor scram for a BWR, is that right?

MR. GORMAN: That's what we are saying,

yes.

MEMBER STETKAR: For a PWR, it seems to say that I need to consider those, though. Is that correct? It is Item No. 39 in your list, if you are looking at it.

MR. GORMAN: We have written a specific position paper for the BWRs. I don't believe that there is a comparable evaluation that has been completed for the P's.

MEMBER STETKAR: Okay. We'll keep going then.

MR. GORMAN: Okay. So, to summarize the operator manual action item, we recognize the staff's position on the use of 1852, as some of the comments here suggested, or broader use of that document might be recommended for the industry, too. But, regardless of all those, we think there's a lot of other good information and necessary information in Appendix G that's not in 1852. We would like to see that appendix endorsed and, if necessary, endorsed with some exceptions.

The 20-minute duration for hot shorts.

CHAIR SIEBER: Yes, on the other hand, if they adopt your position, that is not crucial from a safety-related standpoint? It is just the methodology

differs in the Reg Guide than it does from Appendix E, is that correct? You are going to end up at the same endpoint and the same safety determination --

MR. GORMAN: I think yes. I would think so.

CHAIR SIEBER: -- regardless of which path you take?

MR. GORMAN: I think so, yes.

CHAIR SIEBER: Yes, I do, too. Yes.

So you like your path; they like their path, which is really where we're at, right?

MR. GORMAN: We did all the other stuff to ask them.

CHAIR SIEBER: Okay.

MR. GORMAN: The 20-minute duration for hot shorts. As NRC expressed, their concern is blessing off on a 20-minute duration for hot shorts.

What we currently assume in the analysis is a hot short lasts until somebody takes an action to mitigate its effect. So, if you have a hot short, and even if you don't need that system for six hours, if you want to use it after six hours, you need to build something into your procedures that has an operator go and open a breaker or do something to eliminate that hot short, so that it allows you to do something with

that equipment.

With respect to the testing that has been done through NEI/EPRI and CAROLFIRE testing, we believe that the 20-minute duration is a good number, and it is a good number with wide margin to what we actually saw in the testing.

We would like to see that number endorsed. We recognize that we do have the DC testing program going on right now, and that may give us different results. I believe we already say in our document that the DC testing results need to be reflected into this hot short duration. But we would like to see that endorsed, endorsed with an exception.

Ideally -- and again, we make this recommendation without necessarily understanding all the political ramifications or the regulatory ramifications -- but, to us, it would be good to understand the results of the DC testing and to reflect them into both our document and to the Reg Guide prior to getting people started on this reanalysis effort that we are about to embark on as soon as the Reg Guide goes out.

CHAIR SIEBER: Yes, but until the testing is done and the report is issued and accepted, the staff's position is conservative, right?

MR. GORMAN: Right. Right.

CHAIR SIEBER: Okay.

MR. GORMAN: The third item is the non-concurrent hot shorts and separate non-seal-in/non-latching cables. Again, we have asked for this as a criteria to be applied to the classification of components that are important to safe shutdown. We do not apply them to the ones that are required for safe shutdown.

The circuit failure criteria that we have included in our document says, if you are required for safe shutdown, you have to make sure any cable that can affect your ability to perform your function, of the equipment to perform its function, is properly protected, properly analyzed, properly addressed.

We saw in both the NEI/EPRI, and the CAROLFIRE testing that -- and I am talking specifically here about the intermediate scale testing. I think there was 15 or 16 test configurations in each one of those tests.

The basic configuration was a seven-conductor cable surrounded by three single-conductor cables.

CHAIR SIEBER: Right.

MR. GORMAN: Some of the single-conductor

cables were energized. Conductors within the seven-conductor cable were energized. That configuration was subjected to fires of various heat-release rates.

What we saw in all of that testing, with one exception, is that even though you had a cable bundle in the same cable tray sitting next to another cable in the same, that you didn't have a concurrent set of hot shorts happening in those adjacent cables.

CHAIR SIEBER: Yes.

MR. GORMAN: We understand that it has a limited scope of cable testing. It was done for a specific heat-release rate. But I also believe that the heat-release rates were kind of selected in order to be representative of the types of fires we might see in the plants. Harry may or may not agree with that.

CHAIR SIEBER: My memory of those tests was you didn't have intercable shorts that you could have, particularly in the seven-conductor cable, intracable shorts.

MR. GORMAN: Right, right. So our criteria says, if you have a multi-conductor cable, you need to analyze for whatever set of combinations can happen within that cable. Our criteria, we are debating with the staff still, is that if you have a

separate cable that --

CHAIR SIEBER: You can't cross --

MR. GORMAN: -- is not part of that cable -- not that they won't cross. It is just that if this cable, when it becomes energized due to a hot short, if it closes a contact that energizes a relay, that then aligns up a separate circuit and allows for additional hot shorts to affect the performance of that circuit; we are saying we don't believe that that's a necessary assumption to look at.

The reason why we are saying that is we believe that we need to have a limit on the number of issues that we deal with.

Just as an example, we went through --

CHAIR SIEBER: Do you have test data that proves that?

MR. GORMAN: Just the test data that is done. In reviewing that test data, what that test data showed to me was that you do get hot shorts --

CHAIR SIEBER: Yes.

MR. GORMAN: -- but you need to have, depending on your type of cable, you need to have temperatures in the 400- to 500-, 700-degree range, and you need to have cable damage. If you get cable damage from those temperatures in that range, then

there is a good chance you are going to get a hot short.

There is also information in that testing that suggests that we can get cables to certain temperatures and have no cable damage and have no hot shorts.

CHAIR SIEBER: But those tests, as I recall them, were significantly dependent on the cable type.

MR. GORMAN: They were, yes.

CHAIR SIEBER: So your criteria does not take into account the cable type, right?

MR. GORMAN: No, it does. We looked at all cable types across all the testing.

CHAIR SIEBER: So it applies to all cable types?

MR. GORMAN: All cable types, yes.

CHAIR SIEBER: So the difference, then, is the speed at which it occurred? The thermo-setting was the better cable --

MR. GORMAN: Right.

CHAIR SIEBER: -- as opposed to thermal-plastic.

MR. GORMAN: Thermal-setting was better in terms of --

CHAIR SIEBER: So the time to the short was maybe double --

MR. GORMAN: Right.

CHAIR SIEBER: -- for a thermal-setting versus thermal-plastic?

MR. GORMAN: Right.

CHAIR SIEBER: Okay. Let me think about that.

MR. GORMAN: We really propose this as what we believe to be a reasonable limit, based on testing results; that when you couple the criteria that we believe we have included in our document with the other aspects of defense in-depth, you have safe plant design.

We look at the components of the defense in-depth aspects of fire protection design as all needing to be present. You need to make sure you don't have fires, and as the first one, you need to be able to rapidly detect them and extinguish them, if you have them. The other one is you have to have the path available to safely shut down, in the event that you do have a fire.

We also look at that triangle and we say no aspect of it is going to be perfect. In my view, looking at not allowing this type of a criteria starts

to drive us toward perfection in the area of circuit analysis, and in then the attempt to drive us to perfection, I think it will introduce a large amount of chaos into the analysis.

We have looked at our automatic initiation circuits are really one of the primary areas of concern. If you look at the automatic depressurization system, spurious ADS on one division, on one unit, you can come up with close to 400 different combinations of fire-induced circuit failure combinations that could cause that event to happen.

MEMBER RAY: Well, chaos is a strong word. I'm sure the staff doesn't want to have chaos, either. They must have a different view.

CHAIR SIEBER: Yes. I think the agenda asks the staff to address that. But I have your same thought. I would ask the staff, you have heard and understood this comment? Okay, and when it is your turn, you can tell us your response to it. Okay, thank you.

MR. GORMAN: So, again, we would like to see an endorsement of our position. We think, to some extent, the completion of the DC testing may shed some additional light on our position on this issue also. As an alternative to endorsing the position, we are

looking at, as an alternative, maybe waiting for the completion of the DC testing, understanding the DC testing results, factoring those into our document and the Reg Guide prior to starting off on the reanalysis efforts.

CHAIR SIEBER: And the testing will be done in the end of this year? Okay.

MEMBER STETKAR: Are you looking at cable-to-cable effects in DC also?

MR. FRUMKIN: Yes.

MR. GORMAN: The DC testing is an ungrounded DC -- is that --

MR. FRUMKIN: Yes, it is ungrounded, right.

CHAIR SIEBER: Well, that is the more difficult one because you lose an element of protection that would occur through ground pulse.

MR. GORMAN: Right.

CHAIR SIEBER: Yes. Okay.

MR. GORMAN: So, in our conclusions, we went back and we have looked at the Commission direction. I guess we would give our combined rate to our efforts and the staff's effort on this one of maybe a 90 percent, which is a good A-, but in this industry, with rising expectations and striving for

excellence, you know, we are kind of hoping for an A+ because this is an area where, when people start into this reanalysis, it is going to be a very expensive endeavor. It is going to be more expensive, depending on the pedigree of your current analysis.

So people could spend lots and lots of money on these analyses. I know personally I have done Susquehanna's analysis twice for various reasons. The first time it cost us about $40 million, and the next time we spent about $30 million between the analysis and the repercussions of the analysis in terms of plant changes that needed to take place. So we know it is expensive.

We would like to have, as others would, a clear criteria on what it is that we are being asked to do before we kind of embark upon it again. We have these items that I think are things that need to be close, we need to come to some agreement on, but also items that, as I said in the beginning, we have been talking about openly for two or three years, on some level for 15 years, and subversively for on the order of 30 years.

So we are very, very close to coming to a conclusion on this. If I have a vote, I would like to vote for finishing up and putting the criteria

together, make sure we all understand and agree with it, and then we move on from there.

CHAIR SIEBER: Now my understanding, though, is that your fire analysis that you have today is valid, including the exemptions that are associated with it, except to the extent that enforcement discretion has been granted with regard to items like associated circuits.

So you aren't going to start off doing a whole reanalysis of your plant. You are going to do an analysis of associated circuits and some other things where enforcement discretion has been granted for some time, and that analysis involves generally the things that you are talking about.

MR. GORMAN: Right.

CHAIR SIEBER: And the question is, to what extent do you rely on your methodology, which would basically interpret, admittedly, unfinished test data to provide some shortcuts to the analysis as opposed to the staff's methods? And you believe that those shortcuts are warranted?

MR. GORMAN: I don't know if I would refer to them as shortcuts, but, yes, the items that we are looking at, I call the criteria myself.

CHAIR SIEBER: Yes, right.

MR. GORMAN: And reanalysis needs to have a criteria on it that can be understood and be implemented. These items I think are important aspects of that, particularly as we embark upon dumping a whole bunch of new items into that analysis that is already a very, very complicated analysis.

CHAIR SIEBER: Well, I don't know how the other members think, and we will find out in a little bit, but nothing seems to jump out at me like there is a violation of our basic concepts of safety --

MR. GORMAN: No, no.

CHAIR SIEBER: -- regardless of which way we go, except one is more conservative than the other, it appears.

Okay. At this point, I would ask the members if they have any additional questions they would like to ask our representatives from the Nuclear Energy Institute, based on their comments.

MEMBER BLEY: None from me, Jack.

CHAIR SIEBER: Okay. Bill? None?

MEMBER ABDEL-KHALIK: I have a question to both the industry and the staff. Are there any lessons learned from the recent fire at the Columbia station that would pertain to this Reg Guide?

MR. WEERAKKODY: No, we don't see anything

new coming out of that fire that has to be factored into this.

MEMBER ABDEL-KHALIK: How do you know that?

MR. WEERAKKODY: Well, in the first place, it was a fire that did not affect any of the safety-related plants. What we are looking for here is any new insights of, can a fire cause multiple concurrent hot shorts? To the extent we have looked at that, we didn't have anything coming out of that fire.

MEMBER ABDEL-KHALIK: Okay.

CHAIR SIEBER: Harold?

MEMBER RAY: No, I didn't have anything more for NEI. Thank you, Jack.

CHAIR SIEBER: Okay. Thank you very much, gentlemen.

Next on the agenda is the staff's response and summary.

MR. WEERAKKODY: Yes, I would just like to make one statement, and then I will turn it over to Dan --

CHAIR SIEBER: Okay.

MR. WEERAKKODY: -- to basically substantiate that.

The staff believes that, even though

there's a handful of issues that we have not come to full agreement with the industry, that we have enough of an understanding to issue the Reg Guide and proceed, and get the licensees to comply with the expectations and to say they are using the methods.

With that --

MEMBER RAY: Well, wait. Having said that, though, that sounds like a direct disagreement with the idea that at least one aspect of this would create chaos in the analysis. So, surely, you have a different -- I guess you want Dan to address this specifically, but you must be disagreeing with the view that chaos would result.

MR. FRUMKIN: This is Dan Frumkin.

MR. WEERAKKODY: We do the same thing.

MR. FRUMKIN: Yes. What we have here is, I guess, a typical regulatory conundrum. On one hand, we have -- and these are just different factors that I am just going to pull together and show you some of the ranges that we deal with.

On one hand, in our AC circuit testing that we have done, we have had, I think, the longest AC circuit is under 11 minutes, but most of them were in under the 30-second range. So we, as the staff, can make a deterministic determination, if I can say

that, that 20 minutes is reasonable. It provides reasonable assurance that AC circuits will clear within 20 minutes. We are comfortable giving that to the licensee as a justification.

On the far end of it, we have very little testing for circuits or for DC circuits. Some of the testing that is available by the licensee and some of our current testing that is ongoing says that 20 minutes is not a reasonable value because of the length that DC circuits have stay locked in. So the staff is not comfortable saying 20 minutes is a good assumption.

Now if the industry came in with an hour, I'm not sure that we could do anything with that, either, based on the current level. But this is the bounding. When we have a lot of good, reasonable information, we can call that supportive of a deterministic analysis. When we have contrary information, we say, licensees, you need to do more work.

Now the chaos, the slide I put up as the non-concurrent hot shorts and separate non-seal-in/non-latching cables, we have 120 tests and we had one failure, one concurrent failure. This, in my opinion, falls in between those. It's one in 100.

Okay?

It is certainly not as rare as never from our AC testing, and it is certainly more often than never and more reasonable than the 20 minutes.

So what I see is this is a perfect -- I guess, to carry on what Tom was saying, in some cases where you have a large possibility of a fire and a large consequences, 1 in 100 may not be acceptable. But in some cases where you have a low likelihood of a fire and low likelihood of consequence, 1 in 100 may be enough to say that that is acceptable.

MEMBER RAY: Well, chaos is inevitable because it's necessary, but what is being proposed here is wait until the testing is done, implying that there will be some change in expectation as a result of the testing yet to be completed.

I would interpret your comment just now to be, no, we know enough already; it's not going to change between now and the end of the year. So we can go ahead.

Is that a fair characterization?

MR. FRUMKIN: On this issue, because of this concurrence, even if we have another 100 tests and it's 1 out of 200, I'm not sure that the staff will be comfortable saying, deterministically, we can

assume this doesn't happen.

MEMBER RAY: Okay, fair enough. But I just want to be clear that the remaining testing you don't think would change the bottom-line conclusion that you would draw from the testing already done in this regard?

MR. FRUMKIN: Yes.

MEMBER RAY: So the consequences may be whatever they need to be, but they're necessary to move ahead. That is basically what I am trying --

MR. FRUMKIN: And part of this testing that is occurring, it is kind of a validation of some industry testing that is not publicly available.

In the future, though, if industry or the NRC feels it is necessary to focus in on these issues much more closely and with much more specificity, and we are talking a testing program takes two to three years to start, and so forth, then we may be able to gather more insights on this. But a lot of this testing is to validate some existing testing that is out there that's not publicly available.

So I don't really foresee that this is going to --

MEMBER RAY: You wouldn't change it from chaos to no chaos as a result?

MR. FRUMKIN: Yes.

MEMBER RAY: If there's going to be chaos, there's going to be chaos.

MR. FRUMKIN: And this is extremely area-dependent. It could vary dependent on cable fill in trays. It could depend on, well, maybe three conductor cables have it, but 20 conductor cables don't. One in 120, it may be, if you reproduced that one, it might happen every single time. But if you reproduced that 119, it may never happen. But we don't have that information right now.

CHAIR SIEBER: Well, and that is a matter of chance also.

MR. FRUMKIN: Yes.

CHAIR SIEBER: Harold, I think your question is one of the key questions that we need to know the answer to. I would say that, in a general scheme of things, a 1 percent chance that an event will happen is pretty small. On the other hand, if you look at root causes of CDF, fire is pretty significant. In that regard, maybe 1 percent should be paid attention to.

MR. FRUMKIN: Right, and that is exactly the point. We don't feel, even if we move forward with this approach, as the staff is recommending, I

think it's overstatement to say that there would be chaos because we have risk-informed tools where this number could be applied in the context of the entire area, in the context of the consequences. Although the licensees would likely have to submit that to the NRC, and it would be hard, unfortunately, the testing does not support the dismissal of this issue.

MEMBER RAY: Well, it may be. That may be the chaos that they are referring to, what you just said.

In any event, it is clear, and Jack summarized it well. So I'm satisfied we understand the two sides.

CHAIR SIEBER: Okay.

MEMBER RAY: At least I think I do.

CHAIR SIEBER: Yes, understanding is a step toward resolution.

MEMBER RAY: Yes, right.

CHAIR SIEBER: The very first step.

Okay. You're going to go through all the open items, right?

MR. FRUMKIN: No. Actually, I think I talked about this one. Well, with regard to the 20-minute duration for DC circuits, the evidence isn't in for supporting that, I believe. DC circuits is coming

out of this testing, but the preliminary information is it doesn't support the 20 minutes.

The NRC staff is planning on endorsing the 20-minute duration for hot shorts of AC circuits. So I think that, in a technical way, we agree with the industry.

There was a possibility that we wouldn't have any long-term DC faults, but the preliminary results show that that is not the case.

CHAIR SIEBER: Okay, and the reason for that? Because it is not obvious that there is a reason, but it is the difference, the typical difference in protection system settings?

MR. FRUMKIN: I've heard the difference in protection system. I have heard Harry tell me that, since AC passes through zero, that there is electrical phenomenon which causes these things to clear that doesn't occur in DC.

CHAIR SIEBER: I have to think about that one.

MR. FRUMKIN: And the way that they are grounded. I am not an electrical -- and I think that they are going to need a lot of time. I believe there is perhaps an expert panel planned after this testing, which even once the testing is done, an expert panel

is another 9 to 18 months of people getting together and having conversations, and coming up with a report that is reviewed for public comment. It is a very long process.

But, as we learned from the original NEI testing and the expert panel, new information doesn't really come out of the expert panel. They just provide more confidence of the information.

On this point, the testing isn't supporting less than 20 minutes --

CHAIR SIEBER: Okay. So this one, in your mind, is pretty clear-cut?

MR. FRUMKIN: Yes.

CHAIR SIEBER: Okay.

MR. FRUMKIN: The last NEI open item, as I said, there is some valuable information in their Appendix E, but it is just not to the point where the NRC is prepared to endorse it.

That being said, there are many examples of NEI documents that the NRC doesn't endorse and the licensees use effectively as guidance documents. NEI 02-03, which is a guide for doing 86-10 fire protection deterministic evaluations, the NRC has never endorsed that, but it has been useful. It provides consistency in the licensees, and so forth.

At some point, maybe this could get endorsed, but at this point we are not -- to give ourselves a grade, I think in a lot of areas we are probably 95, give ourselves a 95 out of 100. I think the amount of scrutiny and the work that we have done on particularly Appendix E, we might have gotten a C. Now I'm really mixing my metaphors.

But I recognize that this needs more work. I believe the staff's position is sufficiently safe and sufficiently clear to move forward.

MEMBER RAY: Can you indulge me? You heard my effort to try to make it simple enough for even me to understand the 10-minute issue, which you referred to as the 10-minute criteria, and everybody gets used to buzzwords.

Do you agree with the construct that we came up with, which was the fire starts, some indeterminate time later it is detected? Then there is a 10-minute period during which no operator action is assumed to occur. Then time zero occurs, and operator action occurs after that. Do you draw it the same way?

MR. FRUMKIN: I think I learned a lot during this conversation about how that 10-minute criteria is developed. So I really --

MEMBER RAY: Okay. Well, let's just assume that for right now you don't want to endorse it.

MR. FRUMKIN: I think that the key factors, in my judgment, are not this 10-minute criteria, but it is, what is the fire damage; what is the consequences, and then how long does it take to respond effectively?

MEMBER RAY: Okay, but you referred to the 10 minutes. I still want to explore it a little bit.

MR. FRUMKIN: I don't believe that my explanation of the 10 minutes is consistent with NEI's explanation of the 10 minutes.

MEMBER RAY: All right, that's fine. Thank you. So there's two versions of the 10 minutes.

But, for your understanding of it or the way you would describe it anyway, is it better, more conservative to make the 10 minutes shorter or longer? I am having a hard time even figuring that out. In other words, would it be better to make the 10 minutes longer from the standpoint of being conservative in the analysis or better to make it shorter?

MR. FRUMKIN: Right. My vision of this is it's a race of the fire damage causes some sort of transient, which is going to challenge safe shutdown.

That racer, it just starts. We don't know exactly where it starts.

The earliest it can start is at the beginning of the fire. That is conservatively the beginning of its track.

The operators, the soonest they can begin is when they identify the fire. So there's a potential -- there's a possibility that the damage and the consequence could occur and be unrecoverable before the operators even know there is a fire. We think that is very rare.

MEMBER RAY: Right. Maybe 10 minutes longer would be more conservative is the bottom line, from your standpoint, because it would add to the time before mitigation began?

MR. FRUMKIN: Right, but the real time zero, and I think Steve Hutchins called it negative zero, is the beginning of the fire.

MEMBER RAY: But John asked about what defined time zero, because that is important to the people who actually are engaged in this chaos we're creating, apparently. So we will have to deliberate on that.

John, did you have any more on that?

MEMBER STETKAR: No.

MEMBER RAY: Because I am trying to fit the time zero in with the 10 minutes that we are talking about here.

CHAIR SIEBER: Well, the important thing is, you know, you are talking about the time required for operators to do things. Until they figure out they've got to do something, you can't start the clock.

On the other hand, the system may fail beforehand, and then you have to protect it beyond the operator actions. So, to me, that is conservative.

MEMBER STETKAR: Well, you have to be careful because NUREG-1852 defines two times. It is the amount of time available for the operator to do something before things become bad, if I can characterize it that way.

MEMBER BLEY: Which is highly uncertain.

MEMBER STETKAR: Which is highly uncertain, and that time starts at some zero point that must be defined.

Then there is the amount of time that is required or necessary for the operators to implement what they need to do. In other words, if I need to walk with my bad hip from here to the Capitol Building, it is going to take me a certain amount of

time to do that. If I need to do that within 15 minutes, I can't do that.

And that time also begins at the same zero point. So it is important to clearly define that zero point for both of those analyses, the analysis that determines the amount of time available, and then your analysis that says, given these conditions, how much time is required for the operators to decide what they need to do and then go do it?

MEMBER RAY: But in this case, those two periods don't start at the same point in time --

MEMBER STETKAR: Yes.

MEMBER RAY: -- because there is a lag. I guess maybe I am dwelling on this because I think, ultimately, when we get done, it may be important that we clearly understand it.

I didn't bring up the 10 minutes. It was brought up here. I am just trying to understand what the heck it is --

MEMBER STETKAR: Yes.

MEMBER RAY: -- and what is causing the analysts, who I used to manage, to assume. Do we all understand it the same way? I still don't understand it. I mean I understand what NEI said it was. I don't know what it means particularly, but I

understand at least what they said. I'm not sure what we were commenting on here.

MEMBER BLEY: The real thing going on is that we have a highly indeterminate situation, and people have tried to come up with kind of crude criteria that give us some confidence that they can do what we say they can do within the time before things break.

If you look at the whole basis of how you would do this very precisely, even that you can't do because in any case it is different.

MEMBER RAY: Well, yes, we have always been faced with that dilemma, Dennis, but can you tell me what the heck the disagreement fundamentally is between the two sides on Appendix E? The only thing I have here is this 10-minute criteria. That was what was given as the reason why -- there are other reasons, doubtless, but at least that was specified. And I'm just trying to understand what it is.

If anybody knows, please tell me. I don't know what it is. I don't know what the 10 minutes is.

CHAIR SIEBER: Well, somebody can say I'm wrong, but I think I know. It is the time between the onset of alarms, plant actions, what have you, that alert the operator to the fact that he's got a fire,

until he figures out, he assesses what is going on in the plant and decides manual actions are necessary.

MEMBER RAY: Okay. Let me buy that because that is exactly what NEI said it was. Now they also defined time zero as at the end of the 10 minutes. I hear John saying it is going to be different.

CHAIR SIEBER: That's right. That's right.

MEMBER RAY: But, to me, if we are disagreeing over that 10-minute period, I am trying to understand why. Is that not enough time for people, from the detection of an alarm to initiating action? Is that why we disagree with it? That is what I am trying to understand, Jack.

CHAIR SIEBER: Yes. Well, my thought is that it does take a minute --

MEMBER RAY: I agree.

CHAIR SIEBER: -- perhaps 10 minutes, for an operating crew to look at a bunch of alarms, including the fire alarm --

MEMBER RAY: Yes.

CHAIR SIEBER: -- and handle some immediate things, and decide he has to take a manual action.

MEMBER RAY: But my first reaction --

CHAIR SIEBER: I think it is conservative.

MEMBER RAY: -- is 10 minutes is enough time. That would be my reaction.

CHAIR SIEBER: Yes.

MEMBER RAY: For that interval. So I am believing these guys --

CHAIR SIEBER: Right.

MEMBER RAY: -- apply the 10 minutes to something else. Because, you know, if you need more than 10 minutes from the time the alarm comes in to initiate action, I am wanting to know, well, why does it take more than 10 minutes for that? I would be very upset if that was what we were having --

MEMBER SHACK: If you read Appendix E, it says time zero is 10 minutes after confirmation. Time zero is the time at which fire damage to safe shutdown occurs, needs to be defined.

MEMBER RAY: What does that mean to you, Bill?

MEMBER SHACK: That means that I assume that, after I have confirmation, I am saying that the damage occurs to the components. At that point, I start doing my analysis of how much time I have to do a recovery action.

MEMBER RAY: Okay. So 10 minutes may be too much.

MEMBER SHACK: It may be too much.

MEMBER RAY: Yes. Yes, in that sense -- Jack, hold on.

CHAIR SIEBER: Yes.

MEMBER RAY: In that sense, 10 minutes could be too much, not not enough, because the damage could have occurred at five minutes or one minute or some other time.

So that's why I ask the question, is 10 minutes more conservative when it is short or more conservative -- I mean, is the interval more conservative when it is shorter than 10 minutes or more conservative when it is longer than 10 minutes?

By what you just read, Bill, I would say, well, it is more conservative if it is less than 10 minutes; whereas, if it is --

MEMBER BLEY: Conservative from the viewpoint of what the fire is going to do.

MEMBER RAY: Yes.

MEMBER BLEY: It is not conservative from the viewpoint of, can the people do it within that time. The one thing you are forgetting, I believe -- I could be wrong, Harold -- is these manual actions

aren't the first order of business when the plant trips. The first order of business --

MEMBER RAY: No, no, I haven't forgotten it.

MEMBER BLEY: The first order of business is carrying out the emergency operating procedures. If you look at some of the fires where they have to play the fire procedures against the emergency operating procedures, you can't turn the one loose to do the other. So the emergency operating procedures are moving on, and they have to break somebody off to run the other part of it. Suddenly, a lot of time can go by, and you can see cases where that has happened.

There's no this is more conservative than that. This whole discussion of conservatism, as I know --

MEMBER RAY: All right, I will take conservative out of the discussion, and I haven't forgotten that. But I just said, if it was more than 10 minutes, I wanted to know why. If the staff's view was we need 15 or 20 minutes, I just wanted to know why. That's all.

But what Bill read, to me, is something different, which is you've got 10 minutes after the detection before you have to assume damage that has

failed the shutdown equipment.

MEMBER BLEY: By definition, in the appendix. That's not quite related to reality.

MEMBER RAY: But, Dennis, my point is that's a completely different understanding of the 10 minutes. I was only trying to understand what the 10 minutes was for.

MEMBER SHACK: We are not trying to say good, bad, or just what.

MEMBER RAY: That's right. Jack was using the word "conservative", and I was trying to say, well, it's not clear to me which way is conservative.

CHAIR SIEBER: Well, it depends on which way you take it. For example, here starts the incident. Alarms come in some time later. Operators figure it out, take care of necessary business, and send somebody out. That defines a length of time that is greater than an hour.

In the meantime, the plant's deteriorating through that period. If it gets to the point where operator manual actions in that one-hour-plus time that is allowed is not effective, then you have to consider it as safety-related as opposed to important to safety, and apply greater protection to the --

MEMBER RAY: I believe, if you endorsed

Appendix E, I think what it would mean is you don't have to assume failure of components due to fire until 10 minutes after the alarm comes in. I think that's what it means. And that's a big deal.

CHAIR SIEBER: That is different than what I --

MEMBER RAY: You're darned right it is.

CHAIR SIEBER: Yes.

MEMBER RAY: I'm just trying to understand it; that's all.

MR. FRUMKIN: Well, that was my understanding --

MEMBER RAY: Okay.

MR. FRUMKIN: -- until NEI --

MEMBER RAY: Yes, but NEI gave a different definition here a few minutes ago.

MEMBER SHACK: Well, it is all on page E-3.

MR. SHACK: What is written, it is written in the appendix.

MEMBER RAY: Yes, I think you're right, what we have just now, with Bill's help, understood what the 10 minutes really means.

MEMBER SHACK: Well, we understand what E-3 says.

(Laughter.)

MEMBER RAY: Yes, well, but that's where it comes from. That was the starting point for my question.

MR. FRUMKIN: And NUREG-1852 has a very nice appendix that spells out how these timelines can be done, and done effectively. In fact, some of our licensee exemptions for manual actions go through and they draw all these timelines very nicely. It is very clear what they are trying to get at.

So I think that we have the information out there. Licensees understand how to do it. We are doing some reviews. We are going to learn a little bit from those reviews.

But the staff position is we know what we are doing with these manual actions.

MEMBER RAY: To be fair to NEI, it may have been that that's what they meant when they said time zero was at the end of the 10 minutes --

CHAIR SIEBER: Yes.

MEMBER RAY: -- and I just didn't understand it correctly.

CHAIR SIEBER: Okay, any other questions to the staff?

MEMBER STETKAR: I have a question. It is

not particularly to the staff, Jack, but it is to NEI.

CHAIR SIEBER: Okay.

MEMBER STETKAR: As long as the staff is up here, and you can say, no, you don't want to answer it, and that's fine.

CHAIR SIEBER: They can do that.

MEMBER STETKAR: Of these three open items that we have been discussing here, does NEI have a priority list in terms of which of those three -- I know you want all three of them fully endorsed in the Reg Guide, but is there one that is particularly more beneficial or higher priority for you compared to the other two?

MR. GORMAN: Tom Gorman, NEI and PPL.

Yes, I would say that our third open item would be our priority 1. Our first open item would be priority 2, and our second open item would be priority 3. So that means the non-latching cables, I would say one. Endorsement of Appendix E would be No. 2. Then the duration of the hot shorts would be three.

I think on the duration of the hot short, I think we will eventually get to a number as a result of the DC testing. We just picked 20 minutes because that was the information that was available and the expert panels and everything for the AC testing.

MEMBER STETKAR: But, I mean, all things being equal in terms of where you feel the Reg Guide would reduce the amount of, you used the word "chaos", so I'll use chaos, in your analyses, they appear prioritized in order?

MR. GORMAN: Yes.

MEMBER STETKAR: Okay. Thanks. That helps.

CHAIR SIEBER: Is there not a chaos theory?

(Laughter.)

MEMBER STETKAR: There is, but it is chaotic.

(Laughter.)

MEMBER SHACK: On item three, do you see any difference between grounded circuits and ungrounded circuits?

MR. FRUMKIN: The original CAROLFIRE testing indicated that AC ungrounded circuits would perform the same as AC grounded circuits.

MEMBER SHACK: Right.

MR. FRUMKIN: With regard to DC circuits, either whether they are grounded or ungrounded, I think that is being tested.

MR. BARRETT: This is Harry Barrett.

The only difference that grounded and ungrounded makes is with armored cable. If you have a grounded circuit with armored cable, you are more than likely not going to have a spurious actuation because it is very likely that it is going to ground to the armor.

Ungrounded circuits or grounded circuits, it is still the same electrical physics that goes on. So, as far as the hot short --

MEMBER SHACK: So, if you were going to make an exception, you would make the exception only for the grounded armored cable?

MR. BARRETT: Yes, that would be the only exception.

CHAIR SIEBER: Which is pretty rarely used, right?

MEMBER SHACK: And your resolution to this is we just have to go back to an exemption based on a risk-based analysis?

MR. BARRETT: It depends on the utility. Duke uses it extensively. All of their plants have armored cable, but other utilities don't use it as much.

CHAIR SIEBER: Yes, I don't recall using it. Okay.

MEMBER SHACK: Would you be willing to revise 1.189 to cover grounded armored cables?

MR. FRUMKIN: We could do that. I guess the issue with the grounded cable is that I believe it is more the public availability of the testing. It hasn't been released, and it would be hard to defend that without having that information out.

But the staff has that testing. The industry has that testing. So, I mean, we would be on a level playing field if we had that discussion for the Duke plants, which are all going to NFPA 805.

(Laughter.)

So it becomes a fairly moot point, I think.

CHAIR SIEBER: Any additional questions from members?

(No response.)

Okay. Thank you very much.

What I would like to do now in the few minutes that we have remaining is that we will have a session at the full Committee meeting because the full Committee voted to hear this subject. An outcome of the full Committee could be an ACRS letter, and I will need your help in preparing the first draft.

So what I would like to do is go around

the table and have you provide what your comments are, No. 1, and secondly, if you have a proposed conclusion or recommendation that should be in that letter, tell me what it is.

Dennis, I will start with you.

MEMBER BLEY: I am not ready to say I have a conclusion yet, but I think this goes a pretty good way at giving a reasonable solution to a very difficult and indeterminate problem. I want to think a little bit more about it before I say something more definitive.

CHAIR SIEBER: Okay. Anything else? Bill?

MEMBER SHACK: I am going with Dennis. I like that. They made a lot of progress. Whether I'm ready to say that now is the time to start the clock ticking, which is what you were really talking about --

MEMBER BLEY: That's right.

MEMBER SHACK: I am actually impressed by the amount of progress that has been made. But whether we have to start the clock ticking now or there is some possibility, I think that is the same that needs to be addressed a little bit, is whether -- you know, Dan is making the case that the testing is

not going to change regulatory positions.

If upon reflection at the full Committee he is ready to really stand by that statement, then I think I would be willing to go ahead with it. But I would like them at least to think about that position a little harder, whether they really think it is very unlikely that the testing will change the regulatory positions.

CHAIR SIEBER: Okay. John?

MEMBER STETKAR: I think I will echo Dennis and Bill. It has been pretty obvious that I have some concerns regarding the implicit or explicit time criteria for manual actions, but I don't want to raise that as a particular concern at the moment in terms of endorsing or not endorsing the Reg Guide because I really need to think a little bit more about what I have heard today and how that might be applied in practice. So that is all I have to say, I think.

CHAIR SIEBER: Okay. Said?

MEMBER ABDEL-KHALIK: I agree with my colleagues.

CHAIR SIEBER: Okay. Harold?

MEMBER RAY: Likewise, I hate to be so opaque, but at the end of the day we are setting groundrules for people to do analyses, and that means

that assumptions have to be deemed reasonable and specified.

The exchange we had, for example, on the subject of -- John referred to it as operator actions. I talked about it as the 10-minute business. But what the implication of that is, to me, is indefensible on the one hand, but on the other hand, you have to make some assumption, and is that a reasonable assumption to make? Perhaps it is.

I need some more time to reflect on that.

MEMBER SHACK: There is a justification for the 10 minutes on E-4.

MEMBER RAY: Okay. I mean I realize you can't leave it. You can't have no guidance. So, as I sit here and think about it, I wish we could -- this isn't the time to attempt to do it, but I wish we could say, well, what should be assumed?

MEMBER SHACK: Well, I mean, they do have 1852, which I think is less arbitrary. It asks you to look at a situation by situation and an expert kind of panel thing. I think that's the real decision: can you make blanket rules or do you really have to look at these almost case by case?

MEMBER RAY: The question at hand, though, is, how long after the fire starts should you assume

this damage condition is created? That I don't believe we have talked about at all. I don't have any clue what a reasonable assumption is because somewhere in there you have the detection point occur.

We are really talking about how long after detection before damage. Well, God, I don't know because I don't know what basis to assume from the start of the fire to detection.

CHAIR SIEBER: Well, the difficulty is you have detection and suppression in your fire alarm system.

MEMBER RAY: Yes, I know.

CHAIR SIEBER: That would be a clue, but another clue is when the first fault occurs, and the plant responds to that.

MEMBER RAY: I guess what I am trying to say is, Jack, I can reason through a conclusion that 10 minutes after detection before damage is not an unreasonable thing for purposes of analysis. I can reason that. But is it right? I don't know. That's why I hesitate right now to tell you what my conclusions would be on this.

CHAIR SIEBER: Just getting beyond that, you can't tell an operator to do something until something fails.

MEMBER BLEY: You've got to have an indication.

CHAIR SIEBER: The fire alarm system, the detection and suppression --

MEMBER RAY: That's key.

CHAIR SIEBER: -- part of it, all it does is say send a fire brigade.

MEMBER RAY: Yes, and that's why I can't, just off the top of my head, come to some conclusion about that. It is important. It is the No. 1 item maybe in importance.

So I'm sorry, but I just have to tell you I need to think about this some more.

CHAIR SIEBER: Okay. Now let me ask this question of you: are you concerned more about when the 10 minutes starts or the fact that it is 10 minutes and not 12 or 5, or both, or neither?

MEMBER RAY: Well, no, no, no. I am trying to be responsive. I would say I am probably concerned about the length of time assumed because maybe it should be zero. I honestly don't know.

Because I haven't had to do this for a long time, and when I did have to do it, I didn't have to do the multiple spurious actuation exercise. So I apologize, but I can't tell you what I would put in a

letter, if we were going to write it today, because I haven't thought about it enough.

CHAIR SIEBER: Okay. Well, I guess it is up to me to think about it then.

(Laughter.)

MEMBER BLEY: I'm sure we're all going to think about it, Jack.

CHAIR SIEBER: Everyone has my email address.

Well, I actually think we had a very productive meeting. I thank the staff, not only for today's presentation, but for 30 years of work leading up to it.

I also thank NEI. I think the work you did to assist the staff was valuable. I think your comments were valuable.

I also think the staff and its working with industry was productive in this area. We note that the testing, fire testing of cables, was not complete. We have to ponder whether it is complete enough to reach the conclusion that its completion will not change the outcome.

So, with that, I actually very much appreciate the staff's work and NEI's work, and their associated utilities, and also the members for asking

difficult, detailed questions, which helped me in understanding.

So, with that, we will conclude the meeting six minutes earlier.

Thank you very much.

(Whereupon, at 11:52 a.m., the above-entitled matter was adjourned.)

MEETING OF THE SUBCOMMITEE ON PLANT OPERATIONS AND FIRE PROTECTION

Reg Guide 1.189, Revision 2

DG-1214

Industry Comments

Tom Gorman, PPL

Agenda

- History
- Role of NEI 00-01 Rev 2
- Interface with Regulatory Guide 1.189 Revision 2
- Open Items
- Conclusions

History

- SECY-06-0196 – Issuance of GL 2006-XX, "Post-Fire Safe-Shutdown Circuits Analysis Spurious Actuations" was disapproved by the Commission because "Licensees should not be required to perform analysis for which no clear accepted regulatory guidance exists."

- When the Commission disapproved the GL, it also required the Industry and the NRC to "Develop or endorse guidelines that provide a clearly defined method for the operating plants to determine compliance."

- As requested, the Industry and the NRC Staff have been holding Public Meetings in an effort to establish an acceptable "resolution methodology" for determining compliance

Role of NEI 00-01, Rev 2

- Written to provide the Industry with clear guidance for performing a Post-Fire Safe Shutdown Circuit Analysis
- Establishes a uniform methodology, using a Generic Multiple Spurious Operations List and an Expert Panel Review Process.
- Draft provided to the Industry and the NRC Staff for review in December of 2008.
- NEI 00-01 Revision 2 issued for Industry use in May 2009.

Interface with Regulatory Guide 1.189, Rev 2

- Issued as DG-1214 in April 2009
- Comments provided by the Industry.
  - Recommended that the guidance incorporate references to the appropriate sections of NEI 00-01, Rev. 2 to provide a consistent and comprehensive approach and minimize ambiguity
  - Sections of DG-1214 were found to be in conflict with RIS 2005-30. NEI recommended that RIS 2005-30 be retracted.
- NRC Response to Industry Comments
  - Most comments have been accepted
  - A few Open Items remain

Open Items

1. NEI 00-01, Appendix E - Operator Manual Actions (OMAs):
   a) NRC prefers the approach for reliability spelled out in NUREG 1852 rather than Appendix E and is considering not endorsing Appendix E in the Reg Guide.
   b) NEI's position is:
      i. Appendix E does reference the use of NUREG 1852 for new OMAs requiring NRC acceptance
      ii. The criteria contained in Appendix E is consistent with the criteria historically applied to and accepted for existing OMAs and with the longstanding criteria contained in the NRC Inspection Module for evaluating the acceptability of OMAs used in support of Post-Fire Safe Shutdown.
      iii. Appendix E is needed because NUREG 1852 does not provide many of the required clarifications contained in Appendix E.
      iv. **NRC should endorse Appendix E in RG 1.189, Rev.2** and, if necessary, provide an exception for reliability.

Open items

2. 20 minute duration for hot shorts:
   a) NRC is concerned about endorsing a hot short duration of 20 minutes until the DC Circuit Cable Fire Testing is completed.
   b) NEI position:
      i. All cable fire testing completed to date has shown that the hot short duration is significantly less than 20 minutes. The 20 minute hot short duration provides a clear criteria with adequate margin to the tested values.
      ii. **RG 1.189, Rev 2 should endorse the position taken in NEI 00-01 Rev.2**, revised to state: "NRC agrees that a 20 minute duration for hot shorts on grounded circuits is acceptable. This duration for hot shorts will be revised, if necessary, based on the results of the ongoing ungrounded dc circuit testing."
      iii. **A**s an alternative, the issuance of RG 1.189 could be deferred until the dc circuit testing is completed and this open item is resolved.

Open Items

3. Non-concurrent hot shorts in separate non-seal-in/non-latching cables:
   a) NRC is concerned about endorsing this criteria claiming it is risk based.
   b) NEI position:
      i. This criteria does not apply to circuits for components required for hot shutdown.
      ii. In both the NEI/EPRI and CAROLFIRE Cable Testing concurrent hot shorts in separate cables in the same test occurred in only 1 out of 120 potential cases.
      iii. A limit needs to be established to avoid introducing chaos into the analysis. This limit, when coupled with the defense-in-depth Fire Protection Program, provides reasonable assurance of a safe plant design.
      iv. Completion of the dc circuit testing will provide additional insights related to this criteria.
      v. RG 1.189, Rev 2 should endorse the position taken in NEI 00-01 Rev.2, revised to state: "NRC agrees that this criterion for hot shorts on grounded circuits is acceptable. This criteria as it applies to ungrounded circuits will be revised, if necessary, based on the results of the ongoing ungrounded dc circuit testing."
      vi. As an alternate, the issuance of RG 1.189 could be deferred until the dc circuit testing is completed and this open item is resolved.

Conclusion

- The Commission direction provided in SECY-06-0196 has been satisfied, with limited exceptions.
  - A clearly defined method has been defined in NEI 00-01, Rev. 2
  - A clear regulatory acceptance exists when RG 1.189, Rev. 2, references NEI 00-01, Rev. 2
  - Completion and Evaluation of the ongoing dc circuit testing and resolution of the open items discussed earlier is required to fully satisfy the Commission direction.
- Plant Re-analysis should be deferred until the Commission direction is fully satisfied.
  - Once results of the DC Circuit Test have been evaluated and all open items are resolved, NEI 00-01 can be revised to incorporate final resolutions.
  - Eliminates need to re-perform this costly analysis.

Daniel Frumkin

Fire Protection Branch

Division of Risk Assessment

Office of Nuclear Reactor Regulation

DG-1214, Fire Protection for Nuclear Power Plants

ACRS Subcommittee

August 18, 2009

Topics

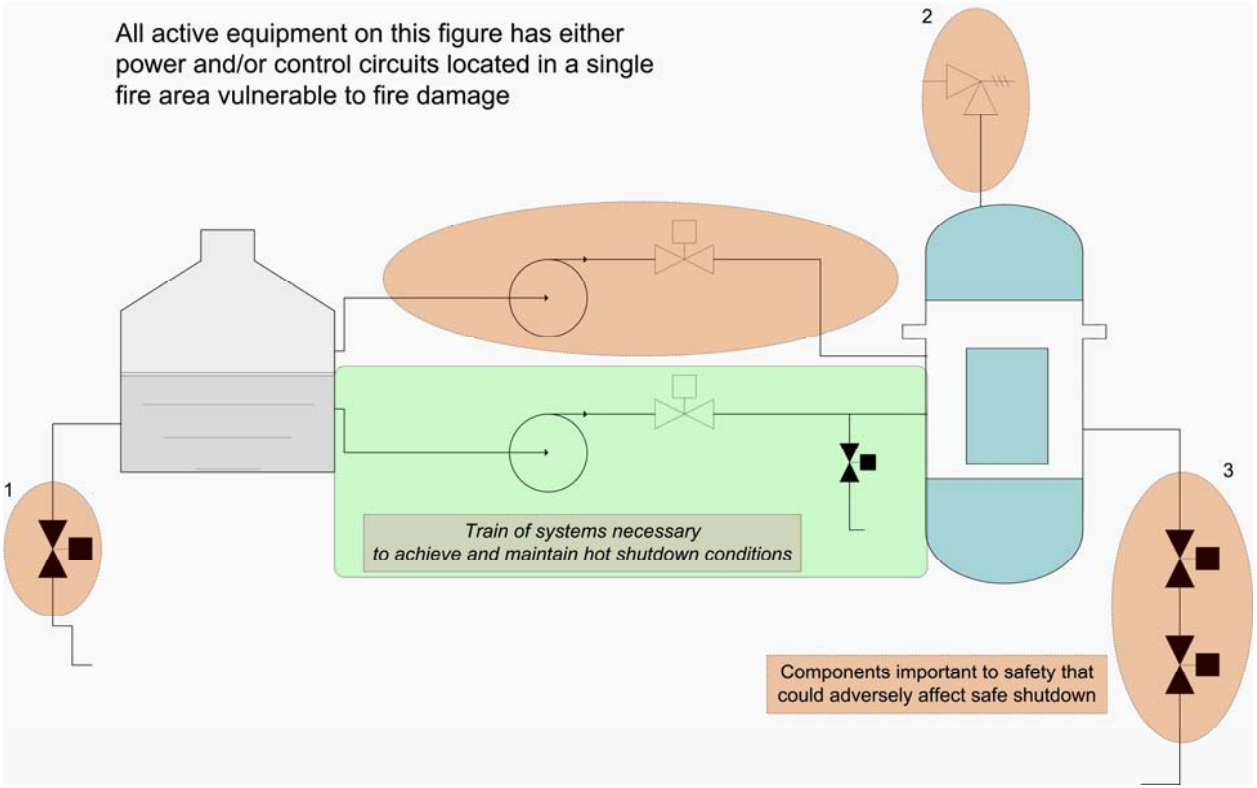
- Background
- Changes
- Public comments
- Public comments not incorporated
- Path forward

Background (1)

- Proposed resolution to multiple spurious actuations in SECY 06-0196, “Issuance of Generic Letter 2006-xx, “Post-Fire Safe-Shutdown Circuits Analysis Spurious Actuations”
- SRM/SECY 06-0196:
  - “The present draft of the proposed Generic Letter does not contain the necessary specificity for a licensee to understand what process will be sufficient to meet the analysis needs and information demands of the draft Generic Letter”
  - “The staff should examine licensee analysis methods in this area, including those using system or functional scenario development approaches, and using the normal public regulatory process to enable stakeholder engagement, develop or endorse guidelines that provide a clearly defined method of compliance for licensees who do not choose to utilize the risk-informed approach contained in 10 CFR 50.48(c).”

Background (2)

- SECY 08-0093, “Resolution of Issues Related to Fire-Induced Circuit Failures.”



Background (3)

- Two categories of equipment were identified in SECY 08-0093:
  - Safe Shutdown Success Path
    - Also “Green Box” or “Components Required for Hot Shutdown”
  - Components Important to Safe Shutdown
    - Also “Orange Box”
- Although both require protection – only Safe Shutdown Success Path Components require Appendix R, III.G.2 protection

Changes in Draft Guide (1)

- The NRC initiated changes relate to Regulatory Position C.5 of the Guide. These changes include discussions of:
  - Safe shutdown success path components and components important to safety
  - Use of manual actions and fire modeling for assessing components important to safe shutdown
  - Examples of the safe shutdown success path components and important to safe shutdown components

Public Comments

- Three industry stakeholders provided comments
- Many comments were editorial in nature and, in the view of the NRC staff, improved the document and therefore were incorporated
- Industry stakeholders commented that NEI 00-01, Revision 2 should be reference in the guide – this comment was consistent with Commission direction and was done except as explained below

Public Comments Not Incorporated (1)

- Appendix E of NEI 00-01 – Operator Manual Actions
  - Reasons for non-incorporation
    - Lack of incorporation of NRC staff comment on assumption that there will be 10 minute criteria
    - Lack of clear discussion on reliability of manual actions
  - Path Forward
    - NUREG-1852 provides information useful for evaluating post-fire operator manual actions
    - Additional information has been added to the guide regarding manual actions
    - Fire modeling may be used to demonstrate that a manual action is not necessary to mitigate spurious actuations of components important to safe shutdown

Public Comments Not Incorporated (2)

- NRC staff endorsement of 20 minute duration of direct current hot shorts from NEI 00-01, for components important to safe shutdown
  - Reason for non-incorporation
    - The state of testing does not support the 20 minute duration for direct current (DC) circuit faults
  - Path Forward
    - NRC plans to endorse 20 minute duration for alternating current (AC) circuits
    - Although current testing is not complete – preliminary results indicate that 20 minute hot short duration for DC circuits may still not be a valid assumption
    - Other options – manual actions, fire modeling are available to evaluate the components important to safe shutdown

Public Comments Not Incorporated (3)

- NRC staff endorsement of limitations on concurrent hot shorts from NEI 00-01, for components important to safe shutdown
  - Reason for non-incorporation
    - These limitations rely on risk-informed assumptions, therefore, this wouldn't be appropriate for DG-1214, which is not formally risk-informed
  - Path Forward
    - Risk options are available in R.G. 1.174, this would involve submittal of an exemption or license amendment
    - Other options such as manual actions and fire modeling are available

Public Comments Not Incorporated (4)

- Numerous other comments were considered and either accepted, accepted in part, or not accepted. Some themes that repeat in these other comments that were not incorporated are:
  - The guide does not supersede a plants approved fire protection program
  - Guidance is located elsewhere in the guide
  - There are means available to deviate from the guidance in the guide

Public Comments Not Incorporated (5)

- The NRC staff view is that there is sufficient guidance or alternatives available for licensees to complete fire induced circuit analyses
- A variety of analysis methods are available that would allow licensees to avoid modifications to resolve non-safety significant circuit analysis issues
- 10 CFR 50.48(c) – NFPA 805, is also an option for licensees
- NRC staff will continue to work with industry regarding refining the implementing guidance for the open issues, but this refinement is not necessary to fulfill the Commissions direction regarding a clearly defined method of compliance

Path Forward

- Issuance of the Final Regulatory Guide 1.189 is planned for the fourth quarter of 2009
- Issuance of R.G. 1.189, will start the “clock” on Enforcement Guidance Memorandum (EGM) 09-002:
  - Licensees will have six months to identify noncompliances
  - And an additional 30 months to resolve those noncompliances
- The NRC will revise its inspection manual to assure that licensees are appropriately implementing the clarification described in RG 1.189